
ENHANCING PROJECT MANAGEMENT FOR SMES: A HYBRID APPROACH

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ABSTRACT

Objective: South Africa's economic growth and development are closely intertwined with government-prioritized infrastructure development projects. However, SMEs in this sector often grapple with insufficient project management processes, impeding their efficacy and economic contributions. The issue stems from the inadequate implementation of project management methodologies by SMEs, which adversely affects project outcomes and consequently their economic impact. **Research Design & Methods:** A literature review was conducted to assess the implementation of project management methodologies by SMEs in South African infrastructure development projects. The objective is to highlight areas for improvement, rectify the deficiency in project management practices among SMEs, and bolster their effectiveness and economic contributions. **Findings:** Preliminary findings accentuate the critical role of project management as a discipline for SMEs involved in infrastructure projects. Its absence or inadequate implementation hampers the growth and sustainability of organizations aiming to make substantial economic contributions and create employment. A hybrid project management model tailored for SMEs in infrastructure development emerges as a mechanism for effectively managing infrastructure projects. **Implications and Recommendations:** The conceptualization of a hybrid project management model for infrastructure development projects holds the potential to enhance project value by facilitating adaptability. By incorporating agile project management components, this model also stands to improve client engagement, consequently elevating the prospects of success in infrastructure development projects. **Contribution & Value Added:** This study contributes to the understanding of how SMEs can improve their effectiveness and economic contributions in South Africa's infrastructure development sector. The proposed hybrid project management model offers valuable insights for practitioners and policymakers in South Africa, ultimately fostering economic development and sustainable growth in the country.

Keywords: hybrid project management; infrastructure development; macro-economic; management; SMEs.

JEL codes: M1, O1, O4

Article type: research paper

INTRODUCTION

Infrastructure development is a pivotal pillar of both South Africa's and the global economy, serving as a driving force for economic growth. As a thriving multibillion-dollar industry, infrastructure development has profoundly impacted the lives of billions, both domestically and internationally (Malah Kuete & Asongu, 2023; Qobo & Dube, 2015; Wethal, 2019) role in spurring economic progress, fostering comprehensive development, and combating poverty. Not only does it involve the construction of structures that enhance productivity and elevate living standards, but it also stands as a labour-intensive sector, capable of engaging a substantial portion of the national workforce when functioning

at full capacity (D'Amato et al., 2019; Fanta, 2016; Razzaq et al., 2021).

Furthermore, the significance of infrastructure development extends beyond its economic impact. It contributes to social and economic growth at the national level by providing vital shelter and creating opportunities for employment. The sector plays a pivotal role in employment creation, offering diverse job prospects across various skill levels, from unskilled to semi-skilled and skilled (Bennett, 2019; Mamirkulova et al., 2020; Menhas et al., 2019; Siemiatycki et al., 2020).

The South African government has accorded significant priority to infrastructure development programs as a national imperative (OECD, 2022). These investments not only fuel economic growth but also serve as instruments for social upliftment and development (Govender, 2019; Venter et al., 2020). Despite allocating substantial resources to large-scale infrastructure projects, the government's initiatives have not always translated into tangible outcomes within a satisfactory timeframe, resulting in a limited number of completed projects. This situation has led to a scarcity of substantial infrastructure projects in the construction (Caprotti et al., 2020; S. Kim et al., 2020; Mphomela, 2020; Schindler & Kanai, 2021). Additionally, economic disruptions have further impeded infrastructure development and adversely affected organizations (Caprotti et al., 2020; S. Kim et al., 2020; Lalmi et al., 2021; Menhas et al., 2019).

Infrastructure development projects are inherently complex and fragmented, particularly for small and medium-sized enterprises (SMEs), which often grapple with due to their intricacy (Andrić et al., 2019; Narayanan et al., 2019). Projects that rigidly adhere to predefined project management parameters often struggle to adapt to global factors (Chester & Allenby, 2019; Morozova et al., 2019). The challenges posed by the inability to adapt are evident in the numerous projects that have been modified, failed, or halted (Carse & Kneas, 2019; Herrera et al., 2020; Y. Kim et al., 2019). Nevertheless, the government has remained steadfast in its commitment to prioritize spending despite the hurdles brought about by the pandemic. This commitment is exemplified through the revised budget for 2020, which placed a stronger emphasis on recurrent expenditure. However, this focus on recurrent expenditure continues to impact the annual infrastructure investment gap (S. Kim et al., 2020; Schindler & Kanai, 2021).

Small and Medium-sized Enterprises (SMEs) operating within South Africa's infrastructure development sector encounter significant hurdles in project management, impeding their efficiency and economic contributions. The insufficient adoption of effective project management methodologies by SMEs within infrastructure projects leads to issues such as delays, budget overruns, and suboptimal project outcomes (Carse & Kneas, 2019; Herrera et al., 2020). This study aims to investigate the challenge of inadequate project management practices among SMEs in infrastructure development (Baratashvili & Kldiashvili, 2019; Özkan & Mishra, 2019; Pace, 2019; Venkataraman & Pinto, 2023) and explore the potential of a hybrid project management model to address these issues, ultimately fostering better project outcomes and stimulating economic growth (Biyygautane et al., 2019; Govender, 2019).

This study focuses on investigating the effectiveness of a hybrid project management model that integrates various project management methodologies, with the overarching goal of enhancing the management of infrastructure projects within the SME sector. The investigation aims to assess how the incorporation of diverse project management approaches, such as lean construction and agile principles, can address external challenges and, in turn, lead to the improvement of project outcomes within this sector. Additionally, the research seeks to investigate the impact of the hybrid project management model on key facets of infrastructure projects, including the adherence to completion timelines, the control of project budgets, and the overall success of these endeavors. This study strives to delve into how the hybrid approach can optimize the allocation of resources, amplify the quality of risk management practices, and facilitate enhanced collaboration and communication among SMEs engaged in the complex landscape of infrastructure development.

To meet these research objectives, the study will employ an extensive literature review methodology, encompassing a wide array of sources including academic journals, books, and industry reports. This comprehensive review will enable a thorough analysis of existing knowledge pertinent to the efficacy of hybrid project management models in the context of infrastructure projects undertaken by SMEs. The

research will extend its focus to investigate the tangible outcomes and impacts that result from the implementation of such a model within SMEs involved in infrastructure projects, giving specific attention to aspects such as resource allocation, risk management, collaboration, and communication practices.

Through the synthesis and critical analysis of existing knowledge, this study aspires to pinpoint research gaps and contribute invaluable insights, which can be harnessed by practitioners, policymakers, and stakeholders within the infrastructure development sector. The ultimate goal is to offer concrete guidance on effective project management strategies and encourage the adoption of the hybrid approach to enhance project outcomes, thereby fostering economic growth and creating sustainable employment opportunities for SMEs within the sector.

The paper is structured into various sections to facilitate the exploration of how SMEs employ a hybrid project management approach in infrastructure development in Gauteng, South Africa. The study begins with an introduction that provides a comprehensive background of the research, articulates the problem statement, and lays out the research objectives.

The literature review section delves deep into the adaptive and agile conceptual hybrid project management model. It considers both internal and external factors that influence and enhance the successful management of infrastructure projects, especially in light of economic disruptors. This section synthesizes pertinent research and theoretical frameworks to establish a comprehensive understanding of the topic. Following the literature review, the research methodology section outlines the approach taken in the study and elucidates the process used for conducting the literature review. It highlights the methods implemented to ensure rigor and reflexivity in the research process, emphasizing the steps taken to collect and analyze data. This rigorous approach ensures the credibility of the study's findings.

The final section begins with the presentation of recommendations to address the findings and challenges identified in the study. Additionally, this section engages in a balanced discussion of the arguments for and against the research, providing a well-rounded perspective on the subject matter. A concise summary of the findings and concluding remarks are provided, offering a succinct overview of the study's key insights and their implications.

LITERATURE REVIEW

The literature review section of this study undertakes a comprehensive examination of existing knowledge and research findings concerning the efficacy of a hybrid project management model that integrates various project management methodologies. This model is explored in the context of enhancing the successful management of infrastructure projects undertaken by Small and Medium-sized Enterprises (SMEs). By synthesizing and critically analysing relevant literature from academic journals, books, and industry reports, this section aims to identify research gaps and contribute to the understanding of project management practices within the infrastructure development context. The literature review investigates the outcomes and impacts resulting from the implementation of a hybrid project management model within SMEs engaged in infrastructure projects. Emphasis is placed on the optimization of resource allocation, the enhancement of risk management practices, and the facilitation of improved collaboration and communication among SMEs.

The insights derived from this literature review will offer valuable guidance and recommendations for practitioners, policymakers, and other stakeholders involved in infrastructure development. It aims to provide practical strategies for enhancing project outcomes, stimulating economic growth, and creating sustainable employment opportunities.

The Significance of Small and Medium-sized Enterprises (SMEs) in Economic Development

SMEs are ubiquitous worldwide, often constituting over 90% of businesses in certain regions (Abisuga-Oyekunle et al., 2020; Haraguchi et al., 2017; World Bank, 2017) and employing more than half of the global population (Gherghina et al., 2020). These enterprises play a pivotal role in fostering economic development by creating employment opportunities, generating income, and ultimately reducing

poverty. Formally registered SMEs contribute an estimated 40% of the revenue to the Gross Domestic Product (GDP) or national income of developing and under-developed countries (Brixiová et al., 2020; Chege & Wang, 2020). Their contributions extend to the creation of products, goods, and services. SMEs are instrumental in job creation, poverty alleviation, new product development, and technological innovation (Brixiová et al., 2020; Otman, 2021; Pedraza, 2021), as innovation and entrepreneurship are fundamental drivers of industrial renewal and economic growth. To effectively address economic and social challenges, SMEs require a supportive environment and necessary support to attain their desired participation and growth within the economy (OECD, 2020; Sadiq et al., 2022).

Overview of Project Management

Project management is a comprehensive discipline encompassing a variety of areas (Fewings & Henjewe, 2019; Kuster et al., 2023; Pace, 2019). As described by Kerzner (2019), project management operates within defined constraints, which encompass timelines and budgets (Baratashvili & Kldiashvili, 2019; Cha & Maytorena-Sanchez, 2019; Kaufmann et al., 2020). The theoretical foundations of project management have evolved over time, and every project is inherently unique, characterized by specific and temporary qualities. Unlike routine organizational operations (Annamalaisami & Kuppuswamy, 2022; Bushuiev & Kozyr, 2020; Salvador et al., 2021), projects are defined as "a specific set of operations designed to accomplish a singular goal" (Project Management Institute, 2020). Each project is initiated and structured to deliver a unique service, product, or result (Chovanova et al., 2020; Elhusseiny et al., 2021).

This study delves into the project lifecycle, agile project management, Lean Six Sigma, and DMAIC (Define, Measure, Analyze, Improve, Control), laying the foundation for the development of a hybrid project management approach tailored specifically for SMEs. These concepts provide essential insights into existing project management frameworks and methodologies. By examining these concepts, the study aims to develop a hybrid project management model that effectively addresses the unique challenges faced by SMEs in the infrastructure development sector.

The Project Lifecycle

The project lifecycle comprises sequential project management processes, essential for evaluating, conceptualizing, and analyzing projects. This lifecycle establishes the procedures, systems, tools, and methods needed to execute a project. According to the Project Management Institute (2020), the project lifecycle is "a series of phases that a project passes through from its initiation to its closure." The APMBOK (2017) defines a lifecycle as "the inter-related phases of a project, program, or portfolio that provides a structure for governing the progression of the work."

The project lifecycle divides project management into distinct phases that serve various purposes, extending beyond planning. "These phases are vital for planning, defining, and guiding the steps necessary for project completion. Additionally, these phases ensure that a project progresses as planned" (Hassanain et al., 2023). The numerous phases categorize different activities and deliverables, enabling advancements and the assessment of completed work for future project improvements. Project managers may adapt the project's stages to accommodate industry-specific requirements, as each sector has unique needs, activities, and processes.

While the specific number of stages and their details may vary, there's a consensus that most projects follow a lifecycle comprising four stages (Araújo et al., 2022; Pinto, 2022): concept (feasibility phase), development (definition phase), execution, and termination (commissioning and handover phase). Many projects can be classified into logical stages or phases that represent activities and tasks performed during specific periods (Jin et al., 2019). The number and specifics of each stage are subjective and tailored to each project, but the fundamental sequence and structure remain consistent across projects.

Agile Project Management

Agile project management is a methodology that employs an iterative approach to project development. It allows immediate responses to inputs, enabling coherent adjustments at each step of a sprint or product cycle (Segebart, 2019). Agile project management promotes rapid adaptation to the ever-changing

environment and encourages cooperative and collaborative work within the project's timeline and budget constraints (Chovanova et al., 2020). In the early 1990s, software development teams discovered that highly structured conventional project management approaches, like the traditional Waterfall methodology, couldn't meet the dynamic demands of software development. The rigid nature of traditional methodologies hindered teams' ability to swiftly adapt to change (Pirro, 2019; Segebart, 2019).

Agile project management expects changes in stakeholder requirements, with testing conducted during the software development process, uncovering defects or non-functional components before end-users engage with the product or system. Agile approaches enable teams to accommodate these changes effectively and produce the best possible results (Chovanova et al., 2020; Segebart, 2019). This approach necessitates shorter development cycles known as sprints, an iterative process, constant feedback, and testing. The Agile Manifesto, born from these principles, values (1) individuals and interactions over processes and tools, (2) working software over comprehensive documentation, (3) customer collaboration over contract negotiation, and (4) responding to change over following a plan. These core values underpin agile project management standards (Özkan & Mishra, 2019; Pirro, 2019) and the twelve agile project management principles.

Lean Six Sigma and DMAIC

Lean manufacturing techniques often expand into lean project management techniques, primarily aimed at reducing waste or wastefulness in project management processes. Application of lean principles is expected to increase customer satisfaction and positively impact an organization's bottom line and profit margins. These principles, derived from successful companies like Motorola and Toyota (Daniyana et al., 2022), address seven waste factors by effectively reducing defects, overproduction, transportation, waiting, inventory, motion, and processing. The concept of "non-value-added time" (NVAT) was introduced, referring to time spent on non-essential project activities (Pongboonchai-Empl et al., 2023).

Womack & Jones (1996) introduced five core lean principles, including specifying customer value, identifying value streams, making value flow by eliminating waste, allowing customers to pull the flow, and continuous improvement in the pursuit of perfection. Value stream mapping is a critical aspect of lean principles that can enhance project management procedures (Ahmed, 2019; Nandakumar et al., 2020). Project managers are responsible for collaborating with functional managers to eliminate waste and ensure project success (Ahmed, 2019; Pongboonchai-Empl et al., 2023; Romero et al., 2019).

Six Sigma aims to achieve a 99.9% defect-free process and generates 3.4 errors per million opportunities or fewer (Panayiotou et al., 2022). The Six Sigma team, using the DMAIC process, identifies the underlying causes of problems. DMAIC consists of five phases: Define (define the problem and objectives), Measure (measure process variables), Analyze (analyze the process and influencing factors), Improve (implement improvements), and Control (assure sustainability of improvements) (Kerzner, 2019; Wahono, 2015). When Six Sigma and Lean are combined, the project team utilizes the lean six sigma toolbox to create substantial changes in business processes. The goal is to reduce defects affecting both internal and external customers and eliminate waste affecting cycle times and costs (Kerzner, 2019).

Hybrid Project Management Approach for SMEs

The review of existing literature forms the foundation for a conceptual hybrid project management model. This model extracts best practices from various project management methodologies, such as traditional, agile, and lean approaches (Afshari & Gandomani, 2022; Bushuiev & Kozyr, 2020; Lalmi et al., 2021). The conceptual hybrid project management approach blends the structure and predictability of traditional techniques with the adaptability and waste reduction of lean and agile methodologies. By combining these approaches, the model can pinpoint project failures with greater precision, maintaining and enhancing the project's strengths. This approach offers potential benefits in infrastructure development projects.

Conceptual Framework for Hybrid Project Management in SMEs

The conceptual framework for the hybrid project management model involves the integration of traditional, agile, lean, and Six Sigma principles to address the unique challenges faced by SMEs in infrastructure development projects (Brown & Adams, 2000). This model seeks to combine the strengths of each approach while mitigating their respective weaknesses.

Traditional Project Management. This component offers structure and predictability to project management. It defines the project scope, allocates resources, and establishes a baseline for project timelines and budgets.

Agile Project Management. Agile principles are infused to promote adaptability and responsiveness to changing requirements and circumstances. This element fosters collaboration, shorter development cycles (sprints), and continuous feedback.

Lean Project Management. Lean principles minimize waste, optimize processes, and enhance value delivery. Waste reduction and the elimination of non-value-added activities contribute to the efficiency of project management.

Six Sigma Principles. The Six Sigma methodology is employed to ensure process efficiency and reduce defects to an exceptional degree. DMAIC (Define, Measure, Analyze, Improve, Control) is applied to identify and eliminate root causes of issues, ensuring a highly effective process.

This hybrid project management framework leverages the strengths of each approach to create a holistic model that addresses the challenges faced by SMEs in infrastructure development. It aims to enhance project outcomes, optimize resource allocation, improve risk management, and foster collaboration and communication.

The literature review has provided a comprehensive understanding of the project management landscape, particularly in the context of infrastructure development projects undertaken by small and medium-sized enterprises (SMEs). SMEs play a crucial role in economic development, and their success is intricately linked to effective project management practices. The review has shed light on the significance of effective project management methodologies in addressing the challenges faced by SMEs in infrastructure development. Agile project management offers adaptability and responsiveness, while Lean principles focus on waste reduction and value enhancement. Six Sigma principles ensure exceptional process efficiency. By combining these methodologies into a hybrid project management model, SMEs can tap into the advantages of each while mitigating their limitations. This approach is particularly valuable in addressing the uncertainties and complexities of infrastructure development projects.

The conceptual framework presented here lays the groundwork for the development and implementation of a hybrid project management model tailored to SMEs in infrastructure development. This model has the potential to significantly improve project outcomes, optimize resource allocation, enhance risk management, and foster collaboration and communication within SMEs. The subsequent sections of this paper will delve deeper into the practical application of this hybrid model, offering insights and recommendations for practitioners, policymakers, and stakeholders involved in infrastructure development. By harnessing the power of this hybrid approach, SMEs can stimulate economic growth, create sustainable employment opportunities, and contribute to the advancement of the infrastructure development sector. The findings in this study aim to bridge the gap between theory and practice, offering tangible strategies for the successful management of infrastructure projects by SMEs.

METHODS

This study employs a literature review approach to investigate the utilization of project management methodologies by Small and Medium-sized Enterprises (SMEs) in South African infrastructure development projects. The literature review method offers a structured examination of existing knowledge and research findings, encompassing academic articles, books, conference papers, and industry reports, contributing to a comprehensive understanding of the research topic.

The primary data collection method for this study entails an extensive review of existing literature.

Various online academic databases, including reputable sources such as Google Scholar, JSTOR, and Scopus, were meticulously employed to search for peer-reviewed articles and other relevant resources. To ensure the selection of high-quality and pertinent sources, a well-defined set of keywords related to infrastructure development projects, SMEs, traditional project management, and hybrid project management were strategically deployed. These keywords guided the systematic retrieval of literature.

The data analysis process within this literature review study encompasses several vital stages. Initially, the amassed literature will be subject to rigorous organization and classification according to thematic categories. These thematic categories revolve around critical aspects such as project management methodologies, challenges faced by SMEs, and the effectiveness of different approaches. To discern recurrent patterns, emerging trends, and valuable insights within the literature, thematic analysis techniques will be meticulously applied. Furthermore, this study will incorporate comparative analysis techniques to juxtapose various project management methodologies and evaluate their respective impacts on SMEs involved in infrastructure development projects.

In summary, this literature review study adopts a systematic and rigorous approach to explore the implementation of project management methodologies by SMEs engaged in infrastructure development projects in South Africa. By conducting an exhaustive examination of existing literature, encompassing academic articles and industry reports, the study aims to provide a comprehensive grasp of the research topic. The methods and procedures of data collection involve targeted searches across relevant databases, guided by specific keywords. Concurrently, the data analysis process entails the meticulous organization of the accumulated literature, the identification of recurring themes, and the implementation of comparative analysis. This comprehensive methodology seeks to generate valuable insights and recommendations that can enhance project management practices within the SME context of infrastructure development.

This study maintains a steadfast commitment to upholding ethical considerations throughout the research process. In obtaining ethical clearance for this literature review, which delves into project management knowledge and the application of project management methodologies by SMEs in the realm of infrastructure development in Gauteng, the research secured approval from the EduREC Research Ethics Committee of the North-West University (Ethics approval number NWU-00994-21-A4). It's noteworthy that this literature review did not involve direct participation of human subjects. Nevertheless, ethical guidelines were scrupulously observed, guaranteeing the use of reliable, reputable, and ethical sources. Stringent citation and referencing practices were meticulously employed to credit the original authors and prevent any traces of plagiarism. Furthermore, in cases where copyright permissions were necessary, diligent efforts were made to secure these permissions, duly respecting intellectual property rights.

In conclusion, this study maintains a robust and systematic approach to scrutinize the utilization of project management methodologies by SMEs in South African infrastructure development projects. The data collection methods were characterized by strategic database searches and the application of specific keywords. The data analysis process involved the meticulous categorization of collected literature, thematic analysis, and comparative evaluation. This comprehensive research methodology is geared towards generating substantial insights and recommendations for the advancement of project management practices within the SME sector engaged in infrastructure development. Moreover, ethical considerations were vigilantly adhered to throughout the research process, ensuring the utmost integrity and respect for intellectual property rights.

FINDINGS

Influence of Macro-Environmental Factors on Project Management Processes

The achievement and efficiency of project management processes within SMEs engaged in infrastructure development projects are substantially shaped by macro-environmental influences beyond their direct control. Gaining insight into and adeptly navigating these factors is pivotal for SMEs to adapt to changing circumstances and optimize their project management methodologies ([Abisuga-Oyekunle et al., 2020](#); [Chege & Wang, 2020](#); [Haraguchi et al., 2017](#)).

Political, Governmental, and Legal Impact

The political arena in South Africa, characterized by diverse organizations and interest groups, exerts a profound influence on the economic landscape, moulding legislation and regulations that, in turn, impact infrastructure development projects (Lazenby, 2021). SMEs must acknowledge the government's role as a primary employer and patron in infrastructure ventures, and they should contemplate the ramifications of political decisions on their project execution (Haraguchi et al., 2017).

Economic, Societal, Cultural, and Demographic Dynamics

The economic sustainability of South African SMEs is intricately linked with economic variables encompassing inflation rates, interest rates, access to financial resources, unemployment rates, and trends in the gross domestic product (GDP) (Haraguchi et al., 2017). These variables wield a direct influence on project delivery within the infrastructure development sector, necessitating vigilance from SMEs regarding economic trends and their strategic repercussions (Ma et al., 2020; Perkins et al., 2005).

Demographic shifts and the societal, cultural, and sub-cultural characteristics of communities play a substantial role in shaping infrastructure development projects (Bushuiev & Kozyr, 2020; Y. Kim et al., 2019). Aspects such as educational levels, income disparities, and consumer behaviour have direct repercussions on project execution, prompting SMEs to incorporate these considerations when interacting with communities (Abisuga-Oyekunle et al., 2020; Hlongwane, 2022).

Technological Advancements and Environmental Influences

Technological progress can have a transformative effect on SMEs, fostering innovation and rendering existing practices obsolete (Lazenby, 2021). Awareness of technological changes in their respective industries is crucial for SMEs to remain competitive and innovative, as technology shapes products, services, marketing strategies, and competitive advantages (Lazenby, 2021).

The physical environment and global climate alterations present both opportunities and challenges to SMEs (Ali et al., 2020; Biygautane et al., 2019; Qobo & Dube, 2015). SMEs need to take into account potential transformations in the physical environment, encompassing aspects like resource scarcity and energy consumption, in order to mitigate risks and harness opportunities (Sadiq et al., 2022).

State Influence: Legislation, Regulations, and Compliance

The state, through municipal, provincial, and national regulations, significantly impacts numerous facets of SME operations, including tax laws, patent regulations, employment policies, and government expenditures (Lazenby, 2021). SMEs must fathom and adhere to the macro-environmental implications of legislative requirements within their project management approaches (Elhousseiny et al., 2021).

Strategic Frameworks and Business Considerations

Beyond the macro-environmental influences, SMEs must craft effective business strategies and operational models to adeptly navigate challenges and seize opportunities (Brosseau et al., 2019; Ithia, 2015). Strategic frameworks outlined by the government, such as the National Development Plan, steer infrastructure development projects and necessitate that SMEs align their services with broader societal goals (Lazenby, 2021). Incorporating project management methodologies as integral components of their operational models empowers SMEs to effectively realize strategic objectives (Brosseau et al., 2019).

Methodology and Approach

Ensuring alignment with legislative requirements and establishing a robust system for sustained progress is of paramount importance for SMEs (Lazenby, 2021). Consequently, a project management approach emerges as a vital tool within the SME arsenal, serving to ensure efficient project delivery. For SMEs to successfully navigate the landscape of project management, they must incorporate essential phases within their methodology or operating model. At a minimum, this should encompass initiation, planning, execution, commissioning, and decommissioning of projects. These elements need to be integral to every project undertaken by SMEs, guaranteeing uniformity and effectiveness, while providing the foundational structure for project initiation, execution, completion, and closure.

The methodology and approach employed in this study were focused on project management processes and the utilization of project management methodologies by SMEs in infrastructure development projects. The following headings encapsulate the critical findings below.

Initiating and Planning. During the initiation phase, SMEs evaluate the project's significance and engage with project sponsors or owners to comprehend project requirements and objectives. This phase involves developing a business case, a project charter, and a stakeholder registry (Kaufmann et al., 2020; Lalmi et al., 2021). The planning phase revolves around resource allocation, the establishment of project timelines and deliverables, and the utilization of tools such as work breakdown structure (WBS) and critical path methodology. In addition, agile methodologies, like daily meetings and Kanban Boards, aid in effective planning and communication (Goldstrong, 2021). For robust project control methods, a risk management approach is paramount (Annamalaisami & Kuppuswamy, 2022). Conventional project management methods utilize tools such as WBS, critical path methodology, and risk assessments during this phase to ensure a comprehensive project plan. The use of information technologies and building information modelling (BIM) as lean design tools can enhance communication within infrastructure development projects, effectively mitigating design errors and conflicts (Lalmi et al., 2021).

Execution, Implementation, and Control. In this phase, the project is executed in a phased approach, incorporating both traditional and agile techniques. The Lean Construction Institute's Last Planner System (LPS) serves as a workflow enhancement tool, while change management processes are introduced to ensure effective project execution and control (Karlsen & Berg, 2020; Kaufmann et al., 2020). LPS is hailed as a managerial approach for efficient construction project management. It ensures that each contractor and subcontractor on the site effectively manages their workload and remains accountable for their agreed-upon tasks (Brown & Adams, 2000; Hartono et al., 2019; Shaukat et al., 2022). The collaborative nature of LPS allows contractors and subcontractors to identify their tasks and determine the order in which each phase should be completed, promoting a more efficient workflow (Lalmi et al., 2021). Consistent use of these methods facilitates on-demand planning, past planning with stress analysis, weekly work planning based on reliable commitments, and learning based on planning system analysis. The execution phase involves SMEs performing the activities outlined in the planning phase (Annamalaisami & Kuppuswamy, 2022), fundamental to the LPS workflow approach. This entails executing tasks and functions to achieve the established objectives and deliverables through precise and functional activity management (Kaufmann et al., 2020). During this phase of the LPS workflow, SMEs effectively manage the time and resource allocation for the tasks and objectives.

Commissioning, Monitoring, and Maintenance. The commissioning phase signifies the project's conclusion and its handover to the project sponsor or end-user. Contracts are finalized, acceptance documentation is completed, and the project is prepared for utilization (Lalmi et al., 2021). The monitoring and maintenance phase sees SMEs scrutinizing the project's performance to ensure alignment with the required objectives. Assessment tools such as matrices and project monitoring and evaluation sheets are employed for ongoing evaluation (Guertler & Sick, 2021).

Modification. The modification phase allows for project adjustments and refinements based on monitoring and evaluation results. It empowers SMEs to make necessary revisions to ensure the continued achievement of the project's goals (Ma et al., 2020).

Environmental Monitoring. Sustained monitoring of macro-environmental factors, legal and regulatory dynamics, strategic frameworks, business processes, and project management techniques proves indispensable for SMEs. This practice enables the identification of external influences, allowing for project adaptation in response while ensuring compliance and minimizing environmental risks (Guertler & Sick, 2021; Özkan & Mishra, 2019).

Developing a Conceptual Hybrid Project Management Model for SMEs: Integrating Macro-Environmental Influences and Methodology Approaches

Through a comprehensive examination of the literature concerning macro-environmental influences on project management processes and the methodologies and approaches employed by SMEs, a conceptual hybrid project management model for SMEs (Figure 1) has been devised. This model seamlessly

integrates facets of traditional project management, agile methodologies, and lean design approaches to enhance project management practices within the SME context. The model underscores the importance of comprehending and adapting to macro-environmental factors, including political, economic, social, technological, environmental, and legal forces. By assimilating these elements into their project management approach, SMEs can effectively initiate, plan, execute, commission, and monitor projects, ensuring uniformity, efficiency, and the successful attainment of project objectives.

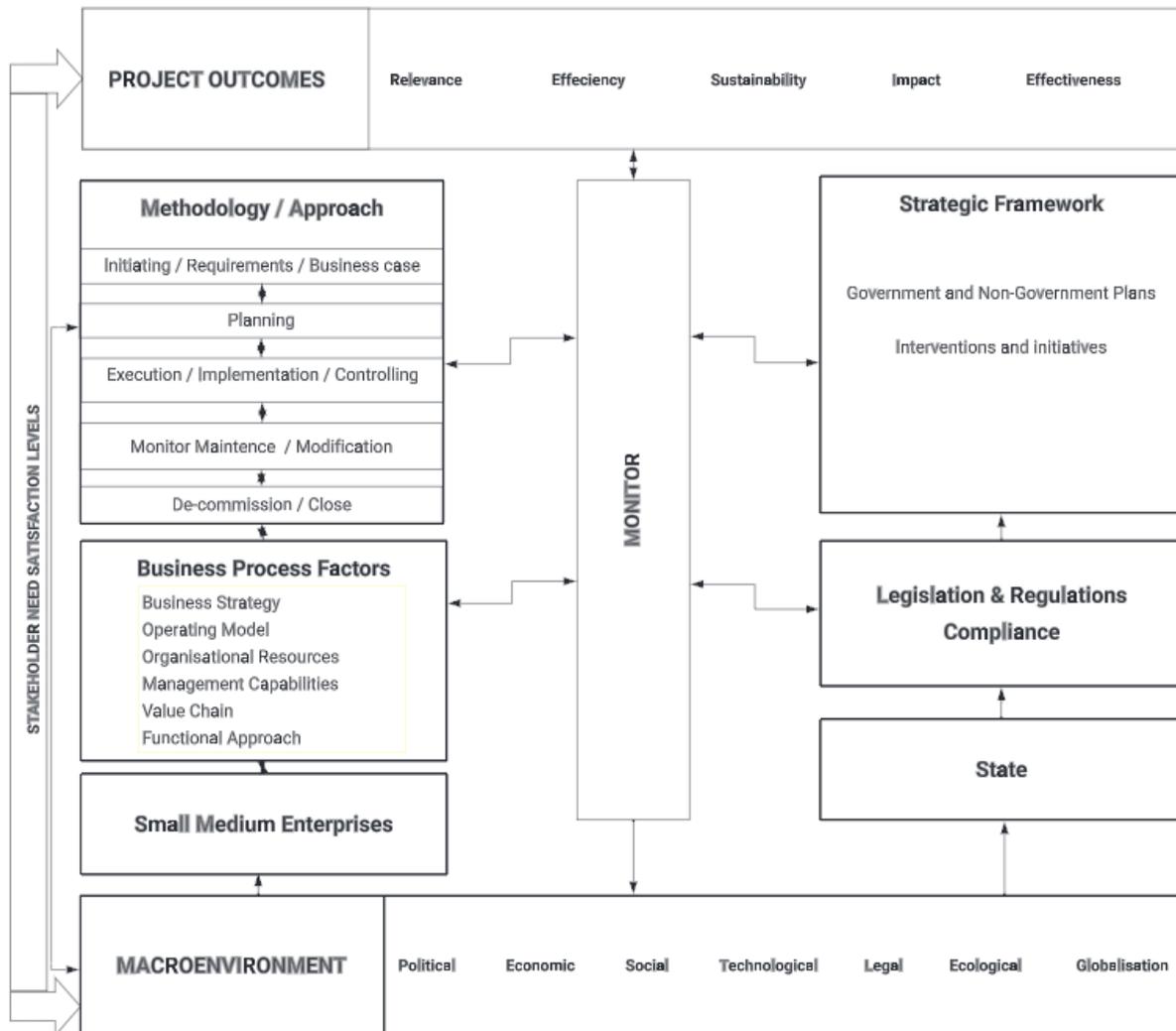


Figure 1. Hybrid Project Management Model Customized for SMEs Operating in Infrastructure Development

Source: Authors (2023)

The conceptual hybrid project management model represents a versatile and integrated approach tailored to bolster the capabilities of SMEs operating within the domain of infrastructure development projects (Afshari & Gandomani, 2022; Bushuiev & Kozyr, 2020; Lalmi et al., 2021). By harmoniously blending established traditional project management techniques, agile methodologies, and efficient lean design principles, this model establishes a comprehensive framework. At its core, the model excels in addressing macro-environmental influences, encapsulating a broad spectrum of factors, including political, economic, social, technological, environmental, and legal dimensions. Its central aim is to furnish SMEs with the tools and methods to consistently and efficiently handle the entire project lifecycle, from initiation to commissioning, ensuring a higher likelihood of achieving successful project outcomes.

One of the model's most distinctive features is its adaptability and responsiveness to the ever-evolving

landscape of infrastructure development projects (Lalmi et al., 2021). It empowers SMEs with a structured methodology to navigate diverse project phases while ensuring the fulfilment of legislative requirements, the preservation of operational sustainability, and the effective consideration of external influences that could impact project success. By embracing this integration of traditional, agile, and lean approaches within the context of macro-environmental forces, SMEs are better equipped to not only survive but to thrive amidst the intricacies of infrastructure development.

Moreover, the model's emphasis on macro-environmental considerations sets it apart by prompting SMEs to engage in a holistic and proactive approach to project management. By addressing factors such as political shifts, economic variables, societal influences, technological advancements, ecological sustainability, and regulatory compliance, the model equips SMEs with a strategic advantage. It encourages a broader understanding of the multifaceted dynamics that can shape project success or failure and equips SMEs with the ability to proactively respond to these forces. This comprehensive model offers not only a roadmap for managing individual projects effectively but also a strategic blueprint for long-term resilience and success within the competitive landscape of infrastructure development.

In conclusion, this study has offered valuable insights into the methodology and approach used to investigate the implementation of project management methodologies by SMEs in the context of infrastructure development projects. The development of the conceptual hybrid project management model presents a pivotal achievement, highlighting the critical role played by macro-environmental influences in SME project management practices. This model serves as more than just a framework; it signifies a significant step towards the enhancement of SMEs' capabilities in project management. By recognizing the multifaceted nature of their operating environment, SMEs can adapt and respond effectively to challenges and opportunities in infrastructure development projects.

This study underscores that SMEs, when armed with the understanding of macro-environmental forces, can not only align their projects with legislative requisites but also ensure sustained growth. Successful adaptation to external changes is a hallmark of thriving SMEs, and the model provides the basis for this adaptability. With the conceptual hybrid project management model in place, SMEs in South Africa have the tools they need to excel in infrastructure development projects, optimizing project outcomes and contributing to the country's growth and development. This research endeavor encourages SMEs to recognize the dynamic nature of their project management landscape and empowers them to shape their destiny in an ever-changing world.

MANAGERIAL IMPLICATIONS

The development of a conceptual hybrid project management model for SMEs carries significant managerial and practical implications.

Awareness of Macro-Environmental Influences. SMEs must proactively recognize and understand the impact of macro-environmental influences on their project management processes. This awareness empowers them to adapt their strategies, thereby mitigating risks and capitalizing on opportunities arising from the external context.

Flexibility through Integration. The integration of traditional project management, agile methodologies, and lean design approaches provides SMEs with a flexible and dynamic framework for executing projects. This integration empowers SMEs to effectively initiate, plan, execute, commission, and monitor projects, fostering consistency and effectiveness in their project management practices.

Continuous Monitoring of Macro-Environmental Factors. It is crucial for SMEs to prioritize the continuous monitoring of macro-environmental factors such as political, economic, social, technological, environmental, and legal forces. This ongoing assessment allows SMEs to adapt to changes in these factors and ensures that their projects remain aligned with the external context.

Investment in Training and Development. SMEs should invest in training and development programs to enhance their project management capabilities. These programs equip their teams with the necessary skills and knowledge to effectively navigate the complexities of hybrid project management.

Emphasis on Collaboration and Communication. Collaboration and communication within project teams and with stakeholders should be emphasized. This ensures a shared understanding of project objectives and fosters efficient decision-making, which is vital for successful project outcomes.

In conclusion, the managerial implications of the conceptual hybrid project management model underscore the importance of aligning project management practices with macro-environmental influences and adopting a flexible and integrated approach. By doing so, SMEs can enhance their project outcomes, improve their adaptability to changing circumstances, and ultimately, contribute to their long-term success and sustainability.

CONCLUSION

The application of a hybrid project management model incorporating various project management methodologies by SMEs in infrastructure development projects can result in faster project completion, enhanced adaptability to changing project requirements, and optimized workflow. Each project management process in this model facilitates continuous collaboration with stakeholders, which is essential for SME project management success.

The effectiveness of the hybrid project management approach in all phases of the model is critical for successful planning, initiation, and execution processes. This is deemed essential for SME project management. For this aspect to aid SMEs in project management and ensure project delivery aligns with the defined objectives and scope, SMEs should subject their projects to assessments that consider the hybrid approach and processes. This practice ensures effective project management within the SME.

One potential limitation of this study is that the proposed hybrid project management model has been primarily developed and evaluated within the South African context. Thus, its effectiveness and applicability may differ in other regions and industries. This limitation suggests the need for further research to validate and adapt the model in diverse contexts.

Another limitation could be related to the practical challenges that SMEs may encounter when implementing the hybrid project management model. Resource constraints, such as budget and skilled personnel, as well as resistance to change within SMEs, could hinder the successful adoption of this approach. Understanding these challenges and developing strategies to overcome them is an area for future exploration.

While the hybrid model emphasizes proactively addressing macro-environmental factors, some external influences may remain unpredictable or beyond an SME's control. These uncertainties may pose limitations to the model's effectiveness in managing external risks. Future research could delve into the specifics of dealing with such uncontrollable external factors within the hybrid project management framework.

Future research endeavors can concentrate on empirically validating the proposed hybrid project management model in various contexts and industries. This empirical research would aim to assess the model's effectiveness and efficiency, providing valuable insights into its real-world applicability and adaptability beyond the South African infrastructure development sector.

Exploring the challenges associated with implementing the hybrid project management model in SMEs is another area of interest for future research. Investigating the reasons behind resistance to change within SMEs and developing strategies to mitigate such resistance can aid in smoother model adoption.

Furthermore, an avenue for future research lies in a detailed examination of the continuous monitoring and adaptation to external factors as a core component of the hybrid project management model. Understanding the nuances of responding to different macro-environmental influences and their implications for project management is vital for enhancing the model's practicality.

In summary, this study's findings and the proposed hybrid project management model provide a promising foundation for SMEs to improve their project management practices. However, it is crucial to further explore the model's applicability in various contexts, address practical challenges, and delve into the nuances of managing external influences. Future research in these areas will contribute to the

model's refinement and its potential for advancing project management in the SME sector. Investigating the challenges and strategies for overcoming resistance to change when implementing hybrid project management in SMEs.

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CONFLICT OF INTEREST STATEMENT

There are no known conflicts of interest related to this article.

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