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Model for Construction Management in the Global South

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Abstract
This paper proposes an integrative model for construction management in the Global South that responds to persistent capacity gaps, institutional fragilities, and resource constraints while leveraging emerging opportunities in digitalisation and sustainability. The model is built around four mutually reinforcing pillars: contextual governance, lean and resilient project delivery, digitally enabled collaboration, and inclusive capacity development. Contextual governance emphasises alignment of project objectives with local regulatory frameworks, socio-cultural realities, and informal institutional practices, ensuring that decision making is transparent, participatory, and accountable. Lean and resilient project delivery focuses on waste minimisation, adaptive scheduling, risk sharing, and lifecycle value, enabling projects to cope with market volatility, political uncertainty, and climate-related disruptions common across many Global South countries. Digitally enabled collaboration promotes the graduated adoption of tools such as building information modelling, mobile data capture, and low-cost sensors, scaled to local infrastructure and skills, to improve information flow, coordination, and real-time performance monitoring. Inclusive capacity development targets contractors, client organisations, regulators, and communities through structured training, mentorship networks, and knowledge exchange platforms that foreground local expertise and indigenous construction practices. The model is further underpinned by a learning-oriented monitoring and evaluation architecture that integrates quantitative indicators with participatory assessments, allowing continuous refinement across project cycles and portfolios. Application scenarios are illustrated for public infrastructure, housing, and industrial facilities, highlighting how the model can be tailored to different procurement routes, financing structures, and institutional capacities. The paper articulates key implementation stages, from baseline diagnostics and stakeholder mapping to co-design of project charters, performance indicators, and feedback loops. It further identifies outcome metrics across cost, time, quality, safety, environmental performance, and social value creation. It also offers a basis for benchmarking national construction sectors, informing targeted regulation, donor programming, and professional education reform initiatives across diverse Global South contexts. By explicitly foregrounding equity, localisation, and climate resilience, the model provides policymakers, industry leaders, and development partners with a practical framework for transforming construction management from a cost-driven, fragmented activity into a strategic driver of sustainable development in the Global South.

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1. Introduction

Construction management in the Global South has evolved within complex historical, political, and socio-economic conditions that differ significantly from those of high-income countries. Rapid urbanisation, population growth, and infrastructure deficits have driven intense construction activity across many African, Asian, Latin American, and small island states. At the same time, sectoral development has often been shaped by colonial legacies, weak regulatory enforcement, fragmented supply chains, and

dependence on external finance and expertise.

These dynamics have produced construction environments where projects frequently face volatility in costs, delays in delivery, and uneven quality and safety outcomes, despite the centrality of the built environment to national development agendas and the Sustainable Development Goals (Abidin, *et al*., 2025, Oni, 2025).

Within this context, construction projects in the Global South continue to grapple with persistent capacity gaps, institutional fragilities, and chronic resource constraints. Public and private clients may lack robust project management systems, reliable data, and skilled personnel. Regulatory institutions often struggle to enforce standards, manage corruption risks, and coordinate across agencies. Contractors, particularly small and medium-sized firms, operate with limited access to finance, equipment, and technical support. These structural limitations are amplified by exposure to climate hazards, political instability, currency fluctuations, and supply chain disruptions. Conventional construction management models, largely developed in and for Global North contexts, do not adequately respond to these realities or to the embedded roles of informal practices and community-based arrangements (Awe, Akpan & Adekoya, 2017, Osabuohien, 2017).

The rationale for a dedicated model for construction management in the Global South therefore lies in the need for a framework that is both context-sensitive and forward-looking. Such a model must recognise the constraints imposed by institutional and market conditions while also leveraging emerging opportunities in digitalisation, local innovation, and climate-resilient design. It should bridge formal and informal systems, integrate governance and technical considerations, and foreground equity, localisation, and sustainability as core principles rather than peripheral concerns. By doing so, it can offer practitioners and policymakers a more realistic and actionable pathway for improving project outcomes and sector performance (Akpan, Awe & Idowu, 2019, Ogundipe, *et al*., 2019).

The aim of this paper is to develop and articulate a model for construction management tailored to the conditions of the Global South, grounded in principles of contextual governance, lean and resilient project delivery, digitally enabled collaboration, and inclusive capacity development. The specific objectives are to synthesise existing theoretical and practical insights on construction management in developing and emerging economies, to identify critical gaps in prevailing approaches, and to propose an integrative framework that can be adapted to diverse national and sectoral settings (Akinola, *et al*., 2024, Bobie-Ansah, Olufemi & Agyekum, 2024). The guiding research questions are: how can construction management practices be reconfigured to address the distinctive governance, resource, and capacity constraints in the Global South; what combinations of organisational, technological, and policy interventions are most promising for improving project performance; and how can local knowledge and innovation be systematically embedded in formal project delivery processes (Abdulrazaq, 2025, Jessa & Ajidahun, 2024)?

The scope of the paper encompasses public and private construction projects in infrastructure, housing, and industrial development across the Global South, with attention to the roles of state agencies, private contractors, professional bodies, and local communities. The discussion does not attempt to provide country-level case studies in depth but instead focuses on patterns, design principles, and implementation pathways that have broader applicability. The paper is structured to first outline the contextual characteristics of construction in the Global South and the theoretical foundations that inform the proposed model, then to elaborate its core components and mechanisms, and finally to consider its implications for policy, practice, and future research (Adeleke & Ajayi, 2024, Babalola, *et al*., 2024, Davies, *et al*., 2024).

2. Methodology

The methodology for developing the Model for Construction Management in the Global South integrates a hybrid multi-model analytical framework that draws inspiration from AI-driven predictive modeling, decision-tree analytics, project management optimization, and blockchain-enabled data integrity. This approach was designed to ensure that the resulting model is adaptable, transparent, and resilient under varied socioeconomic and institutional conditions characteristic of developing regions. The research adopted a multi-phase systems engineering method grounded in comparative modeling, decision analysis, and iterative simulation, aligning with the structured frameworks of Akinbode *et al*. (2025), Abidin *et al*. (2025), and Adeleke and Ajayi (2023).

The study commenced with a data acquisition and preprocessing stage, where both qualitative and quantitative data were collected from case studies, policy documents, and existing literature on construction practices in the Global South. Secondary datasets were sourced from institutional repositories and validated through descriptive statistics and exploratory data analysis. Drawing from Abdulkareem *et al*. (2023) and Akande *et al*. (2025), the research employed privacy-preserving AI models for data integrity during analysis, using homomorphic encryption to protect stakeholder information while enabling transparent computation within the collaborative framework.

In the model development phase, the C4.5 decision-tree algorithm (Abidin *et al*., 2025) was adapted to evaluate decision nodes representing the four pillars contextual governance, lean and resilient project delivery, digitally enabled collaboration, and inclusive capacity development. The algorithm facilitated the ranking of key variables such as stakeholder participation, resource availability, regulatory transparency, and digital maturity, thereby identifying the most critical predictors of project success. To enhance the robustness of this process, Bayesian inference and multi-agent simulation (Akinbode *et al*., 2024; Adeshina *et al*., 2025) were used to model uncertainty across political, financial, and environmental scenarios.

The optimization stage leveraged cost–benefit modeling techniques inspired by Adeleke (2025), integrating multi-criteria decision analysis to balance competing objectives such as cost, quality, and sustainability. A system dynamics approach was applied to simulate interactions among governance variables, contractor performance, and capacity-building interventions. To ensure scalability, federated learning architectures (Adeshina & Poku, 2025) were employed, enabling distributed model training across multiple regions without centralizing sensitive data. This approach aligns with privacy-aware digital transformation goals in infrastructure sectors, particularly in countries with underdeveloped cybersecurity frameworks.

The validation and evaluation phase adopted a hybrid of qualitative and computational methods. Expert evaluations were conducted through structured interviews with policymakers, engineers, and contractors across selected African and Asian countries. Their responses were coded using thematic analysis and triangulated with quantitative model outputs. Following Adeleke & Baidoo (2022) and Du Plessis & Oosthuizen (2018), a PMI-aligned competency assessment framework was integrated into validation to benchmark project management readiness levels. The reliability of the model was measured using performance indicators such as accuracy, consistency, scalability, and stakeholder satisfaction. Sensitivity analyses were conducted using Monte Carlo simulation to assess resilience under fluctuating parameters, including inflation, currency volatility, and climate risks.

Furthermore, the research incorporated blockchain-based audit trails (Adeoye *et al*., 2025; Adeoye *et al*., 2022) for transparency in governance and procurement tracking. This allowed each decision node to generate immutable records that improve accountability and discourage corruption. Data interoperability was ensured through smart contracts, enabling seamless communication between project management systems and regulatory databases. For predictive oversight, the model integrated AI-powered analytics dashboards (Adeshina, 2023; Akinbode *et al*., 2023) to visualize real-time performance indicators such as progress milestones, cost deviations, and carbon emissions, providing stakeholders with actionable insights.

The final implementation stage applied a human–AI collaborative design process (Adeleke & Olugbogi, 2025), combining stakeholder workshops with digital simulations to refine the model. Scenario analysis was used to test how digital interventions, such as BIM-enabled coordination or mobile app–based site reporting, influence project outcomes. Adaptive learning mechanisms were embedded into the model's architecture, enabling iterative refinement through continuous feedback loops, as proposed by Adeleke *et al*. (2024) and Akinbode *et al*. (2025). This approach ensures the model evolves as institutional capacities grow.

The overarching methodological logic followed the "Design–Simulate–Evaluate–Refine" (DSER) cycle. The Design phase entailed conceptual integration of the four pillars; the Simulate phase tested interactions using AI decision-tree and system-dynamics frameworks; the Evaluate phase measured efficiency, resilience, and inclusivity; while the Refine phase incorporated feedback from empirical validation and stakeholder consultations. Through this hybrid methodology, the model achieves a balance between academic rigor and practical applicability.

This methodological synthesis positions the Model for Construction Management in the Global South as a scalable, data-driven framework capable of supporting sustainable construction governance, resilience planning, and digital integration across emerging economies. By merging insights from AI-driven modeling, decision optimization, project management competency frameworks, and socio-technical systems design, it establishes a replicable foundation for transforming construction management into a more equitable, efficient, and transparent system.

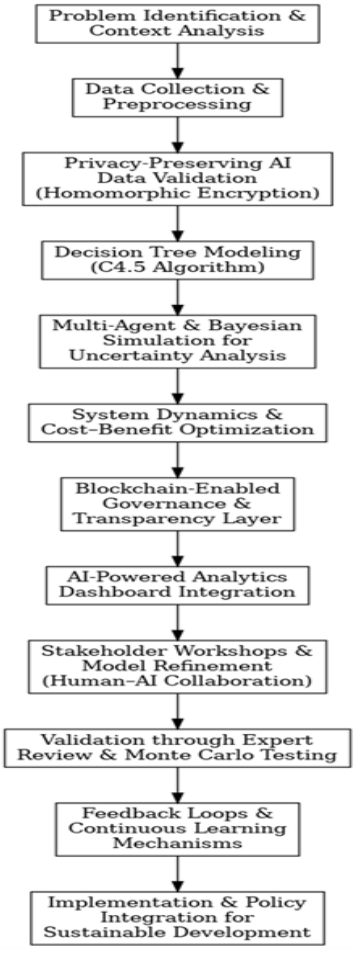

Figure 1: Flowchart of the study methodology

This flowchart represents the dynamic and iterative structure of the methodology combining artificial intelligence, blockchain transparency, lean optimization, and stakeholder collaboration. It ensures that governance integrity, technological integration, and contextual adaptability are maintained throughout the lifecycle of construction management in the Global South.

3. Contextual Overview of Construction in the Global South

Construction activity in the Global South unfolds within socio-economic and political landscapes that differ markedly from those of high-income countries, and these contextual realities shape how projects are conceived, financed, and delivered. Many countries across Africa, Asia, and Latin America are characterised by relatively low per capita incomes, high levels of informality, and pronounced inequalities between urban and rural areas as well as between elites and marginalised groups (Odezuligbo, Alade & Chukwurah, 2024, Oyeyemi, Orenuga & Adelakun, 2024). Public finances are often constrained, making governments heavily reliant on external borrowing, development assistance, or public–private partnerships for large capital projects. Political systems range from relatively stable democracies to fragile states facing recurrent conflict or social unrest, and changes in political leadership can rapidly alter priorities, disrupt project pipelines, or reallocate resources. Construction therefore unfolds amid competing interests, shifting policy agendas, and contested claims over land and resources, even as countries seek to address urgent development needs in housing, transport, energy, health, and education (Adeshina, Adeleke & Ndukwe, 2025).

Within this broader context, typical project environments span a wide spectrum, from donor-funded public works and megaprojects to incremental, self-built housing in informal settlements. Large-scale infrastructure such as highways, ports, power plants, water and sanitation systems, and mass transit corridors frequently involve multiple layers of international and local actors, including foreign contractors, development banks, and domestic ministries or parastatals. Housing projects range from formal estate developments and social housing schemes to incremental upgrading programmes and community-driven construction initiatives (Ayobami, *et al*., 2024, Davies, *et al*., 2024, Eyo, *et al*., 2024). In many cities, a significant share of the built environment is produced outside formal planning and permitting systems, as households and small-scale builders respond to acute housing shortages and affordability constraints. Industrial and commercial projects, including factories, warehouses, and retail complexes, often combine formal contracts with extensive subcontracting chains that reach deep into the informal economy, complicating coordination, quality assurance, and labour protection (Uzoho, 2021).

Regulatory frameworks across the Global South generally include formal building codes, planning regulations, procurement laws, and occupational health and safety standards, but enforcement is frequently uneven and capacity-constrained. Agencies responsible for planning approvals, environmental impact assessments, and site inspections may lack sufficient personnel, technical resources, or autonomy, and their decisions can be subject to political interference. Land administration systems may be fragmented or incomplete, with overlapping claims, weak record-keeping, and limited recognition of customary or collective tenure (Awe & Akpan, 2017). In practice, informal institutions and norms play a significant role in shaping construction processes. Social networks, patronage relations, and community leadership structures influence who gains access to contracts, land, and permits, while local dispute resolution mechanisms may be used to settle conflicts more often than formal courts. For many small firms and workers, relationships of trust, reciprocity, and reputation are as important as written contracts in governing collaboration and risk sharing. Figure 2 shows communication skills and leadership model for construction project management presented by Zulch, 2016.

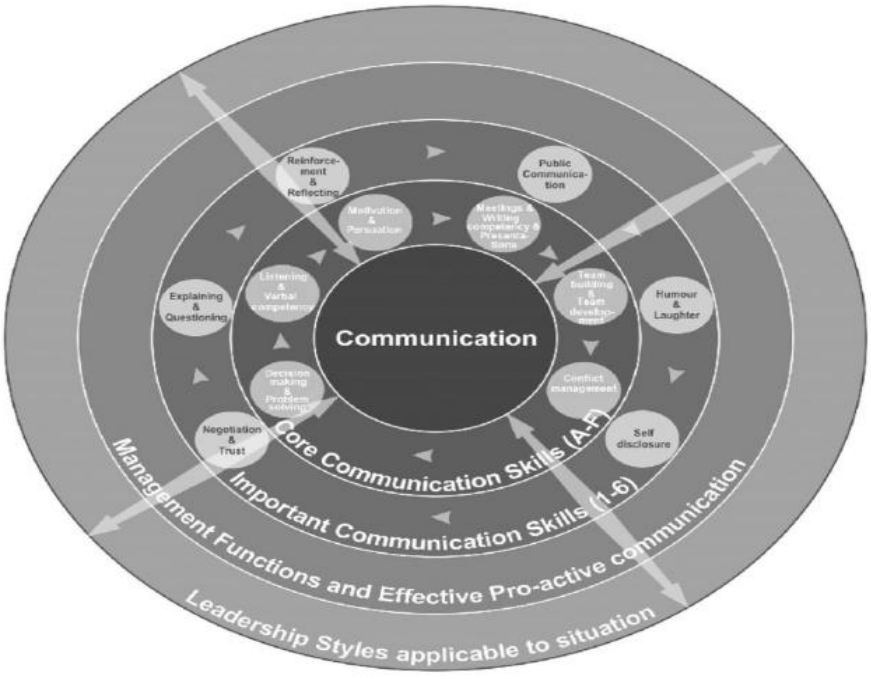

Fig 2: Communication skills and leadership model for construction project management (Zulch, 2016)

These institutional configurations give rise to persistent challenges that complicate construction management in the Global South. Corruption can distort procurement processes, inflate costs, and undermine quality and safety, as contractors cut corners to recover unofficial payments. Funding volatility is common, as projects depend on national budgets vulnerable to commodity price swings, currency devaluations, or shifting donor priorities. Delays in disbursement or changes in financing conditions can stall works, trigger claims, and damage contractor cash flow. Skills shortages affect both professional and vocational roles, with deficits in experienced project managers, engineers, quantity surveyors, and skilled trades such as masons, welders, and electricians (Ogunyankinnu, *et al*., 2024, Okon, *et al*., 2024). Training systems may be under-resourced, misaligned with industry needs, or inaccessible to women and disadvantaged youth, perpetuating gaps in human capital. Climate risks add another layer of complexity, as many countries are highly exposed to floods, heatwaves, storms, sea-level rise, and other hazards that threaten infrastructure integrity, disrupt supply chains, and require new design standards and construction practices.

Yet these contexts also generate significant opportunities that a tailored model for construction management can harness. Rapid urbanisation is creating strong demand for housing, transport, and social infrastructure, providing a powerful impetus for innovation in design, financing, and delivery. Expanding secondary cities and peri-urban areas open space for experimenting with more inclusive and climate-sensitive urban forms, including green infrastructure, transit-oriented development, and locally appropriate building technologies. Development finance from multilateral banks, climate funds, and blended finance instruments is increasingly tied to requirements around transparency, environmental and social safeguards, and performance-based contracting, which can incentivise better management practices and capacity building if effectively localised (Akinbode, *et al*., 2024, Folorunso, *et al*., 2024, Orenuga, Oyeyemi & Olufemi John, 2024)). At the same time, digital technologies are diffusing rapidly, even where basic infrastructure is limited. Mobile connectivity, cloud-based platforms, and relatively low-cost tools such as drones, geographic information systems, and building information modelling create possibilities for more accurate data collection, enhanced coordination, and real-time monitoring, provided that solutions are adapted to local resource and skills realities. Figure 3 shows characteristics of different categories of construction contracts presented by Du Plessis & Oosthuizen, 2018.

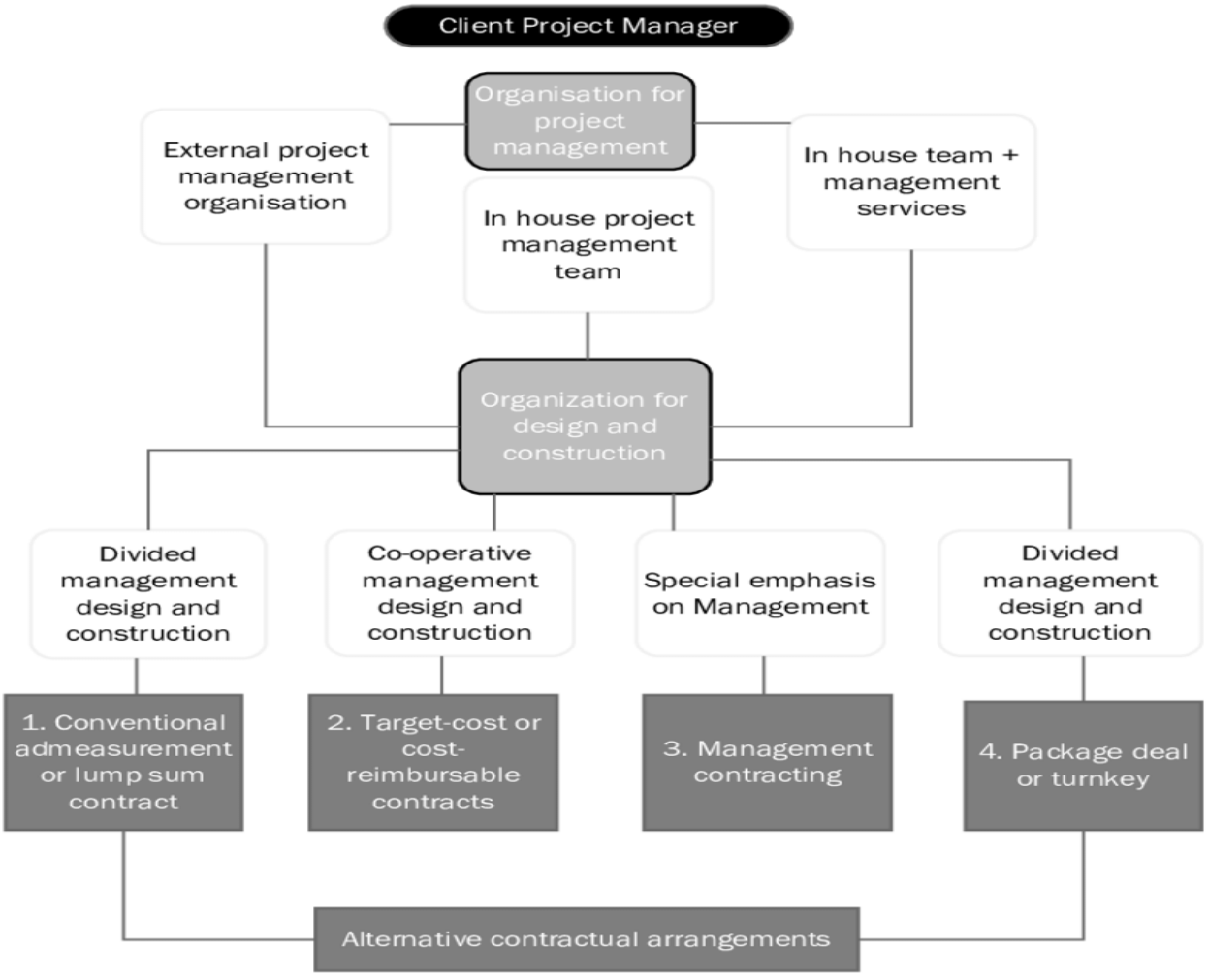

Fig 3: Characteristics of different categories of construction contracts (Du Plessis & Oosthuizen, 2018)

Innovation is not confined to technology; it is also evident in institutional and social arrangements that emerge from the everyday practices of communities, small contractors, and local governments. Community-driven reconstruction programmes, participatory upgrading initiatives, and social enterprises in housing and infrastructure demonstrate alternative ways of organising construction that can be more responsive, accountable, and empowering. Indigenous construction techniques, local materials, and vernacular design traditions offer important resources for sustainability and climate adaptation when integrated with contemporary engineering knowledge. Collaborative models that bring together universities, professional associations, civil society organisations, and industry actors are beginning to generate new curricula, research outputs, and professional standards tailored to local needs rather than imported wholesale from foreign contexts (Ajayi & Akanji, 2021, Ejibenam, *et al*., 2021, Osabuohien, Omotara & Watti, 2021). These developments suggest that, despite significant constraints, the Global South is also a site of experimentation and creativity that can inform globally relevant innovations in construction management.

Understanding this contextual landscape is essential for designing an effective model for construction management in the Global South. Any framework that seeks to improve project performance must grapple with the intersection of formal regulations and informal practices, the coexistence of sophisticated megaprojects and incremental self-build, and the dual pressures of acute development needs and escalating climate risks. It must recognise that projects are not merely technical exercises but are embedded in social and political struggles over land, resources, and recognition (Adeleke, Olugbogi & Abimbade, 2024, Ojuade, *et al*., 2024). At the same time, it should remain attuned to the opportunities presented by urbanisation, development finance, and multi-level innovation, leveraging these drivers to strengthen governance, build capacity, and embed resilience. A nuanced contextual overview, therefore, is not an academic preface but a practical foundation for reimagining how construction is managed, delivered, and governed across the diverse settings that constitute the Global South.

4. Theoretical and Conceptual Foundations

The theoretical and conceptual foundations of a model for construction management in the Global South must begin with a critical review of conventional theories and frameworks that have historically shaped the discipline. Traditional construction management theories largely developed in industrialised nations focus on rational planning, optimisation, and control. They draw heavily from systems theory, project management principles, and operations research. Models such as the project life cycle (initiation, planning, execution, and closure), critical path method (CPM), and earned value management (EVM) assume stable institutional contexts, predictable resources, and mature markets (Akanji & Ajayi, 2022, Francis Onotole, *et al*., 2022). These frameworks prioritise efficiency, time–cost–quality trade-offs, and stakeholder coordination under formal contracts. However, when applied in the Global South, these approaches often struggle due to contextual discontinuities: fragmented governance, limited data infrastructure, and the prevalence of informal arrangements. Thus, while these theories remain foundational, their assumptions must be adapted to account for uncertainty, complexity, and socio-political diversity (Mabo, Swar & Aghili, 2018).

A more recent shift in theory acknowledges that construction management is not merely technical but deeply socio-technical and institutional. The construction process involves negotiations among diverse actors with varying incentives and capacities. Institutional theory highlights how norms, regulations, and informal practices shape organisational behaviour, while socio-technical systems theory emphasises the interdependence of human and technological subsystems. Complexity theory adds that construction projects operate as dynamic, adaptive systems, sensitive to small perturbations in funding, weather, or policy (Odozor, *et al*., 2025, Oni & Iloeje, 2025). These perspectives collectively underscore that managing construction in the Global South requires more than applying imported tools; it demands contextual intelligence, adaptive learning, and institutional embedding.

Governance emerges as a central theoretical pillar in this regard. Governance refers to the structures and processes through which authority, accountability, and decision-making are exercised. In construction management, governance frameworks influence procurement methods, contractual relations, and stakeholder participation. Good governance emphasises transparency, accountability, participation, and rule of law all essential for mitigating corruption and ensuring equitable outcomes (Awe, 2021, Halliday, 2021). However, in many Global South contexts, governance is hybrid, blending formal and informal institutions. Understanding this hybridity is crucial for designing effective models: rigid enforcement of formal procedures without recognising local norms often leads to resistance, while excessive informality can foster inefficiency and corruption. A balanced governance model, therefore, must integrate participatory planning, community oversight, and digital transparency mechanisms to align global best practices with local legitimacy. Figure 4 shows Schematic Representation of the Organisation of the Construction Industry in Botswana presented by Ssegawa-Kaggwa, Ngowi & Ntshwene, 2013.

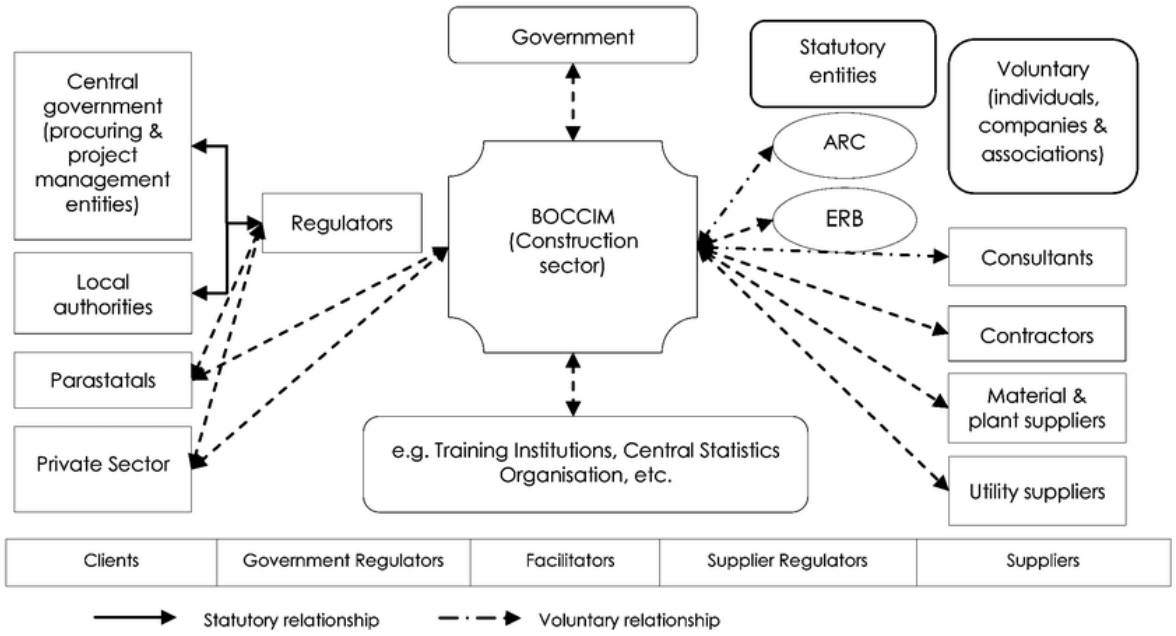

Fig 4: Schematic Representation of the Organisation of the Construction Industry in Botswana (Ssegawa-Kaggwa, Ngowi & Ntshwene, 2013)

The concept of lean construction provides another theoretical anchor. Rooted in the Toyota Production System and operations management, lean construction seeks to minimise waste, optimise value, and promote continuous improvement. It advocates for just-in-time delivery, collaborative planning, and respect for people principles that can enhance productivity even in resource-constrained environments. In the Global South, lean construction must be contextualised to address local supply chain realities, including unreliable logistics, fluctuating material costs, and labour informality (Babalola, *et al*., 2024). By emphasising process flow, collaboration, and visual management tools that are adaptable to low-tech settings, lean principles can help overcome inefficiencies that arise from fragmented project delivery and poor communication among stakeholders. Moreover, lean thinking supports knowledge sharing and worker empowerment, aligning well with capacity-building goals critical in developing economies (Olawore, *et al*., 2025, Umoh, 2024).

Resilience complements lean theory by addressing the capacity of construction systems to absorb shocks and recover from disruptions. Climate change, political instability, pandemics, and financial crises all pose recurrent threats to construction projects in the Global South. Resilience theory, borrowed from ecology and systems engineering, emphasises flexibility, redundancy, and adaptive capacity (Ilemobayo, *et al*., 2024, Selesi-Aina, *et al*., 2024). A resilient construction management framework anticipates risks through scenario planning, integrates redundancies in supply chains, and fosters institutional learning from past failures. It also calls for multi-scalar coordination from project sites to national agencies to ensure that recovery mechanisms are built into both infrastructure design and management processes. Integrating resilience into the construction management model ensures that projects contribute to long-term sustainability rather than merely short-term delivery targets (Abdulrazaq, 2023).

Digital transformation and the advent of Industry 4.0 represent a paradigm shift in how construction is conceived, designed, and managed. Industry 4.0 technologies including the Internet of Things (IoT), Building Information Modelling (BIM), drones, artificial intelligence (AI), and data analytics enable real-time monitoring, predictive maintenance, and enhanced collaboration. However, digital transformation in the Global South must be reframed through an inclusion lens. While advanced economies focus on automation and cyber-physical integration, the immediate priorities in developing contexts are digital access, capacity building, and low-cost innovation (Adeshina, 2021, Isa, Johnbull & Ovenseri, 2021, Wegner, Omine & Vincent, 2021). Cloud-based mobile platforms for project tracking, digital procurement portals to reduce corruption, and open-source BIM tools that can run on low-end hardware are more feasible entry points than fully automated factories. The theoretical discourse on digital transformation thus expands to include notions of "appropriate technology" and "frugal innovation," ensuring that digitalisation enhances human capabilities rather than deepening inequalities (Adeshina, 2025, Balogun, *et al*., 2025, Oyeyemi, Akinlolu & Awodola, 2025).

Inclusion, localisation, and sustainability provide the normative framing principles for the proposed model. Inclusion entails broadening participation in construction beyond traditional elites and professionals to encompass communities, small contractors, women, and youth. It draws from participatory development theory, which stresses co-creation, empowerment, and ownership as prerequisites for sustainable change (Uzoho, 2025). Localisation underscores the adaptation of practices, technologies, and standards to fit local material conditions, climatic realities, and cultural norms. It resonates with theories of endogenous development and appropriate technology that reject one-size-fits-all solutions. Sustainability, as articulated in the Brundtland Report and the Sustainable Development Goals, integrates economic efficiency, social equity, and environmental stewardship (Adewa, *et al*., 2025, Jimoh & Omiyefa, 2025, Osunkanmibi, *et al*., 2025). In construction, this translates into resource efficiency, low-carbon materials, circular economy approaches, and socially responsible labour

practices. These principles are not mere add-ons but constitute the ethical and strategic foundation of construction management reform in the Global South.

Synthesising these theories into a conceptual lens yields an integrative framework that positions construction management as a dynamic interface between governance, process optimisation, technological adaptation, and social inclusion. The model operates across four interlinked dimensions. The governance dimension ensures that decision-making is transparent, participatory, and adaptive to local institutional realities. The operational dimension embeds lean and resilient practices to improve efficiency and manage uncertainty. The technological dimension leverages digital tools appropriate to the resource environment, enhancing information flow and accountability (Ajayi & Akanji, 2023, Halliday, 2023). The human development dimension foregrounds inclusion, localisation, and capacity building as central mechanisms for long-term transformation. Together, these dimensions form a holistic approach that redefines success in construction management from merely delivering projects on time and budget to creating enduring value for people, institutions, and ecosystems (Nonso, *et al*., 2025, Ogundipe, *et al*., 2025).

This conceptual synthesis positions construction management in the Global South not as a derivative field but as a site of theoretical innovation. By merging insights from governance, lean and resilience theory, and digital transformation within an inclusionary framework, it challenges the dominance of Northern paradigms and proposes a model rooted in contextual reality and aspirational modernity. The Global South's diverse experiences where informality coexists with high-tech experimentation, and where community knowledge complements professional expertise offer fertile ground for developing hybrid models that can inform global discourse (Ogunyankinnu, *et al*., 2022, Oyeyemi, 2022). The resulting framework therefore aims to serve as both a practical guide for policymakers and practitioners and a conceptual contribution to rethinking construction management as a discipline attuned to the complexities of development, sustainability, and technological change.

5. Pillar 1: Contextual Governance and Stakeholder Alignment

Pillar 1 of the model for construction management in the Global South centres on contextual governance and stakeholder alignment, recognising that construction projects are not only technical undertakings but also political, social, and institutional processes. Governance structures and decision-making processes determine who sets priorities, allocates resources, interprets rules, and resolves conflicts. In many countries of the Global South, these structures include a mix of central ministries, subnational governments, parastatals, traditional authorities, and development partners, often with overlapping mandates and fragmented coordination (Adeleke and Olugbogi, 2025). Decision making can be highly centralised, vulnerable to political cycles, and influenced by patronage, which affects project selection, procurement, and contract administration. A contextually grounded governance model must therefore clarify roles and responsibilities, strengthen horizontal and vertical coordination, and create channels through which technical information, local knowledge, and public values can meaningfully shape project decisions (Abdulrazaq, 2023).

Stakeholder mapping and engagement strategies are crucial tools for operationalising this pillar. Construction projects typically involve a wide range of actors, including client agencies, contractors, consultants, financiers, utility providers, professional bodies, communities, and civil society organisations. In the Global South, this landscape is further complicated by the presence of informal builders, land speculators, political intermediaries, and customary leaders who exert significant influence even when they are not formally recognised in project documents. Effective stakeholder mapping identifies these actors, assesses their interests, power, and vulnerabilities, and determines appropriate modes of engagement throughout the project life cycle (Adeoye, *et al*., 2025, Olufemi, 2025). Engagement strategies may range from information sharing and public hearings, to participatory planning workshops, community monitoring committees, and co-management arrangements. When designed thoughtfully, these mechanisms help minimise conflict, anticipate social risks, and co-produce solutions that are technically sound and socially acceptable.

Transparency, accountability, and anti-corruption mechanisms are integral to contextual governance because they create incentives for ethical conduct and performance. In many Global South contexts, construction has been associated with inflated costs, substandard work, and political rent-seeking, which erode public trust and waste scarce resources. Addressing these problems requires both institutional reforms and practical tools. Transparent procurement portals, open access to project information, and clear criteria for contractor selection can reduce opportunities for manipulation. Independent audits, citizen report cards, and grievance redress mechanisms create avenues for oversight beyond the immediate project team. Performance-based contracts, linked to measurable milestones and verifiable outputs, help align contractor incentives with project objectives (Akinbode, *et al*., 2023, Onibokun, *et al*., 2023, Osabuohien, *et al*., 2023). Digital tools such as e-procurement systems, geotagged progress photos, and publicly accessible dashboards can reinforce these mechanisms, provided they are accompanied by capacity building and safeguards against data misuse.

The integration of local norms, community participation, and social licence is another defining aspect of this pillar. Formal governance systems often coexist with entrenched customary institutions, religious authorities, and community-based organisations that influence how land is accessed, how disputes are resolved, and how benefits and burdens are distributed. Construction management models that ignore these realities risk triggering resistance, delays, and even project failure. Social licence refers to the ongoing acceptance and approval of a project by affected communities and stakeholders. Securing this licence requires early, continuous, and meaningful engagement that goes beyond token consultation (Asonze, *et al*., 2024, Davies, *et al*., 2024, Odezuligbo, 2024, Wegner, 2024). It entails recognising local rights and customary claims, incorporating traditional knowledge into design decisions, and negotiating benefit-sharing arrangements that respond to community priorities, such as employment opportunities, compensation, or social amenities. Culturally sensitive approaches to communication and participation, including the use of local languages and trusted intermediaries, can significantly enhance legitimacy and cooperation.

Policy and regulatory implications flow directly from the emphasis on contextual governance and stakeholder alignment. Many construction-related laws and regulations in the Global South have been inherited from colonial administrations or imported from foreign jurisdictions with limited adaptation. As a result, they may be overly prescriptive, difficult to enforce, or misaligned with local realities. The proposed model suggests that reforms should focus on simplifying procedures, improving coherence across sectors, and embedding participatory and transparency requirements into statutory frameworks (Akande & Chukwunweike, 2023, Awe, *et al*., 2023, Ogundipe, *et al*., 2023). For example, planning and environmental legislation can mandate stakeholder engagement and social impact assessment, while procurement laws can codify open competition, disclosure of evaluation criteria, and conflict-of-interest rules. At the same time, regulators need adequate resources, training, and autonomy to implement these provisions fairly and consistently. Policy frameworks should also create space for experimentation with new forms of partnership, such as community–contractor joint ventures or social enterprises, that can deliver projects in ways that are inclusive and sustainable (Adeshina & Ndukwe, 2024, Olufemi, *et al*., 2024).

Bringing these elements together, contextual governance and stakeholder alignment provide the institutional backbone of the model for construction management in the Global South. They reframe project success as a function not only of technical delivery but also of how decisions are made, whose voices are heard, and how benefits and burdens are distributed. By recognising the hybrid nature of governance, where formal rules intersect with informal practices and community norms, the pillar encourages adaptive, negotiated, and participatory approaches instead of rigid, one-size-fits-all procedures (Adeshina, 2025, Okonkwo, *et al*., 2025, Oyeyemi, Akinlolu & Awodola, 2025). It also highlights the strategic use of transparency and accountability tools to combat corruption and build trust, while embedding community participation as a source of local insight and legitimacy rather than an obstacle. In doing so, this pillar lays the groundwork for the other components of the model, enabling lean and resilient project delivery, digital innovation, and capacity development to operate within a governance environment that is credible, inclusive, and responsive to the complex realities of construction in the Global South (Olaitan, *et al*., 2025, Umoh, *et al*., 2025).

6. Pillar 2: Lean and Resilient Project Delivery

Pillar 2 of the Model for Construction Management in the Global South emphasises lean and resilient project delivery as a core operational philosophy for enhancing efficiency, adaptability, and long-term sustainability. This pillar responds to the unique realities of resource-constrained environments, where materials, finance, skilled labour, and time are often limited, and where disruptions ranging from climate events to political instability can derail project outcomes. Lean and resilient delivery thus integrates process optimisation with adaptive management, ensuring that construction projects achieve value for money while remaining robust in the face of uncertainty (Ajayi & Akanji, 2022, John & Oyeyemi, 2022, Osabuohien, 2022).

Lean principles and waste minimisation provide the starting point for this approach. Originally derived from the Toyota Production System, lean thinking focuses on maximising value and eliminating all forms of waste whether in materials, time, or effort. In construction, waste often manifests as delays, rework, idle equipment, overproduction, and unnecessary transportation. In the Global South, such inefficiencies are exacerbated by poor logistics, unreliable suppliers, and fragmented subcontracting networks. Lean project delivery offers a framework for continuous improvement through value stream mapping, visual management, and collaborative planning. Simple yet effective tools such as the Last Planner System, pull scheduling, and just-in-time material delivery can be adapted to local conditions, even where digital capacity is limited (Adeshina, Adeleke & Ndukwe, 2025, Ngonso, *et al*., 2025, Ogunmolu, *et al*., 2025). The emphasis shifts from rigid adherence to plans toward a dynamic culture of problem solving, teamwork, and respect for workers' insights. Small and medium-sized contractors who dominate the construction landscape in the Global South can apply lean principles to manage limited resources efficiently, reduce waste, and improve client satisfaction.

Risk allocation, adaptive scheduling, and contingency planning form the second layer of lean and resilient project delivery. Projects in the Global South face multidimensional risks including currency fluctuations, supply chain disruptions, social unrest, and institutional delays. Traditional risk allocation mechanisms often transfer excessive risk to contractors, leading to inflated bids or disputes. A balanced approach is needed, where risks are allocated to parties best positioned to manage them (Obioha Val, *et al*., 2025). This requires transparent contracts, equitable negotiation, and joint risk registers developed at the project inception stage. Adaptive scheduling complements this by recognising that plans must evolve as new information emerges. Techniques such as rolling wave planning, milestone tracking, and scenario-based simulations allow managers to adjust work sequences and resource allocations without losing control of overall objectives. Contingency planning, informed by risk analysis, ensures that time and budget buffers are embedded in project baselines. These adaptive practices help maintain project momentum even amid disruptions, reinforcing resilience at both the project and organisational levels (Ajayi & Akanji, 2023, Oyeyemi & Kabirat, 2023).

Climate resilience, disaster risk reduction, and lifecycle thinking extend the notion of resilience beyond operational continuity to long-term sustainability. The Global South is highly exposed to climate-induced hazards such as floods, droughts, heatwaves, and sea-level rise, which directly affect construction materials, sites, and surrounding communities. Integrating climate resilience into project delivery means adopting site selection, design, and material choices that account for present and future climate risks (Adeshina, 2023, Onyedikachi, *et al*., 2023, Wegner & Ayansiji, 2023). It also involves conducting vulnerability assessments and embedding disaster risk reduction principles into planning and construction. Lifecycle thinking complements these efforts by shifting attention from short-term completion metrics to long-term performance, maintenance, and decommissioning. Lifecycle costing, durability assessments, and modular design can help reduce total cost of ownership while minimising environmental impact. In resource-constrained settings, this approach ensures that infrastructure investments are not only built to last but also adaptable to changing environmental and social conditions. Resilient

delivery therefore becomes a bridge between immediate project outcomes and the broader goal of sustainable development (Adeleke & Baidoo, 2022, Oyeyemi, 2022).

Quality, safety, and cost–time optimisation are interdependent outcomes of a lean and resilient system. Quality management ensures that the product meets design specifications and user needs, but in the Global South, quality assurance is often undermined by weak supervision, counterfeit materials, and limited technical training. Embedding quality into every stage of the project from design review to handover requires institutionalising standard operating procedures, material testing, and peer reviews (Akpan, *et al*., 2017, Oni, *et al*., 2018). Lean construction supports this by focusing on first-time quality and continuous feedback loops. Safety, likewise, is a persistent challenge where enforcement of occupational health and safety regulations is inconsistent. Resilient delivery models integrate safety planning into scheduling, emphasising hazard identification, worker training, and on-site communication. The use of low-cost safety innovations, such as locally made protective equipment or digital safety alerts, can enhance outcomes even in informal settings (Uzoho, 2022). Cost–time optimisation emerges not from cost-cutting but from aligning project activities, resources, and decision-making structures toward shared value creation. Techniques such as value engineering and critical chain project management allow teams to identify non-essential tasks, optimise sequences, and release contingency buffers when milestones are achieved.

Tools and techniques for implementing lean and resilient project delivery combine traditional management methods with context-appropriate innovations. The Last Planner System promotes collaborative scheduling, where frontline supervisors and workers jointly commit to weekly production goals, enhancing reliability and accountability. Value stream mapping helps teams visualise workflows, identify bottlenecks, and redesign processes for smoother flow (Adeleke & Ajayi, 2023, Adeshina, Owolabi & Olasupo, 2023, Oyeyemi, 2023). 5S (Sort, Set in order, Shine, Standardise, Sustain) methods, adapted from manufacturing, can be introduced on construction sites to improve organisation and reduce material loss. Simple visual controls such as daily progress boards and colour-coded task tracking enhance communication and allow non-literate workers to participate actively in project management.

Incorporating digital tools adds another layer of efficiency and resilience. Mobile applications for site reporting, cloud-based document sharing, and low-bandwidth Building Information Modelling (BIM) platforms can support data-driven decision making even in regions with limited connectivity. Remote sensing and drones can monitor progress and environmental compliance, while digital dashboards provide real-time visibility into cost and schedule performance. However, technology adoption must be guided by principles of appropriateness and scalability; the goal is not to replicate high-cost systems from developed countries but to embed affordable, user-friendly solutions that enhance local capabilities (Ajayi & Akanji, 2022, Leonard & Emmanuel, 2022).

Collaboration and cultural change are equally important to implementation. Lean and resilient delivery requires a shift from hierarchical command-and-control structures to participatory and trust-based relationships. Early contractor involvement, integrated project delivery, and partnering agreements can align incentives and reduce adversarial behaviour. Continuous improvement should be institutionalised through post-project reviews, knowledge-sharing sessions, and communities of practice that document and disseminate lessons learned. Capacity development plays a central role, with targeted training in lean tools, risk management, and climate adaptation tailored to local practitioners. Professional associations and universities can act as catalysts by integrating these concepts into curricula and certification programmes (Davies, *et al*., 2024).

In the broader context of the Global South, lean and resilient project delivery represents a paradigm shift from reactive problem solving to proactive value creation. It challenges the assumption that efficiency and resilience are luxuries reserved for wealthy nations by demonstrating that structured, disciplined, and participatory management can yield high returns even in resource-scarce environments. Projects implemented under this model are better equipped to withstand disruptions, deliver lasting social and economic benefits, and contribute to the achievement of Sustainable Development Goals related to infrastructure, decent work, and climate action (Akinbode & Taiwo, 2025, Olufemi, *et al*., 2025).

Ultimately, this pillar transforms construction management from a narrow focus on output delivery to a holistic process that integrates efficiency, adaptability, and sustainability. It enables project teams to think beyond short-term completion toward long-term resilience, fostering a culture of learning and innovation that is essential for the evolving demands of the Global South. By combining lean principles with adaptive and resilient strategies, this model creates a pragmatic and context-sensitive foundation for achieving consistent project success and sustainable development outcomes (Ajayi & Akanji, 2022, Isa, 2022).

7. Pillar 3: Digitally Enabled Collaboration

Pillar 3 of the Model for Construction Management in the Global South focuses on digitally enabled collaboration as a mechanism for bridging gaps in information flow, project coordination, and performance monitoring. Digital transformation has become an indispensable aspect of modern construction management, yet its implementation across the Global South remains uneven. Many countries and organisations operate in low-connectivity environments, face capacity constraints, and depend on fragmented systems. Despite these challenges, the growing affordability of technology and increasing mobile penetration create an opportunity to use digital tools strategically to enhance collaboration, transparency, and efficiency. Digitally enabled collaboration, when appropriately scaled to local contexts, has the potential to revolutionise project delivery and governance while strengthening the link between contractors, clients, and communities (Abdulkareem, *et al*., 2023, Adeleke & Ajayi, 2023, Halliday, 2023).

Appropriate digital tools form the foundation of this pillar. Building Information Modelling (BIM) is a central technology for integrating design, construction, and operation phases through shared digital representations. In the Global South, BIM adoption can help coordinate multidisciplinary teams, detect design clashes early, and optimise material use. While high-end BIM software may be costly, lightweight or open-source versions such as FreeCAD, BlenderBIM, and BIMcollab Cloud can be deployed on standard hardware. Cloud-based BIM

environments also allow for remote collaboration, making it possible for geographically dispersed project participants to work synchronously (Ogunyankinnu, *et al*., 2022, Onibokun, *et al*., 2022). Beyond BIM, mobile applications have emerged as powerful enablers of field-level management. Apps for project tracking, site inspection, worker attendance, and equipment management such as PlanGrid, Fieldwire, or locally developed equivalents provide real-time visibility even in low-resource settings. Low-cost sensors and Internet of Things (IoT) devices can further enhance project monitoring by capturing environmental data, material conditions, and structural performance. For instance, inexpensive temperature or vibration sensors can be deployed to monitor curing of concrete or track equipment utilisation. These tools collectively support a digitally connected construction ecosystem where decisions are based on accurate, timely data rather than assumptions or outdated reports (Akinbode, *et al*., 2025, Bako, *et al*., 2025).

Data governance, interoperability, and cybersecurity form the second crucial layer of digitally enabled collaboration. As construction projects generate vast volumes of data from design files to procurement records and sensor readings ensuring that this data is managed responsibly becomes paramount. Data governance involves defining ownership, access rights, quality standards, and retention policies. In many Global South contexts, data ownership between public agencies, contractors, and donors is poorly defined, leading to duplication, loss, or manipulation. Establishing clear governance frameworks allows for traceability and accountability across the project life cycle (Akande, *et al*., 2023, Akinbode, Taiwo & Uchenna, 2023, Onotole, *et al*., 2023). Interoperability is equally important; different project actors often use incompatible software, making it difficult to exchange or consolidate information. Open data standards such as IFC (Industry Foundation Classes) or COBie (Construction Operations Building Information Exchange) can enable seamless data flow between systems and stakeholders. Cybersecurity, though often overlooked, is critical for protecting sensitive project and financial information. Basic measures such as secure user authentication, encryption, and periodic backups should be incorporated from the outset. Given the prevalence of shared devices and public Wi-Fi in developing regions, awareness training for project teams on data protection and cyber hygiene is essential to prevent breaches and maintain stakeholder trust (Adeosun, *et al*., 2025, Babalola, *et al*., 2024).

Effective communication platforms and real-time performance monitoring are at the heart of collaborative digital ecosystems. Construction projects involve multiple actors who must coordinate across design, procurement, and site execution phases. Traditional communication methods paper documents, in-person meetings, and fragmented email threads are slow and prone to errors. Modern digital communication platforms like Microsoft Teams, Slack, Trello, and Asana can centralise project discussions, task assignments, and document sharing (Akinbode, *et al*., 2024, Olufemi, Anwansedo & Kangethe, 2024). These platforms can be supplemented by local-language chat groups on WhatsApp or Telegram for day-to-day coordination, provided that confidentiality and record-keeping protocols are observed. Real-time performance monitoring transforms collaboration into a data-driven process. Dashboards that visualise progress against cost, schedule, and quality indicators allow managers to make informed decisions quickly. Integrating drone imagery, site cameras, and mobile updates into these dashboards ensures that field realities are continuously visible to decision-makers. When coupled with predictive analytics, these systems can flag potential delays or cost overruns before they escalate, enhancing proactive management. Such transparency not only improves project control but also strengthens accountability to funders and communities (Akande, *et al*., 2023).

However, several barriers hinder digital adoption in the Global South. High initial costs of software licenses and hardware, unreliable electricity and internet connectivity, and limited digital literacy among workers and managers all constrain the uptake of digital tools. Organisational resistance also plays a role, as traditional construction cultures often value manual oversight and hierarchical communication. Furthermore, fragmented policy environments and lack of standardisation make it difficult to integrate new technologies into public procurement systems. Strategies for overcoming these barriers must be context-specific and incremental (Adeshina & Poku, 2025, Obioha Val, *et al*., 2025). Governments and development partners can establish digital infrastructure funds, offer tax incentives for technology adoption, and promote open-source solutions that reduce dependency on expensive imports. Capacity building is equally vital; vocational and professional training curricula should include digital construction management modules tailored to local conditions. Peer learning networks and demonstration projects can showcase successful examples, building confidence among practitioners. Multi-stakeholder partnerships between universities, software developers, and industry associations can drive localisation of tools and foster innovation ecosystems that support sustained adoption (Okonkwor, *et al*., 2025, Umoh, Ofurum & Folasade, 2024).

Scaling digital collaboration requires not only technological solutions but also cultural and institutional transformation. Leadership commitment within organisations is essential to move from ad hoc experimentation to systematic integration. Pilot projects should be used to test and refine digital workflows before scaling them across portfolios. Standard operating procedures that formalise data sharing, file naming conventions, and reporting protocols are necessary to institutionalise consistency (Babalola, *et al*., 2024). At the same time, flexibility must be preserved to allow for adaptation as technologies evolve. Incremental adoption strategies, where low-cost tools are introduced first and gradually upgraded, can help organisations build confidence while minimising disruption. Public policy frameworks that mandate digital project documentation, e-procurement, or BIM usage in certain project categories can accelerate diffusion at the sectoral level.

Case illustrations from various parts of the Global South highlight how digital collaboration can transform project outcomes even in constrained environments. In Kenya, the use of mobile-based project management tools by county governments has improved transparency and timeliness in road maintenance projects, allowing field engineers to upload geotagged progress photos that are automatically shared with supervisors. In India, the integration of BIM with government e-procurement platforms under the Smart Cities Mission has streamlined design approvals and reduced duplication between agencies. Nigeria has seen successful deployment of drone mapping and open-source GIS tools for monitoring housing projects and verifying contractor claims, reducing

fraud and enhancing spatial planning (Bamigbade, Adeshina & Kemisola, 2024, Taiwo and Akinbode, 2024). In Latin America, Chile's PlanBIM initiative has demonstrated how national-level coordination, combined with training and open data standards, can institutionalise BIM practices across the public sector. These examples show that digital transformation in construction is not limited to high-income countries; with contextual adaptation, digital collaboration can deliver measurable gains in efficiency, transparency, and inclusiveness.

Digitally enabled collaboration, as articulated in this pillar, redefines construction management in the Global South as a networked process grounded in data, communication, and shared accountability. It connects designers, contractors, regulators, and communities within an integrated digital environment that supports evidence-based decision making. By prioritising appropriate technologies, robust data governance, and inclusive capacity building, this approach ensures that digitalisation enhances local agency rather than creating dependency. The resulting ecosystem is one where information flows seamlessly across project stages, decisions are transparent, and risks are collectively managed. In essence, this pillar transforms the construction industry from a fragmented and reactive enterprise into a coordinated, knowledge-driven system capable of delivering sustainable infrastructure and social value in the challenging yet promising environments of the Global South (Ologun, *et al*., 2025).

8. Pillar 4: Inclusive Capacity Development and Learning Architecture

Pillar 4 of the Model for Construction Management in the Global South focuses on inclusive capacity development and a deliberate learning architecture, recognising that even the best-designed governance structures, digital tools, and process innovations will fail without people and institutions capable of using them effectively. Capacity in this context is not limited to technical skills; it spans organisational capabilities, institutional memory, and the collective competencies of contractors, clients, regulators, and communities. Contractors, particularly small and medium enterprises, often struggle with project planning, cost control, contract administration, health and safety, and adoption of digital tools (Adeoye, *et al*., 2025, Akomea-Agyin, 2025, Oladejo, *et al*., 2025). Clients in public and private sectors may lack expertise in project scoping, procurement strategy, risk allocation, and performance monitoring. Regulators frequently operate with limited staff, outdated guidelines, and weak enforcement mechanisms. Communities, who live with the consequences of construction projects, are rarely equipped with the knowledge to engage meaningfully in consultations, monitor impacts, or assert their rights. An inclusive capacity development strategy must therefore diagnose and respond to these differentiated needs, building a shared foundation of competence and mutual understanding across the project ecosystem (Uzoho, 2025).

Training, mentorship, and professional development pathways are central instruments for addressing these needs. Traditional capacity-building efforts in the Global South have often taken the form of short workshops or externally sponsored seminars that are disconnected from day-to-day practice and fail to sustain change. The proposed model calls for more embedded and iterative approaches. For contractors, this may involve structured on-the-job training programmes tied to specific projects, where site engineers, foremen, and tradespeople learn lean techniques, safety practices, and digital tools while applying them in real settings (Ajayi & Akanji, 2022, Isa, 2022). For client organisations, leadership and mid-level managers can benefit from tailored programmes on project governance, contract management, and data-driven decision making, delivered through partnerships with local universities and professional institutes. Regulators require specialised training in modern building codes, environmental and social safeguards, and risk-based inspection methods. Mentorship schemes, pairing experienced professionals with emerging practitioners, can help transfer tacit knowledge that cannot be captured in manuals. Professional development pathways should be clearly articulated, with competency frameworks, certification systems, and recognition mechanisms that incentivise continuous learning and performance (Ogundipe, *et al*., 2025, Okonkwor, *et al*., 2025, Olaitan, *et al*., 2025).

Knowledge co-creation and local innovation ecosystems extend capacity development beyond formal training into collaborative learning. Rather than importing solutions wholesale from other regions, the model emphasises generating context-appropriate practices through joint experimentation among practitioners, researchers, and communities. Construction projects can be treated as living laboratories where new materials, techniques, or management processes are piloted and refined (Adeleke, 2025, Adeshina, 2025, Taiwo, *et al*., 2025). Universities and technical colleges can work with contractors and client agencies to document case studies, develop guidelines, and translate research into practical tools. Innovation hubs and incubators focused on construction and infrastructure can support start-ups and social enterprises developing low-cost digital platforms, local materials, or community-based project delivery models. Communities bring valuable knowledge about local climate, land use, social dynamics, and cultural norms; structured mechanisms for capturing and integrating this knowledge into design and implementation strengthen both technical quality and social legitimacy. By fostering ecosystems where knowledge flows in multiple directions, the model counters the tendency toward top-down, consultant-driven interventions that marginalise local expertise.

Monitoring, evaluation, and feedback loops for continuous improvement are essential elements of the learning architecture. In many construction sectors across the Global South, lessons from past projects are not systematically captured, leading to repeated errors and missed opportunities for improvement. The proposed model encourages the institutionalisation of simple but robust mechanisms to document what works and what does not. At the project level, after-action reviews and learning workshops can be held at key milestones and at completion, engaging contractors, clients, supervisors, and community representatives in reflecting on performance against objectives (Olufemi, *et al*., 2024, Umukoro, *et al*., 2024). These reflections should not be limited to technical issues but also encompass governance, stakeholder engagement, and capacity gaps. At the organisational level, project portfolios can be analysed to identify recurring risk factors, cost overruns, or quality issues, and to adjust policies and procedures accordingly. Sector-wide learning can be supported through communities of practice, professional networks, and open-access knowledge platforms where tools, datasets, and lessons are

shared. Feedback loops become most powerful when they directly inform decision-making: procurement criteria, training curricula, regulatory reforms, and investment priorities should be revised in light of evidence from ongoing and completed projects (Akande, *et al*., 2023, Akinbode, *et al*., 2023, Chukwuemeka, Wegner & Damilola, 2023).

Indicators for measuring capacity and performance gains provide the metrics needed to track progress and justify investment in capacity development. These indicators should be multi-dimensional, capturing changes at individual, organisational, and systemic levels. At the individual level, indicators might include the number of practitioners certified in specific competencies, improvements in test scores from pre- and post-training assessments, or demonstrated proficiency in using digital tools. At the organisational level, measures may encompass reductions in project delays and cost overruns, improvements in safety records, increased use of standard procedures, or the proportion of projects using participatory planning methods. For regulators, indicators could track inspection coverage, compliance rates, and turnaround times for approvals (Akomea-Agyin & Asante, 2019, Awe, 2017, Osabuohien, 2019). At the community level, one might monitor the extent of meaningful participation in decision-making processes, satisfaction with project outcomes, and the number of community-generated monitoring reports. System-level indicators could include broader trends such as the proportion of public projects delivered using integrated digital platforms, the uptake of green building standards, or the diversification of the contractor base to include more local and women-led firms. Importantly, indicators should be co-designed with stakeholders to ensure that they reflect shared priorities and are feasible to measure in resource-constrained settings (Adeoye, *et al*., 2025, Olufemi, *et al*., 2025).

An inclusive capacity development and learning architecture ultimately seeks to transform the culture of construction management in the Global South from one of episodic, project-by-project problem solving to one of deliberate, cumulative learning. It recognises that capacity is not a static attribute but a dynamic process of acquiring, applying, and refining knowledge and skills. By embedding training, mentorship, and professional development within real projects; by nurturing innovation ecosystems that value local knowledge; and by institutionalising monitoring and feedback loops that inform policy and practice, this pillar creates the conditions for sustained improvement (Akande, 2025, Oladejo, *et al*., 2025). The focus on inclusive capacity development ensures that benefits are not confined to a narrow group of professionals but extend to communities and marginalised actors whose voices are often excluded yet whose cooperation is essential for project success. As these capabilities grow and are measured through meaningful indicators, the construction sector becomes better equipped to implement the other pillars of the model contextual governance, lean and resilient delivery, and digitally enabled collaboration thereby contributing to more reliable, equitable, and sustainable infrastructure development across the Global South (Adetunmbi, *et al*., 2025, Oladejo, *et al*., 2025).

9. Conclusion

The model for construction management in the Global South brings together four mutually reinforcing pillars that reposition construction as a socio-technical, learning-oriented, and context-responsive enterprise. Contextual governance and stakeholder alignment provide the institutional backbone, clarifying roles, embedding participation, and using transparency to build trust and curb corruption. Lean and resilient project delivery offers an operational philosophy that seeks to minimise waste, manage risk adaptively, and extend attention from immediate outputs to long term functionality and climate resilience. Digitally enabled collaboration creates the connective tissue that links actors, data, and processes through appropriate technologies that are scaled to local resources and capacities. Inclusive capacity development and learning architecture ensure that these structural and procedural innovations are sustained by people, organisations, and communities that possess the skills, confidence, and institutional memory to use them effectively. Together, these pillars form an integrated framework that responds directly to the intertwined institutional, technical, and social realities that shape construction in the Global South.

In theoretical terms, the model contributes to a shift away from a narrow, technocratic view of construction management that is built around universal tools and assumptions of stability. It synthesises insights from governance theory, lean and resilience thinking, socio-technical systems, and digital transformation, and reframes them within a normative commitment to inclusion, localisation, and sustainability. By foregrounding informal institutions, hybrid governance, and community knowledge, the model challenges the dominance of paradigms developed in high income contexts and advances a more plural and context-sensitive theoretical lens. For policy, the framework provides a structured basis for revisiting procurement legislation, planning and regulatory systems, professional standards, and public investment strategies in ways that embed participation, digital transparency, and climate risk considerations. For practice, it offers a set of concrete orientations and tools that contractors, client agencies, regulators, and development partners can use to redesign project delivery processes, adopt appropriate digital platforms, and build multi-actor learning systems.

The implications for sustainable development in the Global South are significant. Construction is central to achieving goals related to infrastructure, housing, health, education, decent work, and climate action, yet poorly managed projects can entrench inequality, environmental degradation, and fiscal stress. By embedding climate resilience, lifecycle thinking, and social licence within everyday construction management, the model supports infrastructure that is not only built but also durable, adaptable, and socially embedded. Through its emphasis on inclusive capacity development and local innovation ecosystems, it also opens channels for small firms, women, youth, and communities to participate more fully in the economic and social benefits of the sector. Digitally enabled collaboration and transparent governance mechanisms help strengthen accountability for public expenditure and reduce opportunities for rent seeking, which is vital for maintaining public trust and mobilising resources for long term investment.

At the same time, the proposed model has limitations that must be acknowledged. It is presented at a relatively high level of abstraction and does not prescribe detailed implementation pathways for specific countries, sectors, or project types. The diversity within the Global South means that institutional and market conditions can vary widely, and what is feasible in one setting may not be realistic in another.

The model also assumes a minimum degree of political will, institutional stability, and openness to reform that may not always exist. Digital components may be constrained by infrastructure gaps, while lean and resilient practices may be difficult to embed in highly adversarial contracting cultures. In addition, the model does not fully resolve tensions between short term pressures for rapid delivery and the long term investments needed in capacity building and governance reform. These limitations suggest that the framework should be treated as a guiding scaffold rather than a rigid blueprint.

These caveats point toward important directions for future research and implementation. Empirical studies are needed to test and refine the model in different contexts, including comparative analyses of projects and programmes that adopt some or all of its pillars. Such research could examine, for example, how specific combinations of governance reforms, digital tools, and capacity building interventions influence project performance and sector transformation over time. There is also scope for methodological work on indicators and measurement systems that can capture changes in capacity, collaboration quality, and resilience, rather than focusing solely on cost and schedule outcomes. Action research approaches, in which practitioners, communities, and researchers co-design and iterate interventions, would be particularly valuable in grounding the model in lived realities.

From an implementation perspective, a phased and adaptive strategy is essential. Governments and development partners could begin with pilot programmes that integrate elements of contextual governance, lean delivery, and basic digital tools in selected project portfolios, accompanied by strong monitoring and learning components. Professional bodies and academic institutions can be engaged early to develop curricula, certification schemes, and communities of practice aligned with the model. Donors and international agencies can align funding conditions with the framework by promoting transparency, participation, and digital documentation requirements while supporting long term capacity development rather than short term consultancy driven approaches. Importantly, feedback from contractors, site workers, and communities should be built into the design and revision of these initiatives, ensuring that the model evolves in response to practice and does not become another imported template.

In conclusion, the Model for Construction Management in the Global South offers an integrated, context-aware, and future oriented framework that seeks to convert construction from a fragmented and often opaque activity into a strategic driver of sustainable development. By coupling institutional reform with process innovation, digital collaboration, and inclusive learning, it provides a pathway for countries to leverage construction not only to build physical assets but also to strengthen governance, expand opportunities, and enhance resilience in the face of profound social and environmental change.

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