

# Strategies to Enhance Public-Private Partnerships (PPPs) Effectiveness in Managing Infrastructure Project Delays in the Western Cape, South Africa

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## Abstract

The delivery of public sector infrastructure projects is characterized by poor performance consistently, with persisting delays that lead to budget overruns in the South African construction industry. While causes of delays in infrastructure projects have been widely demonstrated in previous studies, the use of Public Private Partnerships as a strategic mechanism to deliver infrastructure projects has been highlighted with benefits of minimizing delays through private sector innovative operational excellence. This study investigates causes of delays in Western Cape infrastructure projects and reports their minimization strategies through PPPs. Through a qualitative research design and purposive sampling method, semi-structured interviews were conducted with four experienced professionals who actively participated in Public-Private Partnership infrastructure projects delivery. The data was analyzed using thematic analysis. The findings reveal that delays are multidimensional and systemic, mostly caused by bureaucratic inefficiency, socio-political interference, fragmented interdepartmental coordination, and scope mismanagement. Results further suggest that strategies to improve PPP projects can be strengthened through institutionalization of social facilitation mechanisms, enhanced interdepartmental coordination and accountability via structures, such as the “stage gate process”, capacity building and knowledge transfer within government institutions, improved communication and transparency among all the project stakeholders. These insights can be applied in improving the PPPs frameworks to achieve timely, inclusive, and sustainable infrastructure provision in the Western Cape.

**Keywords:** construction project delays, infrastructure development projects, public-private partnerships

## 1. Introduction

Long-standing research considers infrastructure development as a critical driver of socio-economic growth, improved service delivery, and sustainable development in developing economies (Srinivasu and Rao, 2014; Windapo and Umeokafor, 2023). To achieve these objectives, the construction sector plays a strategic role through the development of economic and social infrastructure (Thacker *et al.*, 2019). Consequently, the construction industry is recognized for its substantial contribution to socio-economic development, employment creation, and Growth Domestic Product (GDP) (Ofori, 1997; CIDB, 2025). However, apart from socio-political disruptions, such as community protests and construction site invasions, which have increasingly contributed toward delays in infrastructure delivery (Aigbavboa *et al.*, 2022), public infrastructure projects are reported with substantial cost overruns, implementation inefficiencies, and project delays in South Africa (Cosa, 2020). Existing studies attributed these delays to factors such as bureaucratic inefficiencies, resource constraints, limited technical resources, institution fragmentation, inadequate planning, procurement challenges, political interference, and weak stakeholder coordination (Nwafor *et al.*, 2019; Ekwuno & Nel, 2022).

Public-Private Partnerships (PPPs) have emerged globally as an alternative infrastructure procurement and delivery approach aimed at leveraging private sector expertise, financing, innovation, and management efficiency in the provision of public infrastructure (Delmon, 2021). Research exists that explored the delivery of infrastructure projects through PPP in South Africa (Aigbavboa, Liphadzi and Thwala, 2014; Dlamini and Botes, 2022). However, there is limited research that examined their strategies in managing infrastructure project delays within the Western Cape public sector context. To address this gap, the study investigates the role of PPPs in managing infrastructure project delays in the Western Cape, South Africa. The study specifically aims to identify the major causes of delays and explore strategies that can strengthen the role of PPPs in improving infrastructure project delivery.

## 2. Literature Review

Public infrastructure projects are inherently complex due to the magnitude of each project, its exposure to the surrounding community, and social-political implications (Radujkovic and Sjekavica, 2017), which complicates their successful delivery. As a result, these

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projects are known for exceeding budget and time, poor quality and service delivery, owing to higher levels of infrastructure project delays (Ahmad *et al.* 2020). According to Ekwuno and Nel (2022), delays have become a common challenge in all areas of government, with problems in payment delays and inefficiencies in procurement and planning processes affecting project schedules. Ekwuno and Nel (2022) further suggested that various delays in public sector projects involve critical and non-excusable delays that are linked to delayed payments, procurement irregularity, and ineffective interdepartmental communication. Critical delays are those that have an impact on the project's completion, such as milestone dates, while non-excusable delays are those that are predictable or within the contractor's control, such as poor planning, among others (Gajare *et al.* 2015). To address these delays, Public-Private Partnerships (PPPs) have been proposed as a mechanism to address infrastructure delivery challenges (Memari, Ogunmakinde and Skulmoski, 2025).

### **2.1 Causes of Infrastructure Project Delays in the Western Cape**

The completion of infrastructure projects on time, under budget, with the best quality, and safely, are all shared objectives among contract parties. However, it is well known that delays pose a serious threat towards the success of projects (Ahmad *et al.* 2020). For example, in Hong Kong, Chan and Kumaraswamy (1997) found that insufficient risk management and supervision, unanticipated site conditions, slow decision-making, variations initiated by the client, and work variations were major causes of delay in construction projects. While in Norway, Zidane *et al.* (2018) found that poor planning and scheduling, slow decision making, bureaucracy within project organizations, shortage of resources, poor communication and coordination between parties, slow inspections by consultant, design changes during construction and lack of commitment of owner, Gebrehiwet *et al.* (2017) reported that corruption, missing utilities at site, inflation in materials prices, lack of material quality, late issue of design documents, delayed delivery of materials, poor site management and performance in Ethiopia. Similarly, studies found that causes of delays in infrastructural delivery were lack of capacity, poor planning and oversight, budgetary limitations, corruption, and lack of public participation from provincial governments, construction site invasions from construction mafias and violent protests in South Africa (Ekwuno and Nel, 2022; Alamu *et al.*, 2024). While these studies show similar persisting problems in internationally, some studies suggested that public-private partnerships possess the opportunity to enhance the delivery of infrastructure projects (Abdel Aziz, 2007). In the construction project context, other empirical studies have demonstrated the benefits of PPP, such as increased project success rates through effective risk

management, private-sector knowledge, improved communication processes, improved flexibility and leadership, reduced delays, innovative funding options and good governance practices in Canada and Ghana (Zhang *et al.*, 2019). Liu *et al.*, (2015) conceptualized a dynamic life-cycle performance measurement framework for PPP infrastructure projects. This framework involves five dimensions, such as stakeholder satisfaction, strategies, processes, capabilities and stakeholder contribution, which were empirically validated in (Liu *et al.* 2016). However, the framework does not address issues like delays and their management.

### **2.3 Strategies to strengthen the role of PPPs for managing infrastructure project delays**

While the global growth of PPPs may be evidence that conventional approaches to infrastructure development are insufficient, shifting risks to the private sector, increasing transparency, and providing access to private resources and experience are recognized to offer benefits over traditional project delivery methods (Nguyen, 2017). Nevertheless, the prospects of PPPs in minimizing delays need to be exploited by adopting frameworks that are anchored in value-creation, joint governance, and alignment of stakeholders (Ndevu, 2021). Harris (2023) suggested that PPPs overall and infrastructure projects specifically must be more robust, guarantee equitable distribution of risk, cost, and resources among the stakeholders to achieve financial objectives. In Nigeria, Alamu *et al.*, (2024) found that strengthening the legal and regulatory framework within which PPPs are executed, increasing the skills and capacity of the public and private sectors, contributed to the success of PPP in delivering infrastructure projects. Alamu *et al.*, (2024) further reported that extending access projects and long-term financing, facilitating responsibility and transparency in the process of acquiring and executing PPP projects, and encouraging stakeholder involvement in the success of PPP projects are crucial. These findings are in line with the general international guidelines that encourage infrastructure project delay reduction efforts, including structured risk sharing, in which delay-related risks are distributed among the parties most capable of addressing them and performance-based contracting (Krishandutt, 2021). Such strategies promote a proactive approach to timely project performance and accountability within the PPP, which is relevant for developing countries where the institutional and financial constraints often delay project implementation. Although these strategies have been studied in various global settings, more research is necessary to determine whether they are applicable in the Western Cape, especially in view of the region's unique capacity and regulatory issues.

### 3. Research Methodology

A qualitative research design underpinned by an interpretivist paradigm was utilized to explore the role of Public Private Partnership in managing delays during infrastructure projects delivery. The main objectives of this study were to identify causes of delays in infrastructure projects and PPP strategies that can be used to manage the delays in the Western Cape. Prior to data collection, ethical considerations were strictly followed, including informed consent received from participants, agreement on confidentiality and voluntary participation of respondents. The purposive sampling method was used to select respondents from a large established contractor and the Department of Public Works to ensure the relevance of their responses to this research.

Semi-structured interviews were conducted with four professionals and stakeholders in the Western Cape, who were involved in the delivery of infrastructure projects using PPPs. While the sample of participants may seem small, Boddy (2016) argues that a small and well-chosen sample can be sufficient for a qualitative study so long as it is fit-to-purpose. Further, Mason (2010) argued that the sample size in qualitative research becomes irrelevant because the value of the study is based on the quality of the data. Lim (2025; p225) concurs with this view by suggesting that “*sample size in qualitative research is best treated as an analytical judgment about adequacy rather than a number derived from a statistical formula*”. Hence, this research offers analytical and contextual insights that are relevant for infrastructure project delivery and PPPs despite the small sample. Moreover, the extensive

interviews within the construction management research discipline.

The data was analyzed using thematic analysis, where themes were identified, categorized, and patterns were recognized. Supporting this, Ahmed *et al.*, (2025) suggested that thematic analysis is good at identifying, analyzing and reporting patterns and themes in qualitative datasets. The analysis highlighted various common themes that were indicative of the systemic causes of delays, institutional weaknesses and potential reforms to improve the performance of PPPs. These themes emerged inductively through the narratives of the participants that were validated by their recurrence in the various interviews, as compared to the literature, to ascertain the validity and conceptual comparison. This analytical process enabled the study to correlate empirical evidence with its theoretical background.

### 4. Findings and Discussion

#### 4.1 Profile of Interviewees

Table 1 provides the demographic profile of the participants who contributed to this study. The data emanating from the four structured face-to-face interviews are presented and coded as participant A, B, C and D to protect the privacy of each participant. This involved 2 Contracts Managers from the private sector, the Deputy Director and the Project Manager from the public sector. The selection of these participants was purposive with the aim of guaranteeing diversity of views within the two sectors (public and private) of the construction and infrastructure ecosystem in the Western Cape. This diversity is supported by Chileshe, Rameezdeen and Hosseini (2015) who argue that it is a

**Table 1:** Profile of Interviewees

| Participant Code | Sector  | Position / Role                                          | Years of Experience | Primary Area of Work                                                                                            | PPP Experience Level |
|------------------|---------|----------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------|----------------------|
| A                | Private | Contracts Manager (Infrastructure Projects)              | 25 years            | Project management and delivery of infrastructure in housing and municipal developments.                        | High                 |
| B                | Private | Contracts Manager (Civil Works Division)                 | 24 years            | Infrastructure project management, residential and civil works                                                  | Moderate             |
| C                | Public  | Deputy Director (Provincial Department)                  | 25 years            | Community development, intergovernmental coordination                                                           | Moderate             |
| D                | Public  | Project Manager (State Owned Enterprise – Energy Sector) | 17 years            | Technical project management and coordination in renewable energy, transmission projects and maintenance works. | High                 |

Source: Researchers

experience of the participants in both infrastructure project delivery and PPPs contributes to the relevance and validity of the data collected. This is also supported by Chileshe, Rameezdeen and Hosseini (2015) in their study, which involved a small sample of eight

fair representation of construction organizations involved in a range of construction activities, from strategic to overall construction project delivery.

All participants possessed more than 15 years of pertinent experience, which reflects a seasoned level of knowledge regarding policy level and operational

realities in the South African construction industry. The inclusion of both private and public participants guaranteed that the study recorded various aspects of PPP implementation, including contract formulation and technical execution (private sector) and social facilitation and governance oversight (public sector).

#### **4.2 Key Factors Contributing to Infrastructure Project Delays**

The findings show that even though PPPs have a high potential to promote speedy infrastructure project delivery and enhance accountability within the Western Cape public sector, the key challenges in their implementation include bureaucratic inefficiency, poor coordination and fragmented governance and socio-political interference which significantly contributes to project delays.

##### *4.2.1 Bureaucratic and institutional inefficiencies*

Most of the participants described major causes of PPP infrastructure project delays as bureaucratic inefficiencies and procedural complexity. This was mainly associated with the procedural inflexibility of government structures in which rigid approval regimes within governments and delays in administrative responses are more likely to increase project durations. The respondents, especially those employed in the public sector, focused on the rigid administrative procedures of the Public Finance Management Act (PFMA) and Municipal Finance Management Act (MFMA) models that often require multiple stages of approval before projects can be implemented. Participant C reported that *“Even with approved funding we still have to go through internal committees, supply chain management, and then Treasury and all of that takes weeks or months.”*

According to Participant D *“...the long procurement procedures and unnecessarily complex compliance requirements are stalling the project schedule even before the commencement of work.”* However, Participant A suggested that *“by the time the paperwork is done, the contractor prices and material costs are already outdated”*. This highlights the time-consuming aspect of tender adjudication and contract closing to frequently creates cost uncertainty and cost inflation.

These findings reveal how “bad policy” is not a cause of administrative inefficiency but rather the outcome of over-regulation and lack of process integration that undermines the timeliness of infrastructure delivery. The responses from the participants note that excessive procedural compliance, which is intended to be accountability-facilitating, may frequently lead to stagnation in schedules. These findings are linked to Zidane *et al.*'s (2018) study that found that bureaucracy within project organizations, as well as poor planning and scheduling, are contributing factors that lead to delays in infrastructure projects, even within the PPP

project delivery framework. Research by Ekwuno and Nel (2022), also discovered that the fundamental obstacles to timely infrastructure delivery in South Africa are inefficiencies in governance and inefficient administrative planning.

##### *4.2.2 Poor coordination and fragmented governance*

The issue of a lack of coordinated efforts within the government departments involved in delivering infrastructure was a consistent theme among all participants. This fragmented approach was widely regarded as a key contributor to project delays. Participant D noted that the line departments tend to handle projects in a silo, which translates to inconsistent communication, duplication of efforts, and slow decision-making. The participant described an energy project that was halted because there was no collaboration between the utility company responsible, the provincial roads department and the local municipality, which resulted in significant scheduling conflicts and the delay of project completion.

Participant A also added that multi-agency dependencies (e.g., environmental approvals, land use permits and funding transfers) are not handled simultaneously but in a sequence, which results in duplication and loss of time. Participant B further noted that there is no single entity that assumes ownership of the entire timeline, thus accountability is compromised. This fragmentation highlights a structural governance challenge of limited policy coherence and cross-sector collaboration despite robust frameworks in theory. It further highlights poor interdepartmental coordination and inclusion of private stakeholders as a structural challenge of governance. Kwofie, Ellis and Opoku's (2021) study found that when good communication processes exist between PPP parties, governmental support exists, activities among stakeholders are efficiently coordinated, and flexibility in contractual arrangements exists, this contributes positively to improving PPP performance.

##### *4.2.3 Socio – political interference*

Socio-political interference was identified as one of the major sources of delays in infrastructure projects. According to both the private and public sector participants, local labor conflicts, community unrest, and political influences are some of the factors that tend to derail project schedules. Participant C said that *“...protests or political leveraging can halt project progress despite technical and financial preparations being completed.”* Moreover, various studies have highlighted construction site invasions from construction mafias and violent protests in South Africa as a recurring phenomenon causing challenges in the successful delivery of infrastructure projects (Ekwuno and Nel, 2022; Alamu *et al.*, 2024), which is confirmed by Participant A, reporting that “construction mafias,”

are some of the reasons that delayed projects or impose costly suspensions of work. However, Participant D noted that political conflicts had held up approvals for months. Among most of the participants, weak stakeholder engagement was a symptom and a cause of socio-political interference, in which the lack of communication and inclusion in the decision-making process creates mistrust and opposition. This is supported by Zidane et al.'s (2018) study which identified poor communication and coordination between parties as a contributing factor for delays.

#### **4.3 Strategies to Enhance PPP Effectiveness in Infrastructure Delay Management**

The analysis showed that there are various interrelated strategies that can enhance PPP effectiveness in infrastructure project delay management: improved coordination and accountability, enhanced communication and stakeholder alignment and integration of social facilitation mechanisms.

##### **4.3.1 Improved Coordination and Accountability**

Fragmented accountability is a structural weakness that was noted multiple times by participants. Participant D suggested the implementation of "*Stage-Gate Project Management*" in all government agencies to introduce accountability and impose deadlines. Matha (2021) defines the stage-gate process as a project management method where a project is broken down into stages that are separated by "gates", which are strict project reviews conducted between each stage in the project that determines, whether the project team is ready to proceed to the next stage of the project. Participant D reported that "*...had each department been obliged to sign off within a definite time, and the progress reviewed on record, we would not have so many open-ended delays. Stage-gate reviews hold each individual accountable.*" While both Participant D and Participant C shared similar sentiments, Participant D further stated that even the most effective private partner could not fully undo the indecisiveness of the public sector in the absence of rigid coordination. Hence, participants from the private sector urged that joint monitoring structures should be established, where both sectors are jointly responsible for enhancing discipline and predictability in project execution. This is further supported empirically by Zhang et al. (2019) who found that PPP projects with project control mechanisms demonstrated better schedule performance compared to projects delivered through the traditional procurement methods. Further, Bwanali and Rwelamila (2015) observed that properly structured PPPs with improved leadership and flexible contractual relationships, result in fewer delays. Collectively, these studies suggest that embedding formal coordination and accountability mechanisms, such as the stage-gate process into PPP governance structures could potentially contribute to reducing project delays in the Western Cape.

##### **4.3.2 Enhanced Communication and Transparency**

Improved communication and transparency were considered critical towards ensuring trust, alignment, and dispute avoidance among all stakeholders in a project. Both public and private sector participants indicated that accessibility to open communication channels and transparent reporting systems would reduce the level of misinterpretations and help to promote accountability. While Participant B indicated that "*...clear communication prevents local conflicts from escalating as disputes usually arise as a result of misunderstandings between contractors, consultants and officials,*" Participant A reported "*...that effective alignment between consulting engineers, contractors, and government officials avoids duplication and rework. We require regular updates on the progress in real-time and open lines of communication between departments. When we all understand what is going on, there are less surprises.*" In line with these findings, Kwofie, Ellis and Opoku's (2021) study found that when good communication processes exist between PPP parties, governmental support exists, activities among stakeholders are efficiently coordinated, and flexibility in contractual arrangements exists, this contributes positively to improving PPP performance.

The value of joint progress meetings and transparent reporting was also emphasized by both participant C and D. This reinforces the view that communication is a direct determinant of project schedule performance. These findings collectively suggest that formalizing communication protocols and transparency mechanisms within the PPP frameworks in the Western Cape could serve as a practical strategy for reducing project delays.

##### **4.3.3 Integration of social facilitation mechanisms**

The participants highlighted that social facilitation must be institutionalized in the context of PPPs to avoid community-based disruption. They contended that social facilitation was to be applied as a risk management tool rather than a compliance checkbox. According to Participant C, "*...social facilitation should not be a secondary consideration; it should form part of the PPP design.*" The participant further explained that "*by having community development workers on board early, you will identify tensions early enough and resolve them before they rise. Social facilitation must be functional rather than symbolic.*"

Participant C further emphasized the need to incorporate social facilitation units, like the Community Development Workers Programme (CDWP), as part of the PPP governance frameworks. The participant gave an example that protests and site disturbances can often be avoided by early intervention by community development workers, citing a transport project where the local conflict was removed through

co-operation between community development workers, councilors, and contractors.

## 5. Conclusion and Further Research

The purpose of the study was to establish the ability of PPPs as a practical mechanism to govern and reduce delays in the delivery of infrastructure by the government in the Western Cape. The findings show that causes of delays have complex and multidimensional aspects, including administrative, social and governance aspects. Issues of bureaucratic inefficiency and fragmented coordination continue to be problematic, and socio-political risks continue to be a constant threat to the sustainability of infrastructure projects. The findings suggest that application of PPPs incorporates innovation, accountability, and performance management of the private sector with social inclusion and management control of the public sector. Community liaison structures, and improved governance mechanisms are very critical in achieving this balance. This study reveals that PPPs can be viewed as instruments of collaborative governance that can increase the institutional responsiveness, correspondence of stakeholders and public value creation in South Africa in the context of infrastructure provision.

## References

- Abdel Aziz, A.M., 2007. Successful delivery of public-private partnerships for infrastructure development. *Journal of construction engineering and management*, 133(12), pp.918-931.
- Ahmad H. S., Ayoush M. D., Al-Alwan M. S. (2020). Causes of delay to public infrastructure projects according to engineers representing different contract parties. *Built Environment Project and Asset Management*, 10(1), 153–179. <https://doi.org/10.1108/BEPAM-03-2019-0026>
- Ahmed, S.K., Mohammed, R.A., Nashwan, A.J., Ibrahim, R.H., Abdalla, A.Q., Ameen, B.M.M. and Khedhir, R.M., 2025. Using thematic analysis in qualitative research. *Journal of Medicine, Surgery, and Public Health*, 6, p.100198.
- Aigbavboa, C.O., Liphadzi, M. and Thwala, W.D., 2014. An exploration of public private partnership in infrastructure development in South Africa in: Laryea S. and Ibem, E. (Eds) *Proceedings 8<sup>th</sup> Construction Industry Development Board Postgraduate Conference*, 10-11 February 2014, University of Witwatersrand, Johannesburg, South Africa, 101-109.
- Future research should consider expanding the participant base to include local municipalities, National Treasury PPP unit representatives, and community organizations, to capture a broader range of stakeholder perspectives. Comparative studies conducted across different provinces and countries would further assist in determining whether the patterns identified in this study are specific to the Western Cape or reflect wider national and international trends in PPP implementation. Given the findings of this study regarding the importance of community engagement and socio-political risk, future research should also investigate the cost-efficiency of incorporating social facilitation units into PPP frameworks. Finally, the potential of digital project management systems to enhance transparency and real-time monitoring of PPP performance represents a relevant and underexplored area that warrants further investigation.
- ## 6. Disclosure
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- Alsharef, A., Banerjee, S., Uddin, S.J., Albert, A. and Jaselskis, E., 2021. Early impacts of the COVID-19 pandemic on the United States construction industry. *International journal of environmental research and public health*, 18(4), p.1559.
- Alfen, H.W., Kalidindi, S.N., Ogunlana, S., Wang, S., Abednego, M.P., Frank-Jungbecker, A., Jan, Y.C.A., Ke, Y., Liu, Y., Singh, L. and Zhao, G., 2009. *Public-private partnership in infrastructure development: case studies from Asia and Europe*. Weimar: Verlag der Bauhaus-Universität.
- Boddy, C. R. (2016). Sample size for qualitative research. *Qualitative Market Research: An International Journal*, 19(4), 426–432. <https://doi.org/10.1108/QMR-06-2016-0053>
- Chileshe, N., Rameezdeen, R. and Hosseini, M.R., 2016. Drivers for adopting reverse logistics in the construction industry: a qualitative study. *Engineering, Construction and Architectural Management*, 23(2), pp.134-157.
- CIDB, 2025, Annual Report 2024/25, Retrieved from: <https://www.cidb.org.za/wp-content/uploads/2024/09/Annual-Report-2022-2023.pdf>

- Cosa, S., 2020. Exploring the factors responsible for the delays in the execution of construction projects by the National Department of Public Works and Infrastructure in South Africa. University of Johannesburg (South Africa), M.Eng., University of Johannesburg
- Delmon, J. (2021). Private sector investment in infrastructure: Project finance, PPP projects and PPP frameworks: Kluwer Law International BV
- Dlamini, Z.H. and Botes, L., 2022. Challenges to Effective and Efficient Infrastructure of Public Private Partnerships in South Africa. *Administratio Publica*, 30(1), pp.56-75.
- Ekwuno, A.O. and Nel, H., 2022. Analysing The Project Delay Causes IN The South African Construction Industry. *International Journal of Engineering Applied Sciences and Technology*, 7(6), pp.15-73.
- Gebrehiwet, T., & Luo, H. (2017). "Analysis of delay impact on construction project based on RII and correlation coefficient: Empirical study". *Procedia engineering*, 196, 366-374.
- Harris Sr, C.E., 2023. Public Private Partnerships in Infrastructure: A Study on Performance and Equity Improvement (Doctoral dissertation, National University).
- Khumalo, M.J., Choga, I. and Munapo, E., 2017. Challenges associated with infrastructure delivery. *Public and Municipal Finance Journal*, 6(2), pp.35-45. Koppenjan, J., Klijn, E.H., Krishandutt, V., 2021. Public-private partnerships in addressing infrastructure delivery needs. *Civil Engineering Siviele Ingenieurswese*, 29(10), pp.1-1.
- Liu, J., Love, P. E. D., Davis, P. R., Smith, J., and Regan, M. (2015). "Conceptual framework for the performance measurement of public-private partnerships." *J. Infrastruct. Syst.*, 04014023.
- Liu, J., Love, P.E., Smith, J., Matthews, J. and Sing, C.P., 2016. Praxis of performance measurement in public-private partnerships: Moving beyond the iron triangle. *Journal of Management in Engineering*, 32(4), p.04016004.
- Lim, W., M., (2026) Sample Size in Qualitative Research: Moving from Data Saturation to Theoretical Saturation, *Journal of Global Marketing*, 39:2, 224-234, DOI: 10.1080/08911762.2025.2590757
- Lukhele, T.M., Botha, B. and Mbanga, S., 2022. *A conceptual framework for systematic project planning towards the successful delivery of infrastructure. Journal of Public Administration*, 57(3), pp.544–557.
- Ndevu, Z., 2021. Public Private Partnership Understanding and the Ideal Underpinning Theories: A Public Sector View. *Journal of Public Administration*, 56(2), pp.183-197.
- Nguyen, D.A., 2017. Improving public-private partnership contracts through risk characterization, contract mechanisms, and flexibility.
- Ofori, G. (1990). The Construction Industry: Aspects of its Economics and Management. Singapore, Singapore University Press
- Radujković, M., & Sjekavica, M. (2017). Project performance measurement using EVM and ABC. *Procedia Engineering*, 196, 607–615. <https://doi.org/10.1016/j.proeng.2017.08.013>
- Srinivasu, B. and Rao, P.S., 2013. Infrastructure development and economic growth: Prospects and perspective. *Journal of business management and social sciences research*, 2(1), pp.81-91.
- Thacker, S., Adshead, D., Fay, M., Hallegatte, S., Harvey, M., Meller, H., O'Regan, N., Rozenberg, J., Watkins, G. and Hall, J.W., 2019. Infrastructure for sustainable development. *Nature Sustainability*, 2(4), pp.324-331.
- Windapo, A. and Umeokafor, N., 2023. Sustainable Improvement in Infrastructure Development in Africa: Which way forward? Editorial June 2023. *Journal of Construction Business and Management*, 6(1), pp.v-ix.
- Zhang, J., Chen, F. and Yuan, X.X., 2020. Comparison of cost and schedule performance of large public projects under P3 and traditional delivery models: A Canadian study. *Construction management and economics*, 38(8), pp.739-755.
- Zidane, Y. J. T., & Andersen, B. (2018). "The top 10 universal delay factors in construction projects". *International Journal of Managing Projects in Business*. <https://doi.org/10.1108/IJMPB-05-2017-0052>.