Pak. j. life soc. Sci. (2024), 22(2): 17970-17979 E-ISSN: 2221-7630;P-ISSN: 1727-4915

Pakistan Journal of Life and Social Sciences
www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2024-22.2.001312

RESEARCH ARTICLE

The Socio-Economic Effects of Delayed Rural Road Construction Projects: The Case of Malamulele

Gail Chauke Nyeleti[1*], Bulelwa Maphela[2]

[1,2] School of Economics, College of Business and Economics, University of Johannesburg. South Africa

ARTICLE INFO

Received: Sep 22, 2024

Accepted: Nov 15, 2024

Keywords

Infrastructure
Rural Areas
Road Construction
Local Economic Development (Led)
Socio-Economic Impact

***Corresponding Author:**

nyeletig@gmail.com

ABSTRACT

South African public roads are still characterized by dire potholes, faded road markings, and poor road sign maintenance. This study investigates the perceptions of community members on the delays of road construction projects. The study aimed at measuring the socio-economic impacts of a delayed road project using the road construction project of Collins Chabane Local Municipality implemented in Malamulele. Questionnaires were administered to 120 commuters who were regular users of the concerned road. To examine the data in the most effective way, descriptive statistics were combined with the different aspects that applied to the study. The degree of reliability was assessed using Cronbach's alpha. The study revealed that community members are affected by delays in the construction of road projects. The study also revealed that delay in road construction leads to higher transportation costs and longer travel times. This research recommends cutting-edge technologies to monitor the equipment, keep an eye on worker productivity, and monitor site activity to reduce construction delays, and lastly, municipalities should employ skilled personnel and avoid selecting the lowest-bidding contractors.

1. INTRODUCTION

South Africa has consistently prioritized infrastructure development, as evidenced through its fiscal decision-making (Deacon and Kajimo-Shakantu, 2024). However, infrastructure development still faces tremendous shortfalls in efficiency and untimely delivery. The Department of Local Government advised municipalities to increase infrastructure spending and concentrate on delivering dependable, high-quality services in order to support and accomplish the goals of the Local Economic Development Framework. Section 153(a) of the South African Constitution emphasizes that a municipality's development of its infrastructure to create an environment that is conducive to businesses and firms operating is one of the most important and key strategies it can employ. To create a conducive environment for local community dwellers, three key rural infrastructure projects (electrification, roads, and telecommunications) are to be in place; these infrastructures contribute towards reducing inequalities and poverty (Adanlawo and Chaka, 2024; Tariq and Gardezi, 2023).

Among the three types of infrastructure assets, roads are considered to have the greatest impact. One of the targets relevant to roads and transport in the United Nations' Sustainable Development Goals (SDGs) is to improve road safety by expanding public transportation and ensuring that everyone has access to affordable, safe, accessible, and sustainable transportation systems by the year 2030. Paying particular attention to the needs of those who are most at risk, such as children, women, people with disabilities, and the elderly (United Nations, 2015). The value of rural road infrastructure for rural communities is immeasurable since it improves their socioeconomic conditions in a number of ways. Rural communities can benefit economically and maintain a sustainable standard of living by improving the rural road networks.

Onu et al.'s (2023) survey regarding public infrastructure across various African regions explicitly expounded that most infrastructure construction projects on a global scale, have experienced some sort of a major delay. Magumbate and Kruger (2021) revealed that only 25% of those projects under construction globally are finished on schedule (Kim and Bilbao, 2023), and without going beyond what has been allocated for their implementation. This is the case for most road construction projects in South Africa (Ajiboye et al., 2024; Vahed et al., 2022; Shivambu and Thwala, 2019; Mashwama et al., 2018). The delays in construction projects put the public, businesses, and rural poor communities at disadvantage, thereby, hinder local economic development (LED) (Edison, 2020).

Quite a number of local and international studies have examined the impacts that delays have on construction project. However, delays in the construction of roads do not only have an impact on the construction industry, but also have a huge effect on the overall economic and social condition of communities. This study investigates the social and economic impacts of untimely infrastructure service delivery in communities, particularly in the context of public roads. The delayed municipal road development project at Malamulele Town in Collins Chabane Local Municipality in the Limpopo province is used as a case study to examine the socio-economic impact this project had on the residents. The introduction section introduces the study, the review section focuses on South Africa road network, the social benefits of road infrastructure for communities, the social benefits of road infrastructure for communities, and the impacts of delays on community. The research methodology follows, while the results and discussion section interpret and discusses results. The final section concludes the research and suggests future research area.

2. LITERATURE REVIEW

South Africa's road network

The South African National Roads Agency Limited (SANRAL) estimates that South Africa's total road network is 750 000 km long, making it the longest in Africa and the 10th longest in the world, with a network value of more than R2.1 trillion. Rural roads in South Africa are in an undesirable state, with the majority of them being earth and gravel roads, whereby rural road maintenance continues to be a difficulty (Sewell et al., 2019). The South African Institute of Civil Engineering says that provincial, metropolitan, and municipal gravel roads are in poor condition. This is attributed to neglect. Only 2% to 12% of South Africa's gravel roads, according to them, are in excellent to very good state depending on the province (Sewell et al., 2019). On the other hand, the poor to extremely poor condition of roads affects 40% to 90% of the population (Anciaes and do Nascimento, 2022).

The social benefits of road infrastructure for communities

The Department of Provincial and Local Government (DPLG) (2006) describes municipal infrastructure as the capital works necessary to supply services to the municipality, and it comprises all actions essential to guarantee that the works are delivered properly. Development of infrastructure can also be seen as providing essential infrastructure facilities like telecommunication systems, building of highways, bridges, and roads, water and sanitation supplies, schools, airports, electricity supply, and making sure transportation is available (Zhang and Cheng, 2023; Manggat et al., 2018).

Infrastructure development can have both social and economic impacts on communities (Nkomo and Adanlawo, 2024). Economic infrastructure directly contributes to processes that facilitate the production of output, and these include infrastructure services like electricity connection, road provision, transportation, and water provision (Sabir and Shamshir, 2020). While social infrastructure can be referred to as infrastructure that is linked to providing basic services to the population, such as water and sanitation, education, healthcare, welfare, and information (Owolabi et al., 2024; Pandey et al., 2022). Roads' infrastructure in South Africa's rural areas, according to Onu et al. (2023), is a crucial driver for long-term economic growth, greater social access, and poverty reduction. Akpan and Morimoto (2022) and Alobo Loison (2015) also add that access to roads is simply one element that contributes to alleviating poverty and is not essentially the most significant in several cases.

Adanlawo et al. (2021) and Cumming et al. (2017) stipulate that infrastructure development is necessary for developing countries that are eager to attain the main development objectives such as

industrialization and urbanization, as well as sustainable economic development. Kim and Bilbao (2023) point out that in a country like South Africa that is characterized by high levels of unemployment, the construction of infrastructure projects has been realized as one of the ways of creating employment opportunities in the long and short term. Guzman et al. (2021) aver that when transport services are provided, which include the maintenance and construction of infrastructure like roads, it creates income-earning opportunities for the poor. Chaka and Adanlawo (2023) add that road construction and improvement are labor-intensive processes that provide employment prospects as people and firms can efficiently conduct their day-to-day operations. Barbosa et al. (2017) and Gertler et al. (2014) conclude that when there are good roads, industrial firms may opt to manufacture in previously inaccessible places and thereby bring with them new opportunities that were not previously available.

Social costs of road construction

According to Gilchrist and Allouche (2005), the social costs of construction can be classified under four categories, which are pollution, traffic congestion, social/health/ecological, as well as disruption of economic activities. The costs are summarized in Table 1 below:

Table 1: Social costs of construction

Social Costs of Construction			
Traffic and congestion	**Economic Activities**	**Ecological/social/health**	**Pollution**
• Detours • Utility cuts • Prolonged closure of road space	• Loss of income • Property damage • Productivity reduction • Loss of tax revenues	• Damage to Recreational facilities • Surface/subsurface disruption	• Noise • Dust • Vibration • Air/Water pollution

Source: Gilchrist and Allouche (2005).

During the construction of a road and most especially when the project takes longer than anticipated to complete, the communities are negatively impacted as it brings discomfort for those living around the construction site. **Impacts of road construction delays on communities**

Chaka and Adanlawo (2022) and Ngcobo and Mahlambi (2019) point out that for the purposes of LED, the delays in construction projects are not favorable for the public, businesses, and poor communities. Delays in construction projects affect poor communities as they will not be receiving an income when no activities are happening on site, and this defeats the purpose of LED to eradicate poverty. Idrees and Shafiq (2021) highlight two important effects of delayed road projects on the public: time-wasting and fuel costing. Champagne and Dubé (2023) aver that access to road and transport infrastructure is one of the major factors that businesses consider when they want to locate their firm or expand their business. When construction projects are not completed or take longer than necessary, the consequences are substantial to the public. A study by Tola (2024) documents that road construction project delays have a negative impact on businesses and consumers. When the road is congested, it is not only consumers and motorists that get affected, but businesses as well, since it will no longer be desirable for consumers to go to those businesses located in congested areas. This in turn decreases the demand for their products and services.

More so, public services such as emergency response services are affected during road construction (He et al., 2023; Zhang et al., 2022). Emergency services vehicles such as fire, ambulances, and police are likely not to respond to emergencies within the desirable time due to more time spent navigating through the increased traffic congestion on the road. Delayed response times could degrade emergency response service, affecting people and property. Nwachukwu et al. (2017) state that the longer that construction project takes to be completed or delayed, the more the negative impacts on the public.

3. MATERIALS AND METHODS

This study adopts a quantitative approach. Chaka and Adanlawo (2024) point out that the use of the quantitative method emphasizes objective measurements and the statistical analysis of data collected through questionnaires and surveys using computational techniques. To get a perspective of the socio-economic impacts the delay on the project had on the community, a questionnaire approach was adopted. 120 survey questionnaires were distributed to commuters who were regular users of the concerned road. 95 responses were retrieved; 3 were ruled unfit due to missing information. 92 returned questionnaires were finally analyzed. This denotes a total of 76.67%. Descriptive statistics were used to make generalizations about the socio-economic impacts the delayed construction project had on the entire community. Specifically, the researchers took a statistic from the sampled data (participants) and used it as a population parameter, i.e., population mean, to make estimation parameters applicable to the entire community.

To examine the data in the most effective way, descriptive statistics were combined with the different aspects that applied to this study. The degree of reliability was assessed using Cronbach's alpha. The reliability evaluation criteria were formulated as follows: when the Cronbach Alpha value was greater than 0.6, the parameter used in the questionnaire proved reliable; to the contrary, the parameter was not reliable. In this research, a Cronbach's alpha of 0.82 was determined for 19 items and 92 survey participants. For simplified comprehension, the results are displayed in tables.

4. RESULTS AND DISCUSSIONS

Descriptive analysis of the impact of road construction delays

To illustrate each factor's degree of significance, we calculated its mean score (MS) and standard deviation (SD), and Table 2 displays the factors that are prioritized.

Table 2: Descriptive analysis of the impact of road construction delays

Socio-economic impacts	Mean Score	Standard Deviation	Importance
Impact on living standard	4.63	0.59	1
Access issues to areas with economic activity	4.60	0.49	2
Higher transportation costs	4.36	1.03	3
Increase in travel time	4.34	1.05	4
Safety concerns	4.30	1.09	5
Traffic and congestion	4.21	1.14	6
Access issues to hospitals and educational institutions	3.98	1.41	7
Decrease in income earnings	3.61	1.04	8
Increase in community health issues	3.29	0.82	9
Hindrance to business growth	3.04	1.41	10

Source: Questionnaire survey (2023).

The table demonstrates that community commuters faced hurdles as a result of the delays in the internal roads upgrade project, with varying mean scores, including but not limited to: impact on living standards (M = 4.63); access issues to areas with economic activity (M = 4.36); increase in travel time (*M* = 4.34); safety concerns (*M* = 4.30); traffic and congestion (M = 3.98); decrease in income earnings (M = 3.29); and hindrance to business growth (M = 3.04).

Based on Table 4, among the most stressful concerns encountered by community commuters is the impact on living standards at the highest mean (M = 3.04). It is for this reason that an ANOVA test or comparison was employed as well to see if there were significant variations among the results obtained.

The standard deviation (*SD* = 1.41) outcome of similarities for the variables access issues to hospitals and educational institutions and hindrance to business growth respectively demonstrate a higher

result implying that the latter category of participants, i.e., students who were affected by road construction delays along with other commuters who wanted to access hospitals, were equally affected in the same way as those who are self-employed and/or running their own business activities.

Laying out the socioeconomic effects of these road construction delays on the community had been the most important part of the findings. These outcomes led to the observation that, despite the fact that the community's standard of living is distinct, they collectively experienced inconvenience as a result of delays of road construction projects.

Impact on living standard

Table 3: Measuring responses about the impact road construction has on living standard

Selected Response	Mean	Standard Deviation
The delay on the completion of the project impacted the living standards of the community due to the prolonged inconveniences that were Already there due to construction activities.	4.63	0.59

Source: Questionnaire survey (2023).

As shown in Table 3, the mean of the variable on the mean of the variable on the impact of living standards on community commuters shows that there was a significantly higher agreement among the participants when compared to the entire mean generated. The impact of living standards on community commuters shows that there was a significantly higher agreement among the participants when compared to the entire mean generated. However, the standard deviation (*SD* = 0.59) shows that some participants could be far away from the mean (*M* = 4.63). Therefore, the reliance on the finding that the road construction delays impact the community commuters' standard of living is statistically insignificant due to the fact that experiences may vary across participants, as reflected by the mean score of (*M* = 4.59) compared to the standard deviation result (*SD* = 0.59).

Access Issues to areas with economic activity

Table 4: Measuring Responses about Access Issues to Areas with Economic Activity

Selected Response	Mean	Standard Deviation
Access to areas with economic activity was a challenge when the road improvement project was delayed.	4.60	0.49

Source: Questionnaire survey (2023).

The mean for this variable (M = 4.60) reflects significantly higher agreement amongst participants on the Likert scale who responded. In other words, such a higher concurrence is of an individual view that access issues to areas with economic activity were highly impacted by road construction delays in the Malamulele B area. As such, it would be relevant to hypothetically argue that roads' upgrade was scheduled to take place, but its delay affected their access.

Higher transportation costs

Table 5: Measuring responses about higher transportation costs

Selected Response	Mean	Standard Deviation
I was faced with higher transportation costs when travelling to areas with economic activities when the road improvement project was delayed.	4.36	1.03

Source: Questionnaire survey (2023).

Table 5 reveals that the means of the chosen variable on transportation costs range when contrasted with the first variable in Table 5 being higher, i.e., (M = *4.36*), can be computed as 0.27, and both questions proved only marginally significant to participants' user experience. In comparison with Table 5, the standard deviation (*SD* = 1.03) is greater than one (*SD* = > 1). As a result, this variable on transport expenses reveals that participants' levels of reluctance are not very high and that certain participants may be far off the mean (*M* = 4.36).

Increase in travel time

Table 6: Measuring responses about increase in travel time

Selected Response	Mean	Standard Deviation
I was faced with an increase in travel time when the road improvement project was delayed.	4.34	1.05

Source: Questionnaire survey (2023).

Table 6 reveals that a negative impact emanates from a delay of the road construction project. However, the mean (*M* = 4.34) can be interpreted as indicating that there has been less agreement with the actual average mean across commuters' responses to this research's participants; as a result, there is a high level of disagreement among those surveyed. Additionally, the statistical average has a huge variance/range compared to the data, making it less dependable than it would be if the SD was less than one, or (*SD* = <1).

Other key emergent themes

Table 7: Other key emergent themes

Selected Response	Mean	Standard Deviation
Safety concerns	4.30	1.09
Traffic and congestion	4.21	1.14
Access issues to hospitals and educational institutions	3.98	1.41
Decrease in income earnings	3.61	1.04
Increase in community health issues	3.29	0.82
Hindrance to business growth	3.04	1.41

Source: Questionnaire survey (2023).

In Table 7, the mean (*M* = 4.30) generated for safety concerns is statistically and positively computed (*SD* = 1.09). It can, however, be argued that since the ANOVA function generated a p-value that is greater than >0.5, the data remains fitted with the community commuters' experiences of safety concerns. Therefore, this renders it somewhat not a null hypothesis but a reflection of significant outcomes as per the claim that safety was a concern when the road upgrade project was delayed.

Table 7 generated a moderate mean (M = 4.21) and the standard deviation, which is (SD = 1.14). This suggests a pure statistical significance across the five-point Likert scale. Consequently, this parameter is more statistically connected to the responses in Table 6, where an increase in travel time was a result of road construction project delays, including a mean of (*M* = 4.34) and a standard deviation of (*SD* = 1.05). Therefore, the range between the mean (*M* = 4.21) of traffic and congestion in Table 7 and that of Table 6, where the mean was (*M* = 4.34), along with the range for their standard deviations, i.e., (*SD* = 1.05) and (*SD* = 1.14), reflects a slight disagreement amongst participants.

As shown in Table 7, the mean and standard deviation (*M* = 3.98) and (*SD* = 1.41), respectively, confirm that the correlation is primarily attributed to the variable/parameter impact and not necessarily to the responses. As a result, the standard deviation of (*SD* = 1.41) indicates that data points are dispersed from the mean, indicating indecision and larger variation across participants' replies on the five-point Likert scale. The amount to which road construction exerted a negative impact on their mobility as commuters, particularly road construction project delays, hampered their ability to access hospitals and educational institutions.

The statistical responses to the question of how road construction project delays led to a decrease in income earnings exhibit a variety of implications. The mean (*M* = 3.6) and standard deviation (*SD* = 1.04) in Table 7 regarding this theme suggest a chance that, as a variable, a decrease in income earnings is more significant than standard deviations exceeding its mean. Furthermore, the determining factor is the value's position relative to its mean, which is quantified in standard deviations, and in this scenario, participants' responses to this question remain drastically distinct, despite the fact that the variable itself bears weight. Thus, the mean of (*M* = 3.61) illustrates that people lose more money as a result of their struggle with mobility.

The responses provided on the increase in community health issues are statistically significant (*SD = 0.82);* the researcher considers an emanating large effect, which further establishes a crucial point. Participants are frequent and ordinary users of the road. The premise is that the severity of increased dust output, noise levels, and exposures of other hazardous elements during construction projects, along with longer project durations and delays, all have a negative impact on the health of the community over time.

The responses to hindrance to business growth are primarily calculated at a mean of (*M* = 3.04) with an ending value of (*SD* = 1.41) in Table 7. The median and standard deviation of this measure show greater variety and hesitation among participants on the five-point Likert scale when compared to other comparable indicators across the dataset. Such an indecision is figurative of a statistical variance wherein the researchers observed that at least half (50%) of the responses fall within that range, and no more than half (50%) subsequently fall outside of it. It is evident that not every participant was a business owner, i.e., a self-employed person pursuing business activities during the road construction project, and this demonstrates such accuracy.

Cronbach's Alpha: The degree of reliability

The study's reliability is connected to the consistency of findings or the accuracy of an instrument in obtaining the same results when used again in the same circumstances (Xaba and Adanlawo, 2024). In this study, a reliability test was performed to determine if the parameters included in the questionnaire proved reliable. The reliability evaluation criteria were formulated as follows: when the Cronbach Alpha value was greater than 0.6, the parameter used in the questionnaire proved reliable; to the contrary, the parameter was not reliable. In this research, a Cronbach's alpha of 0.82 was determined for 19 items and 92 survey participants. Table 8 below summarizes the results of the reliability tests of all of the variables. Labels of conclusive outcomes are either significant (reliable) or insignificant (unreliable).

Table 8: Cronbach's Alpha: The degree of reliability

Variable/Parameter	Cronbach's Alpha	Conclusion
1. Impact on living standard (X_1)	0.827	Significant
2. Access issues to areas with economic activity (X_2)	0.843	Significant
3. Higher transportation costs (X_3)	0.902	Significant
4. Increase in travel time (X_4)	0.787	Significant
5. Safety concerns (X_5)	0.819	Significant
6. Traffic and congestion (X_6)	0.913	Significant
7. Access issues to hospitals and educational institutions (X_7)	0.819	Significant
8. Decrease in income earnings (X_8)	0.871	Significant
9. Increase in community health issues (X_9)	0.937	Significant
10. Hindrance to business growth (X_{10})	0.924	Significant

Cronbach's alpha values in Table 8 are all greater than >0.6, including a lowest alpha value of 0.787. This is appropriate and confirms that closely comparable items are reliable.

5. CONCLUSION

This study provides valuable insights to municipalities and construction organisations, allowing them to develop methods to overcome delays. The most crucial aspect of the findings was the outlining of the socio-economic impact that road construction delays have on the community. In

particular, the effect on quality of life; accessibility problems to places with economic activity; increased expenses for transport; longer journey times; safety issues; traffic and congestion; along with issues with access to medical facilities and educational facilities; decrease in income, escalation of social problems, and obstruction of business expansion. The study discovered that although the standard of living of participants (community commuters) varies, they are all affected by delays in the construction of road projects. The study validates and concurs with previous research by Tariq and Gardezi (2023) and Aziz and Abdel-Hakam (2016), who elaborated that when delays occur, residential areas close to active construction sites are typically subject to detrimental consequences such as inconvenience and economic losses.

The study also found a connection between higher transportation costs and longer travel times. This supplements earlier research and also confirms and agrees with previous research conducted by Akpan and Morimoto (2022), who clarified that faster road construction means better physical links such as less distance to ongoing economic benefits, especially increased employment, and welfare gains. The research further discovered that based on their experiences, community commuters in Malamulele, where the road construction project took place, found that in the presence of delays, there were increased issues, including instances where certain slopes excavated rendered the roads dangerous. While this can be added to literature, it remains an important finding that can improve future construction work, and lessons can be learned on how to prevent such safety issues affecting communities in this context. The study also statistically discovered that the participants' responses agreed with the degree to which road construction had an adverse effect on their mobility as people who commute, specifically road construction project delays, inhibited their capability to access healthcare facilities and places of learning.

This study recommends that construction firms should offer training programs to their staff so as to be proactive in identifying households to be compensated should their properties be affected by construction projects. The use of cutting-edge technologies to monitor the equipment, keep an eye on worker productivity, and monitor site activity is also recommended to reduce construction delays, and lastly, municipalities should avoid selecting the lowest bidder contractors and employ skilled personnel. The findings have practical, scientific, and policy implications for understanding project delays and their impacts in the worldwide construction industry. Future research could look into how to curb the delays of road construction.

Declaration

We are the authors of the article in the order in which listed.

The article is original, has not been published and has not been submitted for publication elsewhere.

We have not quoted more than 500 words/a table/a figure from a published work in the article.

Author's contribution: Nyeleti conceptualized and drafted the manuscript, Nyeleti collected and analysed the data, Maphela supervised and offered advice, Maphela proofread the manuscript and align to journal specification. All authors have read and agreed to the published version of the manuscript.

Acknowledgements: The authors would like to acknowledge the community members and officials from the Collins Chabane Municipality for the assistance provided during the data collection process and providing additional information.

Competing interests: The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Data availability: The raw data are available from N.G. Chauke.

REFERENCES

Adanlawo, E. F. (2017). *Community development: The use of corporate social responsibility initiatives by shopping centre Landlords* (Doctoral dissertation, University of Zululand).

Adanlawo, E. F., & Chaka, M. (2024). The impact of cadre deployment on governance and service delivery in South Africa. *International Journal of Development and Sustainability*, *13*(4), 264-272.

Adanlawo, E. F., Reddy, M. M., & Rugbeer, H. (2021). Intercultural business communication: The implications of language barriers. *Psychology and Education Journal*, *58*(5), 6281-6290.

Ajiboye, A. O., Silas, M. Z., Adindu, C. C., Alhassan, E. A., & Kolo, S. S. (2024). A Comparative Study of Local and Global Construction Materials Sourcing Strategies for Road Projects in Nigeria. *CSID Journal of Infrastructure Development, 7*(2). https://doi.org/10.7454/jid.v7.i2.1090

Akpan, U., & Morimoto, R. (2022). An application of Multi-Attribute Utility Theory (MAUT) to the prioritization of rural roads to improve rural accessibility in Nigeria. *Socio-Economic Planning Sciences*, *82*, 101256. https://doi.org/10.1016/j.seps.2022.101256

Alobo Loison, S. (2015). Rural livelihood diversification in sub-Saharan Africa: a literature review. *The Journal of Development Studies*, *51*(9), 1125-1138. https://doi.org/10.1080/00220388.2015.1046445

Anciaes, P., & do Nascimento, J. M. (2022). Road traffic reduces pedestrian accessibility–Quantifying the size and distribution of barrier effects in an African city. *Journal of Transport & Health*, *27*, 101522. https://doi.org/10.1016/j.jth.2022.101522

Aziz, R. F., & Abdel-Hakam, A. A. (2016). Exploring delay causes of road construction projects in Egypt. *Alexandria Engineering Journal*, *55*(2), 1515-1539. https://doi.org/10.1016/j.aej.2016.03.006

Barbosa, F., Woetzel, J., & Mischke, J. (2017). *Reinventing construction: A route of higher productivity*. McKinsey Global Institute.

Chaka, M., & Adanlawo, E. F. (2022). Role of public relations (PR) in nation-building: A case study of South Africa. *Journal of Nation-Building and Policy Studies*, *6*(3), 5-21. https://doi.org/10.31920/2516-3132/2022/v6n3a1

Chaka, M., & Adanlawo, E. F. (2023). The impact of ethnicity on South Africa's national unity. *African Renaissance*, *20*(2), 315. I: https://doi.org/10.31920/2516-5305/2023/20n2a15

Chaka, M., & Adanlawo, E. F. (2024). The Role of Communication in Nation-Building: A Theoretical Framework for South African National Unity. *Studies in Media and Communication*, *12*(3), 325-334. https://orcid.org/0000-0002-5407-5724

Champagne, M. P., & Dubé, J. (2023). The impact of transport infrastructure on firms' location decision: A meta-analysis based on a systematic literature review. *Transport Policy*, *131*, 139-155. https://doi.org/10.1016/j.tranpol.2022.11.015

Cumming, T. L., Shackleton, R. T., Förster, J., Dini, J., Khan, A., Gumula, M., & Kubiszewski, I. (2017). Achieving the national development agenda and the Sustainable Development Goals (SDGs) through investment in ecological infrastructure: A case study of South Africa. *Ecosystem services*, *27*, 253-260. https://doi.org/10.1016/j.ecoser.2017.05.005

Deacon, H. A., & Kajimo-Shakantu, K. (2024). The prevalence of claims under the JBCC Principal Building Agreement in South Africa. *International Journal of Construction Management*, *24*(3), 331-338. https://doi.org/10.1080/15623599.2023.2223003

Edison, J. C. (2020). *Infrastructure Development and Construction Management*. London: Routledge. https://doi.org/10.1201/9781003055624

Gertler, P. J., Gonzalez-Navarro, M., Gracner, T., & Rothenberg, A. D. (2014). The role of road quality investments on economic activity and welfare: Evidence from Indonesia's highways. *Unpublished manuscript, University of Toronto, and University of Ottawa for helpful comments and suggestions*.

Guzman, L. A., Oviedo, D., Arellana, J., & Cantillo-García, V. (2021). Buying a car and the street: Transport justice and urban space distribution. *Transportation Research Part D: Transport and Environment*, *95*, 102860. https://doi.org/10.1016/j.trd.2021.102860

He, H., Li, R., Pei, J., Bilodeau, J. P., & Huang, G. (2023). Current overview of impact analysis and risk assessment of urban pluvial flood on road traffic. *Sustainable Cities and Society*, 104993. https://doi.org/10.1016/j.scs.2023.104993

Idrees, S., & Shafiq, M. T. (2021). Factors for Time and Cost Overrun in Public Projects. *Journal of Engineering, Project & Production Management*, *11*(3). https://doi.org/10.2478/jeppm-2021-0023

Kim, J., & Bilbao, P. (2023). Why Are the Frequently Reported Delay Factors in Construction Projects Recurring?: A Qualitative Study. International Journal of Sustainable Construction Engineering and Technology; 14(1; 2), 21-31. http://dx.doi.org/10.30880/ijscet.2023.14.01.003

Manggat, I., Zain, R., & Jamaluddin, Z. (2018). The impact of infrastructure development on rural communities: A literature review. *International Journal of Academic Research in Business and Social Sciences*, *8*(1), 647-658. http://dx.doi.org/10.6007/IJARBSS/v8-i1/3837

Mashwama, N. X., Mushatu, W. S., & Aigbavboa, C. O. (2018). Challenges faced by stakeholders in the road construction projects in the Gauteng province of South Africa. In *Creative Construction Conference 2018* (pp. 345-353). Budapest University of Technology and Economics.

Nkomo, N. Y., & Adanlawo, E. F. (2024). Impact of Economic Growth on Unemployment in South Africa: A Time-Series Data Analysis. *International Journal of Management, Entrepreneurship, Social Science and Humanities*, *7*(2), 84-98. https://doi.org/10.31098/ijmesh.v7i2.2138

Onu, M. A., Ayeleru, O. O., Oboirien, B., & Olubambi, P. A. (2023). Challenges of wastewater generation and management in sub-Saharan Africa: A Review. *Environmental Challenges*, *11*, 100686. https://doi.org/10.1016/j.envc.2023.100686

Owolabi, O. C., Adanlawo, E. F., & Owolabi, A. G. (2024). Job Involvement and Work Satisfaction as Correlates of A Responsiveness Behaviour Among Nurses in Abua Multi-System Hospital, Ado-Ekiti. *Revista de Gestão Social e Ambiental*, *18*(6), e07868-e07868. https://doi.org/10.24857/rgsa.v18n6-175

Pandey, B., Brelsford, C., & Seto, K. C. (2022). Infrastructure inequality is a characteristic of urbanization. *Proceedings of the National Academy of Sciences*, *119*(15), e2119890119. https://doi.org/10.1073/pnas.211989011

Sabir, S., & Shamshir, M. (2020). Impact of economic and social infrastructure on the long-run economic growth of Pakistan. *Sustainable water resources management*, *6 (1)*, 1-16. https://doi.org/10.1007/s40899-020-00361-3

Sewell, S. J., Desai, S. A., Mutsaa, E., & Lottering, R. T. (2019). A comparative study of community perceptions regarding the role of roads as a poverty alleviation strategy in rural areas. *Journal of rural studies*, *71*, 73-84. https://doi.org/10.1016/j.jrurstud.2019.09.001

Shivambu, X., & Thwala, W. D. (2019). Assessment of the delays in the delivery of public sector projects in South Africa. In *Intelligent Human Systems Integration 2019: Proceedings of the 2nd International Conference on Intelligent Human Systems Integration (IHSI 2019): Integrating People and Intelligent Systems, February 7-10, 2019, San Diego, California, USA* (pp. 902-908). Springer International Publishing. https://doi.org/10.1007/978-3-030-11051-2_138

Tariq, J., & Gardezi, S. S. S. (2023). Study the delays and conflicts for construction projects and their mutual relationship: A review. *Ain Shams Engineering Journal*, *14*(1), 101815. https://doi.org/10.1016/j.asej.2022.101815

Tola, E. (2024). Assessment of Causes and Effects of Delay in the Case of Arba Rakati-Michata Road Project. *Engineering Future Sustainability*, *1*(3). https://doi.org/10.36828/efs.242

United Nations (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. *Resolution Adopted by the General Assembly on 25 September 2015*, 42809, 1-13. Available online at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

Vahed, F., Lefoka, M., & Windapo, A. (2022). Delay Minimising Measures Used on Road Construction Projects in South Africa. In *Construction Industry Development Board Postgraduate Research Conference* (pp. 657-667). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-22434-8_63

Xaba, F., & Adanlawo, E. F. Are women Empowered through ecotourism projects? A quantitative approach. *Pakistan Journal of Life and Social Science*, 22(1): 3085-3092. https://doi.org/10.57239/PJLSS-2024-22.1.00224

Zhang, Y., & Cheng, L. (2023). The role of transport infrastructure in economic growth: Empirical evidence in the UK. *Transport Policy*, *133*, 223-233. https://doi.org/10.1016/j.tranpol.2023.01.017

Zhang, Y., Zhou, M., Kong, N., Li, X., & Zhou, X. (2022). Evaluation of emergency response capacity of urban pluvial flooding public service based on scenario simulation. *International Journal of Environmental Research and Public Health*, *19*(24), 16542. https://doi.org/10.3390/ijerph192416542