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The Effects of Road Infrastructure Planning on Socio-Economic Opportunities Opportunities in Rural Areas, South Africa

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Abstract

This paper aims to assess the effects of road infrastructure planning on socioeconomic opportunities of ruras areas in South Africa. Road infrastructure planning is critical for South Africa's economy because most products, such as petrol, diesel, agricultural products, and mining products, are transported via roads to different localities. In most cases, roads, especially national and provincial, are planned and constructed through populated settlements especially rural areas. The lack of proper road infrastructure in these areas affects the socioeconomic opportunities of the population. Many roads are not constructed to accommodate pedestrians to safely walk and cross the roads; consequently, that leads to pedestrians crossing the roads at areas that are not supposed to, to the detriment. This affects the socio-economic status of the community. The paper employed a qualitative study. The paper used academic articles, legislative framework, and reports to derive the conclusion. The paper argues that the planning of road infrastructure without the consideration of the socio-economic ties of settlements threatens the safety and socio-economic development of the population. The paper found that national and provincial roads are constructed to provide easier transportation

of goods and services. The paper concludes that local municipalities should construct safety infrastructure to ensure the safety of people and enhance the socioeconomic ties in these areas.

Keywords: *Socio-economic opportunities; Road infrastructure; Planning; Safety*

Introduction

Integrated transport planning has become a key instrument towards fostering economic growth through the transportation of goods and services (Ng, Law, Jakarni, and Kulanthayan, 2019). According to the South African Local Government Association (SALGA) (2018), in Europe, planning was used to identify and assemble an appropriate land for the development of new settlements, parks, roads, and industrial development. This enabled many people in Europe to enjoy living in measurably better conditions (SALGA, 2018). This shows that planning is critical toward shaping settlements and subsequently transport planning in rural and urban areas. Effective and integrated transport planning should consider the safety of the communities where the road passes. This means that proper road infrastructure should be in place to address the safety of the communities. However, in many cases, the safety of people is overlooked during the construction of roads. This is further compounded by the social and economic ties that communities along these roads possess, which becomes integral within the context of transport planning. Efficient road infrastructure planning leads to accessibility to employment, markets, and investment opportunities (Ng *et al.*, 2019). This efficient road infrastructure planning mostly serves as a growth point for businesses and settlements (Ghosh, 2017). Road infrastructure plays an imperative role in changing the socio-economic opportunities of many people in urban and rural areas (Sengupta, Condoo & Rout, 2016). According to Ghosh (2017) and Ng, Law, Jakarni, and Kulanthayan (2019), road infrastructure is crucial for the transportation of goods, people, and services from their point of origin to their destination efficiently and economically. Therefore, the lack of proper road infrastructure planning leads to challenges such as undeveloped roads, unsafe roads, accidents, and traffic congestion along the roads (Mamabolo, 2016). Consequently, these challenges potentially affect transport planning and the safety of the communities.

The socio-economic development improves with the improvement of proper road infrastructure (Ng *et al.*, 2019). This is because people can access various services such as health facilities, shopping centres, and the

development of small businesses. It is important to note that there are some factors that depict socio-economic development, such as income, education, employment, community safety, and social support (Mofomme, 2019). Therefore, the investment in the construction of road infrastructure contributes to poverty reduction, agricultural productivity, and employment opportunities. In South Africa, some provincial roads pass through populated rural areas, which has the potential to influence people's socio-economic development (Mitchell, 2020). This influence is understood when people have access to employment, social support, schools, and the ability to safely cross the road. However, most of these roads are characterised by poor infrastructural conditions that do not allow pedestrians to cross safely. Mitchell (2020) states that the poor conditions and location of the provincial roads are a threat to the safety of humanity and the socio-economic development of rural communities. Roads in poor conditions become a problem at night and during unfavourable weather conditions (Mofomme, 2019). This has led to many people in these areas being hit by cars and losing their lives. Consequently, accidents and the loss of life affected the socio-economic factors such as community safety and income. Pedestrians' jaywalking, which connotes walking on the street without regard for approaching traffic, has been one of the major causes of road accidents coupled with speedy vehicles (Mofomme, 2019). However, during the construction of road infrastructure, there is little consideration about the socio-economic ties that bound communities together in settlements divided by a provincial or national road. The next section will be engaging the legislative framework guiding infrastructure development and improvement of the socio-economic opportunities of the community.

Legislative framework

The Constitution of the Republic of South Africa, 1996, as a supreme law stated in its preamble that it was adopted to improve the quality of life of all citizens and free the potential of every person. Section 152, subsections (1) (b) and (c), states that the objects of local government are to ensure the provision of service to communities in a sustainable manner and to promote social and economic development. This means that local municipalities are mandated by the constitution to ensure the socio-economic opportunities of the community. Section 7(1) of the Constitution (1996) states that this Bill of Rights is a cornerstone of

democracy in South Africa. It enshrines the rights of all people in our country and affirms the democratic values of human dignity, equality, and freedom. This affirms that all citizens have the right to freedom of movement, safety, education, and quality services, which is inclusive of proper road infrastructure. Section 4(a) of the Infrastructural Development Act, Act No 23 of 2013, states that the function of the council is to ensure the coordination of the development, implementation, monitoring, and maintenance of the national infrastructural plans. Furthermore, subsection (d) of the act ensures that infrastructure development regarding any strategic integrated project is given priority in planning, approval, and implementation. This means that strategic projects such as national roads, provincial roads passing through economic zones, mines, etc. must be given priority in the planning, approval, and implementation. Therefore, the lack of proper road infrastructure in these rural areas should be prioritised to safeguard the socioeconomic opportunities of the population. This is also reflected in the Local Government: Municipal Systems Act (32 of 2000) and Local Government: Municipal Structures Act (117 of 1998).

Road infrastructure planning in rural areas

Transport planning and development of road infrastructure directly influence the promotion of regional development (Tsiotas & Polyzos, 2024). According to Mamabolo (2016), road infrastructure planning can be understood as the designing, developing, and organising of transportation networks, which also includes roads and highways to make the movement of people and transportation of good and services more earlier. It can also be understood the minatenance of existing road networks such as paved roads, speed ramps, pedestrian crossing, and traffic circles while planning for the construction of new roads (Byaruhanga, Muzaale, & Jarbandhan, 2020). Therefore, road infrastructure is critical to economic growth and competitiveness in South Africa. Road infrastructure planning has been a major cause of concern in many countries, including South Africa. Considering South Africa's positive curve in road transport infrastructural development since the dawn of democracy, one is tempted to note with caution that South Africa has one of the best well-developed road infrastructure investments in Africa (Hlotywa & Ndaguba, 2017), especially in urban areas. According to Hilbers, Sijtsma, Busscher and Arts (2024), the planning of road infrastructure networks often does not focus on the

local landscape, but places its focus on the overarching national and regional scales due to the networked nature of infrastructure. This means that road infrastructure planning does not take into account the perception of local citizens and understanding the local context (Hilbers *et al.*, 2024). Consequently, the decision regarding road infrastructure does not possess the realities of the locals in rural areas. Road infrastructure planning serves as an input in the production process of various goods and services, leading to a better quality of life and a greater value for money (Hlotywa & Ndaguba, 2017). Road infrastructure links urban areas with rural areas, thereby facilitating the mobility of goods and people. Thus, the accessibility of proper road infrastructure in rural areas leads to people easily accessing basic services such as health care provision (e.g. ambulances) and crime prevention (e.g. police services). However, the physical features of the roads play a crucial role in defining the levels of mobility and safety for both urban and rural roads.

Transport planning and road infrastructure planning are implemented to meet the socio-economic needs of geographic areas and the economy effectively and efficiently (Bogale, 2016). According to Collinson and Patterson-Abrolat (2016), the quality of road infrastructure in South Africa plays a significant role in improving the socio-economic opportunities of the citizens. Providing road infrastructure and maintenance is regarded as a social responsibility of the South African government (Byaruhanga *et al.*, 2020; Hilbers *et al.*, 2024). Road maintenance is as important as road infrastructure planning. The quality of road infrastructure directly influences the citizen's safety, health, and opportunities for work, which are understood to be the socio-economic factors. Sodongi and Amrans' (2011) perspective of road infrastructure provision and transport planning includes indicators relating to the characteristics of the road system and network, such as the size of the road, traffic lights, speed ramps, value, and distribution of the network.

Local government as a sphere closest to the people ensure that all developmental plans are achieved through a participatory approach in which all citizens become part of the overall developmental agenda. According to Mitchell (2020), South Africa does not have a single entity that oversees the construction and maintenance of all roads. This has contributed to the varying quality of national roads, provincial roads, and municipal roads (Mitchell, 2020). The structural gap in road infrastructure constitutes a profoundly serious handicap to local

economic development and poverty reduction (Ametepey, 2019). It has been argued that transportation has a direct correlation with the level of poverty a community experiences. Hence, tackling socio-economic challenges along with improving road infrastructure and transportation should be at the forefront of the fight against poverty and improving development (Malinga, 2022). The Infrastructure Development Act, Act No. 23 of 2014, makes provision for the facilitation and coordination of public infrastructure development in South Africa. The act further emphasises that planning, implementation, approval, and maintenance of infrastructural development within rural areas should be fast-tracked. Hence, cooperation among all three spheres of government is significant to overcome service delivery challenges and the provision of safe road infrastructure.

The development and prioritisation of road networks, especially in rural areas, is crucial in the upliftment of these poor communities in developing countries (Ametepey, 2019). In South Africa, various national and provincial roads pass through population settlements. In South Africa, there are many places that are separated by national roads or provincial roads, such as Limpopo Province (e.g. Mankweng, Ga Mothiba-Nobody, Mookgopong, and Botlokwa), Gauteng Province (e.g. Hammanskraal, Mpumalanga) Province, and North West Province. According to Mitchell (2020), some provincial roads that run through rural areas have, over the past two decades, undergone significant deterioration in quality, while some have been improved to foster smooth transportation of goods and services. These roads, in most cases, do not have protective measures to manifest or enable the socio-economic ties of these areas while ensuring that the community is protected from accidents. Therefore, this puts the lives of pedestrians and motorists at risk on a daily basis. Thus, road infrastructure planning and maintenance should be done continuously to avoid deterioration that will lead to high rehabilitation costs (Hlotywa & Ndaguba, 2017). Therefore, Regular planned maintenance is crucial to ensure that roads are serviceable.

Unpacking the socio-economic ties of settlements in South Africa

South African communities come from a long and tragic history of political injustice driven by colonisation and the apartheid government over the years (Monama, Mokoele & Mokgotho, 2022; Mlambo, Mubecua & Mbatha, 2023). The spatial distribution of human

settlements in South Africa is still defined by past spatial inequalities and disparities. It has become essential for integrated human settlements to be introduced as a tool to redress the imbalances of the past and bring about significant socio-economic transformations (Mvuyana, 2019). According to Travassos, Coelho, and Arends-Kuenning (2020), the elderly and people living in rural areas are vulnerable to poverty, and they have demonstrated the inability to recover from shock. This means the elderly and rural population's difficulty to recover from income shock and poverty becomes a permanent feature (Travassos *et al.*, 2020). However, socio-economic development cannot be understood within the context of a household only, but within a community as a whole. This means the socio-economic ties of human settlements in rural areas of South Africa are complex and multi-faceted. It involves examining various factors that influence the well-being and development of communities. Human settlements are organised permanent or temporary inhabitation of humans on small or large areas of land, including all the requisite infrastructural facilities (Ngcobo & Mvuyana, 2022). Any design for human settlements aims to provide residential areas closer to employment with access to public transport networks, services, and the efficient use of infrastructure. This is very important toward the improvement of socio-economic opportunities of the population.

Housing, facilities, services, and infrastructure are the principal components of human settlements. These settlements must be economically, socially, physically, culturally, and environmentally interrelated (van der Walt, 2019). Many human settlements are characterised by disparities in living standards and reflect inadequate planning, which is what needs to be rectified with proper planning through an integrated human settlements approach (Mlambo *et al.*, 2023). Key aspects to consider when analysing the socio-economic opportunities of human settlements include social, environmental, income, education, community safety, social support, and economic aspects (Mlambo *et al.*, 2023). Rural areas that have a provincial road passing through often access education, social support, and other economic aspects on the other side of the roads. This means that there will be a continuous movement across the road to access these socio-economic opportunities. In most cases, people find themselves having to cross the road to access leisure time, entertainment, and social and economic needs. This type of arrangement goes beyond human needs but also the animals in these areas. Such an analysis or recognition does not find resonance in the municipal planning systems. Additionally, the

types of economic activities available in different settlements have the potential to influence employment opportunities and economic development (van der Walt, 2019). Planning for settlements aims to satisfy all the basic needs such as housing, employment, education, and employment coupled with the need for leisure, entertainment, and family ties within an integrated community environment (Mokoete, 2023). The improvement and satisfaction of these needs are the prerequisites when considering the notion of quality of life. The quality of life in human settlements is heavily influenced by the quality and availability of housing, infrastructure, services, and opportunities (van der Walt, 2019).

Analysing the socio-economic ties with road infrastructure planning

The analysis of socio-economic ties with road infrastructure planning is a complex and multifaceted task (Nyawo & Mashau, 2019). Road infrastructure plays a crucial role in enhancing accessibility to various regions. Roads are classified under economic infrastructure as they are seen as one of the key levers of economic growth as they deliver a higher economic rate of investment than any other form of infrastructure in South Africa (Fox & Porca, 2001). Improved accessibility can stimulate economic development by facilitating the movement of goods and people, attracting businesses, and creating job opportunities (Nyawo & Mashau, 2019).

Well-planned roads can support compact and sustainable development, reducing urban sprawl and its associated socio-economic challenges (Nyawo & Mashau, 2019). Ensuring that road networks serve all communities, including the marginalised ones, is essential for equitable access to economic opportunities, education, healthcare, and social services (Malinga, 2022). It was argued that the lack of structure that forces cars to lower their speed is to ensure easy movement of goods and services, which is important for local economic development. However, this reasoning does not consider the safety and well-being of citizens. Efficient road networks can reduce transportation expenses, making goods more affordable and improving the quality of life for residents (Verma & Ramanayya, 2014). The construction and maintenance of road infrastructure create job opportunities (Esson, Gough, Simon, Amankwaa, Ninot & Yankson, 2016). Unemployment is a pandemic that plagues many developing countries, and improvement is fundamental in improving access to markets and employment

opportunities (Nyawo & Mashau, 2019). Analysing the impacts of road infrastructure planning on employment is therefore important in understanding the socio-economic contributions, road safety, and accessibility, which can impact public health outcomes (Esson *et al.*, 2016). Proper planning can lead to safer roads, reduced accidents, and improved access to healthcare facilities (Bener, Abu-Zidan, Bensiali, Al-Mulla, and Jadaan, 2003). This is the reason road infrastructure decisions should be made with a long-term perspective, considering how they will impact the socio-economic factors over the years.

Socio-economic analysis should also consider the environmental impacts of road infrastructure (Malinga, 2022). This is because sustainable road planning can reduce pollution and protect natural resources, which can in turn have economic benefits and mitigate the negative effects of road infrastructure (Bener *et al.*, 2003). The socio-economic ties of a settlement should be a central consideration in road infrastructure planning to promote economic development, social inclusion, and the overall well-being of the community (Huchzermeyer, 2006). It has become a truism that road infrastructure is an enabler of socio-economic development (Malinga, 2022). The successful implementation of road infrastructure is thus of utmost importance. Such analysis is crucial for informed decision-making in road infrastructure planning, as it directly influences the well-being and prosperity of communities (Malinga, 2022). Road infrastructure development is the panacea for the alleviation of poverty. Improved quality of life and reduced poverty are the benefits derived from the different infrastructural sectors (Malinga, 2022). Road infrastructure is one of the main pillars in achieving socio-economic development, thus increasing prosperity (Ng *et al.*, 2019).

Lack of Road Infrastructure and Its Implications on Populated Settlements

The lack of road infrastructure hinders development that might assist communities (Nyawo & Mashau, 2019). Poverty and poor road infrastructure lead to communities not being able to readily access government services (Komackova & Poliak, 2016). However, inadequacy of road infrastructure is a frequent problem, especially in rural areas (Nyawo & Mashau, 2019). One of the major concerns of service delivery in South Africa has been about the lack of road provision. Poor road infrastructure is said to be a major cause of road

accidents, low economic output in populated areas, and a threat to the durability of transport modes such as taxis, buses, and private vehicles (Singh, 2012). The conditions of rural and provincial roads have been deteriorating and seem to be receiving less attention than what is really needed (Singh, 2012). The importance of road infrastructures cannot be underestimated as it serves to enhance the socioeconomic lives of communities, which again positively impacts other aspects of communities' growth and development.

Challenges that persist on the roads of populated areas are mostly caused by roads' poor conditions, such as potholes, gravel, unpaved sidewalks, and cracks. Even in cases where the road is in good condition, the lack of measures that reduce the speed of cars and improve visibility remains a major challenge in most areas (Mondschein & Taylor, 2017). In the areas separated by national or provincial roads, many people are in danger of being hit by cars. In an area called Nobody Ga Mothiba in the Polokwane Local Municipality in Limpopo Province, there have been many accidents where pedestrians are hit by speeding cars, resulting in the loss of life. According to Travassos *et al.* (2020), vulnerable populations find it very difficult to recover from this shock, thus potentially making poverty a permanent feature of the households. In cases where the breadwinners pass on after being hit by a car while crossing the road, the trauma and shock become difficult to recover from. Some roads are in such a poor state due to the heavy traffic that leads to congestion, and this in turn accelerates the deterioration of these roads (Mondschein & Taylor, 2017). Therefore, the congestion of cars in populated areas poses a serious risk to the well-being of the people, which disturbs the socio-economic tie that binds those areas together. These socioeconomic ties can be understood as people who have social relations and economic activities with people and others across the road. This means that people located on both sides of the national and provincial roads are obliged to cross these busy roads mostly on foot regularly. Many roads do not accommodate pedestrians to walk and cross the roads; consequently, that leads to pedestrians crossing the roads in areas that are not supposed to, to the detriment. These pedestrians who take the risk by crossing the roads at undesignated locations are most likely to be hit by vehicles travelling at high speed. This then results in road traffic accidents that have high serious fatalities. Road traffic injuries constitute a major public health burden in terms of mortality, morbidity, and disability (Santos, Behrendt, and Teytelboym, 2010; Onyemaechi & Ofoma, 2016).

Violating traffic signs have contributed to fatal road mishaps in South Africa (Onyemaechi & Ofoma, 2016). Furthermore, negligent acts such as overtaking, jaywalking, and excessive speeding are two contributing human factors that cause roads accidents (Onyemaechi & Ofoma, 2016). Most rural roads are poorly developed to the extent that they do not have proper road signages, traffic lights, and speed humps to maintain control and alleviate accidental crashes, especially at intersections (Santos et al., 2010; Uttley & Fotios, 2017; Montle & Moleke, 2021). These roads also do not have visible pedestrian crossings, which help with the flow of cars and pedestrians (Uttley & Fotios, 2017). In cases where there are marked pedestrian crossings, motorists do not comply with the demarcated road sign. The prevalence of road accidents in South Africa has raised scepticism about road travel in the country (Montle & Moleke 2021).

The socio-economic ties within road infrastructure planning

The connection between the socio-economic ties of a settlement is indeed crucial, but it is often overlooked and neglected (Malinga, 2022). The connections formed between these different scale settlements are referred to as infrastructure networks and can also be defined at a regional, provincial, and national level. Road networks determine how easily people can access essential services. Neglecting the road infrastructure in economically disadvantaged areas can perpetuate poverty through limited access to services (Faiz, 2012). Inadequate road infrastructure can lead to social exclusion, as people in remote and marginalised communities may struggle to connect with the rest of society (Faiz, 2012). This isolation contributes to social inequalities, which in turn hinders community development. The neglected connection of environmental factors in road planning in economically challenged areas can lead to environmental degradation and harm community's health. Well-planned road infrastructure can stimulate economic development by improving the transportation of goods. Road infrastructure can attract businesses to the areas, create job opportunities, and boost local economies (Nget *al.*, 2019). Therefore, it is important to ensure that road infrastructure planning is equitable and considers the specific needs of the socio-economically disadvantaged groups of the population.

The impact of road infrastructure planning on socio-economic development continues to be the subject of most debates, along with its exact role and influence (Desai & Peerbhay, 2016). The expansion and improvement of road infrastructures contribute to increased accessibility and mobility while reducing the distance to destinations, travel costs, and travel time. If road infrastructure is well planned and managed, it can positively transform the quality of life of citizens through the dynamic externalities that its development often generates (Faiz, 2012) and consequently increase the safety of the people. The impacts of road infrastructure planning can be seen in terms of the local impacts and the wider region's perspectives. Road infrastructure plays a key role in progress and socio-economic growth, which possesses direct and indirect effects. The direct effects of mobility for society and goods and indirect benefits are derived from planning and implementing road infrastructure (Ferrari, Bottasso, Conti, & Tei, 2018). Low-income communities may have limited access to well-planned road infrastructure, affecting their ability to access jobs, education, and essential services. However, this accessibility of social and economic activities comes at a cost in most populated areas separated by national and provincial roads. This may be because developed communities receive more attention for road infrastructure development, leaving poorer neighbourhoods with inadequate and poorly maintained roads (Porter, 2015). Better road connectivity can stimulate economic growth, but the disparities in planning may hinder opportunities for the less affluent areas (Nyawo & Mashau, 2019). It is argued that the relationship between infrastructure planning and socio-economic growth is not straightforward. Not many studies have been undertaken to assess the socio-economic impacts of road infrastructure planning. Scientific evidence and empirical studies have shown that investment in road infrastructure, especially in areas with underdeveloped roads, has provided an impressive return towards socio-economic development (Ng *et al.*, 2019). Lack of road infrastructure or poor road network systems are barriers to agriculture, industry, and trade, and may hinder socio-economic development (Nyawo & Mashau, 2019).

Conclusion

The purpose of the paper was to assess the effects of road infrastructure planning on the socio-economic opportunities or development conditions of people in rural areas. It is clear from the paper that the

adequacy of road infrastructure is important to ensure the improvement of social support, community safety, economic activities, income, and education, which are factors associated with the socio-economic opportunities of the people. The fact that the strategic projects, such as national and provincial roads, must be prioritised and ensure a smooth flow of goods and services needs to be relooked. This is because these roads continue to pose a serious threat to the livelihood and lives of many people. Therefore, this paper calls for a policy position that puts people's safety and socio-economic opportunities at the core of road infrastructure planning. Importantly, it was found that there are no policies or acts that postulate the safety of people live next to these highways. Therefore, the provincial government must develop policy that addresses the opportunities of the road passing populated settlements. National and provincial roads that pass through populated settlements should be fitted with safety features to safeguard the safety of the people. Well-designed roads with proper signage and safety features have shown characteristics of reducing accidents and saving the lives of the people who cross the roads every day. Construction of road infrastructure without consideration of the socio-economic ties that communities separated by national and provincial roads is a danger to the well-being and safety of ordinary people. Therefore, in these areas, there is a need to construct speed humps, walkway bridges, lower speed limits, and street lights to preserve the socio-economic relation of these communities while ensuring their safety. There is a need for the local government to invest in proper safety infrastructure such as speed humps, lights, pedestrian walkways and crossings, and overhead bridges, especially in rural areas. There should be consultation between communities and local government in the construction of roads and maintenance to foster safety measures for the roads. Furthermore, it is a common course that roads attract settlement development. Therefore, there should be a continuous analysis of the road infrastructure to assess if it continues to be safe and foster the socio-economic tie binding these settlements. The paper achieves its intended purpose assessing the effects of road infrastructure on the socio-economic opportunities in rural areas.

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