

Sustainable Regional Development through Safe Construction Governance in Vision 2030 Giga-Projects

Vipin Morakandy Kooloth^{1*} 

¹Independent Researcher

*Corresponding Author

Vipin Morakandy Kooloth

Independent Researcher

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Abstract: Saudi Arabia's Vision 2030 giga-projects are reshaping regional development through new tourism, mobility, housing, logistics, heritage, entertainment, energy and smart-city assets. Their scale, simultaneity and geographic dispersion make safety governance more than a site compliance function: it becomes a development capability that protects workers, stabilizes delivery, strengthens investor confidence and translates construction expenditure into durable social value. This review synthesizes recent literature and institutional evidence from 2020 to 2025 to examine how safe construction governance can support sustainable regional development in Vision 2030 giga-project environments. The review adopts an integrative narrative method, combining peer-reviewed studies on Saudi construction safety climate, occupational health and safety management systems, digital safety technologies, megaproject governance and sustainability reporting with official Saudi regulatory and program sources. The paper proposes a Safe Construction Governance for Regional Value framework built around five linked domains: leadership accountability, risk-based planning, worker welfare, digital assurance and regional value integration. Findings show that the strongest safety outcomes are likely where governance is embedded early in project selection, design, procurement, contractor onboarding, work packaging and benefit realization, rather than treated as an inspection activity after mobilization. The review concludes that Saudi giga-projects can become international exemplars when occupational safety, environmental protection and community development are governed as one integrated value system.

Keywords: Vision 2030, Giga-Projects, Construction Governance, Occupational Safety, Sustainable Regional Development, Saudi Arabia.

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1 INTRODUCTION

Saudi Arabia's Vision 2030 has converted regional development into a portfolio of highly visible mega and giga-projects. NEOM, Red Sea Global, Qiddiya, Diriyah, ROSHN and wider infrastructure programs are intended to diversify the economy, generate jobs, improve quality of life and position the Kingdom as a competitive global destination. The Vision 2030 Annual Report presents transformation as a cross-sector national program, while PIF

describes giga-projects as vehicles that stimulate the economy beyond real estate and infrastructure (Vision 2030, 2025; PIF, 2025). Market analysis similarly reports a project pipeline of exceptional value, spatial reach and delivery speed (Knight Frank, 2024). In this context, construction is not merely a production activity; it is the physical mechanism through which regional policy becomes lived infrastructure.

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The scale of simultaneous construction also creates a governance challenge. Giga-project sites concentrate temporary workforces, high-risk equipment, tight schedules, complex subcontracting chains, logistics pressure, extreme climate exposure, migrant worker dependence and public scrutiny. Saudi construction safety research identifies management commitment, supervision, communication, training, worker involvement, social security and competence as major determinants of safety climate (Mosly and Makki, 2020; Makki and Mosly, 2021). Other Saudi studies show that implementation barriers, quality-system maturity and accident trends remain important issues for contractors and public stakeholders (Al-Otaibi and Kineber, 2023; Alghaseb and Alshmlani, 2022; Alsulami, 2025). These findings imply that safety performance depends less on isolated toolbox talks and more on governance systems that align client decisions, designer choices, contractor controls and worker participation.

Sustainable regional development requires economic, social and environmental gains to be delivered together. In construction, this means that the benefits of new districts, resorts and transport assets should not be undermined by preventable injuries, weak welfare arrangements, excessive rework, poor emergency preparation, carbon-intensive methods or distrust among affected communities. The global literature increasingly frames occupational health and safety management systems as part of sustainability, because they improve communication, consultation, productivity and worker wellbeing (Kineber *et al.*, 2023; Navarro Claro *et al.*, 2025). Similarly, megaproject scholarship argues that governance must deal with moving goals, changing stakeholders and long-term public value rather than only scope, cost and schedule (Bourne *et al.*, 2023; Li *et al.*, 2024). This review therefore examines safe construction governance as a strategic regional development tool for Vision 2030 giga-projects.

2 Aim and Objectives of the Study

The aim of this review is to develop a conceptual and practice-oriented understanding of how safe construction governance can strengthen sustainable regional development in Vision 2030 giga-projects. The study moves beyond the narrow question of how to reduce accidents on individual sites and instead asks how safety governance can become part of regional value creation.

Five objectives guide the review. First, it identifies recent safety, sustainability and governance themes that are most relevant to Saudi giga-project delivery. Second, it explains the institutional context created by Vision 2030, PIF giga-

projects and Saudi occupational safety and health regulation. Third, it evaluates how leadership, procurement, worker welfare, digital assurance and reporting affect safe project performance. Fourth, it proposes an integrated governance framework that connects construction controls with economic, social and environmental development outcomes. Fifth, it highlights research and policy priorities that can help Saudi giga-projects move from compliance-based safety toward learning-based, data-enabled and regionally accountable safety governance.

3 REVIEW METHODOLOGY

This paper follows an integrative narrative review method suitable for topics where empirical evidence, policy documents and practitioner frameworks must be interpreted together. The attached Springer-style model paper was used as a structural reference because it organizes Vision 2030 transformation around thematic domains and institutional examples, while maintaining a concise review format (Murshid, 2024). For the present topic, the search focused on literature and official sources published from 2020 to 2025. Search strings combined terms such as safe construction governance, Saudi Arabia construction safety, Vision 2030 giga-projects, occupational safety climate, OHS management systems, digital construction safety, megaproject governance, sustainability reporting and regional development.

The review drew on four evidence groups. The first group included Saudi construction safety studies addressing safety climate, implementation barriers, prediction models, quality management and accident trends. The second group covered international review papers on OHS management systems, digital technologies, BIM, AI, IoT, sustainability reporting and megaproject governance. The third group contained official or semi-official Saudi sources from Vision 2030, MHRSD, NCOSH, GASTAT, PIF and giga-project entities. The fourth group included global policy or benchmarking documents on safe work, buildings and construction decarbonization, and megaproject decision-making. Sources were included when they were recent, relevant to construction or governance, and useful for interpreting regional development value. Sources were excluded when they were older than 2020, unrelated to construction governance, or purely promotional without evidence of mechanisms.

The analysis used thematic synthesis. First, each source was coded against three questions: what safety governance problem is identified, what mechanism is proposed, and what regional development outcome may follow. Second, recurring mechanisms were grouped into governance domains. Third, these domains were translated into a

conceptual framework that can be used by clients, program management offices, contractors and regulators. Because this is a review paper, no human subjects, experiments or confidential project data were used. The method is intended to be transparent, replicable and appropriate for a conceptual article aligned with Scopus and Web of Science review expectations.

4 Vision 2030 Giga-Projects as Regional Development Systems

Vision 2030 giga-projects are distinctive because they operate as regional development systems, not single construction contracts. PIF states that giga-projects are designed to stimulate economic diversification beyond real estate and infrastructure, while NEOM describes construction technology as a way to optimize development, reduce carbon footprint and safeguard worker welfare (PIF, 2025; NEOM, 2025). Red Sea Global links reporting to environmental protection, social development, economic growth, Saudi Vision 2030 and global reporting standards, and its destination resilience work embeds health, life safety, infrastructure protection and risk governance into tourism delivery (Red Sea Global, 2024; Red Sea Global, 2025). These examples show a policy shift: projects are expected to produce place-based value, not only built assets.

A regional development perspective changes how construction safety should be governed. When a project is located in a developing destination, an accident can damage more than a contractor's record. It can interrupt logistics, affect local suppliers, increase insurance costs, reduce workforce confidence, invite external criticism and delay public benefits. Conversely, high safety maturity can professionalize local firms, create skilled Saudi safety careers, improve emergency services, strengthen workforce health, reduce rework and build trust with investors and communities. In this sense, safe construction governance contributes directly to the social dimension of sustainability and indirectly to economic and environmental outcomes.

Giga-project governance also faces uncertainty. Megaprojects often begin with ambitious goals that evolve as costs, technology, stakeholder expectations and market conditions change (Bourne *et al.*, 2023). Sustainability research further argues that megaprojects should be evaluated through their ability to deliver sustainability of projects, for projects and by projects across long time horizons (Li *et al.*, 2024). Safe construction governance must therefore remain adaptive. It should provide stable principles, such as zero harm, legal compliance and worker dignity, while allowing delivery teams to adjust methods as designs, packages and regional priorities change.

5 Safe Construction Governance: Concept and Domains

Safe construction governance is the system of authority, accountability, processes, data and culture through which project actors prevent harm and create sustainable value during design, procurement, construction, commissioning and handover. It differs from traditional site safety management in three ways. First, it includes upstream decisions by investors, clients, designers and program boards. Second, it integrates safety with environmental, social and governance responsibilities. Third, it links site performance to regional outcomes such as employability, community confidence, resilient infrastructure and productivity.

The first domain is leadership accountability. Saudi safety climate evidence consistently emphasizes top management commitment, supervision, guidance and communication (Mosly and Makki, 2020; Makki *et al.*, 2020). In giga-projects, leadership accountability should be visible at board, program, project and package levels. Clients should define non-negotiable safety expectations in contracts, allocate realistic time for high-risk work, require competent supervisors and review leading indicators, not only lagging injury rates. Leadership also requires fair enforcement. Workers and contractors must see that production pressure will not be allowed to override safe systems of work.

The second domain is risk-based planning. MHRSD's Safety and Health Management Regulation requires a facility-specific policy covering key occupational safety and health aspects and signed by senior management (MHRSD, 2020). For giga-projects, this principle should extend to early hazard identification, constructability reviews, temporary works governance, heat stress management, emergency plans, traffic logistics, lifting operations, confined spaces and interface risks between contractors. Safety should be planned during design and procurement because many hazards are created before workers reach the site.

The third domain is worker welfare and participation. Construction workers are not passive recipients of rules; they are knowledge holders who understand real work conditions. Studies on Saudi safety climate identify worker involvement, attitude, competence, social security and health insurance as important determinants (Mosly and Makki, 2020; Mosly, 2021). Governance should therefore include multilingual communication, grievance routes, health surveillance, fair accommodation, rest facilities, heat controls, medical access and worker representation. The social sustainability of giga-projects depends on whether workers experience the transformation agenda as safe, fair and dignified.

The fourth domain is digital assurance. Digital technologies can improve construction safety through sensing, visualization, risk prediction, training and decision support, although evidence quality and implementation maturity remain uneven (Trask and Lindereth, 2023; Daniel *et al.*, 2025). BIM, IoT, artificial intelligence, drones, digital permits, wearable sensors and dashboards can help managers identify hazards earlier and audit controls more consistently. However, technology must support judgment rather than replace it. A digital safety system is only credible when data quality, privacy, interoperability, cyber security and field usability are governed.

The fifth domain is regional value integration. Safety governance should be linked to local employment, contractor development, emergency preparedness, environmental stewardship and transparent reporting. Sustainability reporting in construction is increasingly aligned with SDGs and requires clearer metrics, determinants and outcomes (Aros *et al.*, 2025). The regional value perspective encourages clients to report not only injury rates but also training hours, Saudi professional development, supplier safety maturity, welfare audits, carbon reduction from safer methods, emergency response readiness and lessons learned across the portfolio.

6 Regulatory and Institutional Context in Saudi Arabia

Saudi Arabia's institutional environment has become more supportive of occupational safety and health. MHRSD frames the National Council for Occupational Safety and Health as part of efforts to improve legislation, awareness, national resources, accident investigation and injury statistics in line with Vision 2030 work environment goals (MHRSD, 2023). The Safety and Health Management Regulation, authored in 2020, establishes expectations for policies, roles, procedures and management responsibility (MHRSD, 2020). GASTAT's 2024 workplace statistics report provides national indicators, including occupational injury rates, training coverage, dedicated OHS departments and exposure to workplace risks (GASTAT, 2025). These sources create a public foundation for evidence-based safety governance.

For giga-projects, regulation should be interpreted as a minimum floor rather than the ceiling. Projects with global brands, international contractors, tourism ambitions and complex stakeholder expectations require governance maturity that exceeds basic compliance. This includes independent assurance, transparent incident learning, contractor prequalification, high-risk work accreditation, welfare oversight and integration with

environmental and social impact management. Internationally, the ILO's recognition of a safe and healthy working environment as a fundamental principle reinforces the idea that safety is a rights-based development issue, not only a technical requirement (ILO, 2022).

Institutional coordination is especially important because giga-projects involve multiple authorities, developers, consultants, contractors, suppliers, training providers and local communities. Fragmented responsibilities can create gaps in emergency response, permit control, traffic management, temporary accommodation, waste handling and subcontractor supervision. A regional safety governance platform can reduce these gaps by harmonizing standards, sharing lessons, tracking leading indicators and supporting common competency requirements across neighboring projects. This is particularly relevant in areas where several programs compete for the same workforce, materials, transport corridors and public services.

7 Digital Governance and Evidence-Based Assurance

The digital transformation of construction safety is highly relevant to Vision 2030 because Saudi giga-projects are already positioned as smart, data-intensive developments. Recent reviews show increasing interest in digital OHS interventions, but they also caution that many tools are still evaluated through prototypes, simulations or limited case evidence rather than long-term injury reduction (Trask and Lindereth, 2023; Daniel *et al.*, 2025). This matters for governance: buying technology is not the same as governing safety.

A mature digital safety model should begin with risk questions, not devices. For example, if the risk is vehicle-pedestrian interface, the governance question is how site layout, access control, driver competence, proximity alerts, lighting and supervision work together. If the risk is heat stress, the question is how scheduling, hydration, rest, medical monitoring, weather data and emergency response are integrated. BIM-AI platforms can combine spatial, temporal and sensor data to support sustainable construction safety management, but they require disciplined workflows and responsible data use (Chong *et al.*, 2025). Without clear ownership, data standards and response protocols, dashboards may create a false sense of control.

Digital governance also enables portfolio learning. A single incident in one site can be converted into preventive action across many packages if data structures are harmonized. Lessons from near misses, inspections, audits, welfare checks and environmental incidents can reveal common

subcontractor weaknesses or design assumptions. This aligns with responsible innovation thinking, which calls for anticipation, inclusion, reflexivity and responsiveness across the megaproject life cycle (Lin *et al.*, 2025). In Vision 2030 settings, responsible innovation means that smart construction must be safe, explainable, worker-centered and regionally beneficial.

8 Worker Welfare, Social Sustainability and Community Trust

Worker welfare is central to safe construction governance because giga-project delivery depends on large, diverse and mobile workforces. Safety climate research in Saudi Arabia highlights that workers' perceptions are shaped by supervision, training, communication, support and social protection (Mosly and Makki, 2020; Mosly, 2021). If workers fear retaliation, misunderstand instructions, lack rest, or distrust medical and reporting systems, formal safety procedures will not function as intended. Safe governance therefore requires psychological safety, not only physical barriers.

Social sustainability also includes the relationship between construction sites and host regions. Local communities are more likely to support development when projects demonstrate respect for worker dignity, environmental protection, road safety, dust control, noise management and emergency preparedness. Red Sea Global's resilience approach is useful because it links health, life safety, environmental protection, critical infrastructure, supply chain continuity and economic-social risk planning (Red Sea Global, 2025). Such integration can help giga-projects avoid the common separation between HSE departments and regional development teams.

The review literature on OHS management systems indicates that safety systems can improve communication, consultation, productivity and wellbeing when they are implemented as learning systems (Kineber *et al.*, 2023). In practice, this means contractors should not treat welfare audits as paperwork. They should use findings to redesign accommodation, transport, fatigue management, training and medical support. Clients can reinforce this by making welfare performance part of payment, award, renewal and recognition decisions. Safe governance becomes credible when workers can see that reporting hazards leads to visible improvement.

9 Procurement, Supply-Chain Control and Contractor Maturity

Procurement is one of the most powerful safety governance levers. Giga-project clients shape safety outcomes through prequalification, tender

evaluation, contract terms, schedule realism, payment practices, design completeness and change management. If contracts reward low price and rapid mobilization without testing safety capability, risks are transferred downward to subcontractors and workers. If contracts require mature safety systems, competent supervision, training plans, welfare standards and transparent reporting, the supply chain receives a clear signal that safe delivery is part of value.

Saudi studies identify implementation barriers and the need for safety management guidelines in the construction industry (Al-Otaibi and Kineber, 2023). These barriers can be addressed through tiered contractor maturity models. A tier-one contractor may have international systems, but a small subcontractor may need practical support to meet expectations. Program management offices can create shared induction centers, approved training providers, common permit systems, mobile inspection tools and mentoring arrangements. This avoids a punitive model in which small firms are expected to meet standards without capability-building.

Supply-chain governance also affects regional development because local contractors and suppliers can retain knowledge after major projects finish. Training Saudi safety professionals, supervisors and inspectors creates human capital for future industrial, tourism and municipal projects. Quality management research in Saudi construction suggests that TQM practices can support OSH performance when leadership, participation and continuous improvement are embedded (Alghaseb and Alshamlani, 2022). Thus, safe procurement should be understood as local capacity development, not only risk transfer.

10 Proposed Framework: Safe Construction Governance for Regional Value

This review proposes the Safe Construction Governance for Regional Value framework. The framework has five mutually reinforcing layers. Layer one is mandate: Vision 2030 objectives, legal requirements, client policy and board accountability. Layer two is design and planning: early hazard elimination, constructability, environmental controls, logistics, emergency planning and welfare design. Layer three is delivery assurance: competent people, contractor controls, permits, supervision, audits, digital monitoring and incident learning. Layer four is worker and community value: health protection, voice, training, local employment, emergency readiness and social trust. Layer five is regional legacy: transferable skills, safer local supply chains, resilient assets, transparent reporting and improved quality of life.

The framework treats safety as a value chain. Decisions at the mandate layer determine whether downstream actors have enough authority, budget and time to act safely. Design and planning determine whether hazards are removed or inherited. Delivery assurance determines whether controls are applied consistently. Worker and community value determines whether project benefits are experienced fairly. Regional legacy determines whether knowledge and infrastructure remain useful after construction. This layered view supports both corporate governance and daily site management.

The framework also offers measurable indicators. Leadership can be measured through board safety reviews, closure of critical actions and director site engagement. Planning can be measured through design risk reviews, high-risk work readiness and emergency drills. Delivery assurance can be measured through leading indicators, critical control verification and near-miss learning. Worker value can be measured through welfare audit closure, heat-stress compliance, training completion, grievance resolution and health surveillance. Regional legacy can be measured through Saudi safety career pathways, local supplier maturity and public reporting quality.

11 DISCUSSION

The literature and institutional evidence reviewed in this paper support three main arguments. First, safe construction governance is a prerequisite for sustainable regional development in Vision 2030 giga-projects. The size and visibility of these projects mean that harm prevention affects investor confidence, delivery continuity, worker dignity and public legitimacy. Second, governance must be integrated across the project life cycle. Safety cannot be delegated only to site HSE teams when many risks originate in strategic decisions, design choices, procurement models and schedule pressures. Third, digital technologies can improve assurance but only where they are embedded in accountable governance systems.

There are also tensions. Giga-projects often face pressure to deliver symbolic milestones quickly. This can conflict with careful planning, contractor development and worker welfare investment. Megaproject research warns that goals and governance move over time, creating misfit if decision systems are not adaptive (Bourne *et al.*, 2023). The response should not be slower delivery for its own sake, but better sequencing, clearer authority and transparent trade-off decisions. The National Audit Office's lessons on megaproject governance emphasize clarity of authority, outcomes, benefits and value rather than only cost control (NAO,

2025). This lesson is directly relevant to construction safety governance in Saudi giga-projects.

Another tension concerns reporting. Sustainability reports can demonstrate accountability, but they can also become selective narratives. Construction sustainability reporting research calls for stronger metrics, models and outcome evidence (Aros *et al.*, 2025). Giga-projects should therefore publish balanced safety and welfare information, including leading indicators, serious incident learning, contractor improvement programs and regional capacity outcomes. Transparent reporting would help Saudi Arabia demonstrate that its development model protects people while delivering transformation.

12 Future Research Agenda

Future research should test the proposed framework through empirical case studies of Vision 2030 construction programs. Priority topics include heat-stress governance, migrant worker voice, digital permit-to-work systems, contractor safety maturity, design-for-safety adoption, emergency coordination across regional project clusters and the relationship between safety investment and productivity. Comparative studies could also examine how Saudi giga-projects learn from global megaprojects while adapting to local climate, labor market and regulatory conditions. More longitudinal data are needed to connect leading indicators with injuries, welfare outcomes, carbon performance and regional economic benefits.

Researchers should also investigate the governance of artificial intelligence in construction safety. AI can predict hazards and prioritize inspections, but it may also introduce bias, privacy concerns and accountability gaps. A responsible innovation approach would ask who benefits, who is monitored, who can challenge outputs and how lessons are shared (Lin *et al.*, 2025). Such questions are essential as giga-projects move toward digital twins, automated equipment and smart-city operations.

This governance lens is important because safe delivery converts capital expenditure into trusted public value. It also helps regional institutions retain practical knowledge after temporary construction peaks decline. For Saudi giga-projects, the decisive test is whether safety learning travels between packages, regions and future assets. Such learning can make prevention a permanent development capability rather than a temporary project requirement. This is the practical bridge between construction execution and sustainable transformation. The review contributes to scholarship by connecting safety climate studies, OHS

management systems, megaproject governance and regional development theory within one Saudi-specific argument. It contributes to practice by translating dispersed evidence into a framework that clients and program management offices can use during procurement, mobilization and assurance. It contributes to policy by showing that regulation, statistics, national council activity and project-level disclosure can reinforce each other when they are treated as parts of one governance ecosystem. It contributes to project controls by recommending leading indicators that reveal weak supervision, delayed actions, poor welfare conditions and supply-chain capability gaps before they become major events. It also contributes to sustainability debate by placing worker protection beside carbon, biodiversity, localization and investor confidence, rather than treating it as a secondary compliance topic. This integration is important for regions such as Tabuk, Riyadh and the Red Sea coast, where construction activity changes labor markets, local services and future urban identity. A safe project can train local supervisors, improve emergency coordination, establish stronger supplier standards and leave behind governance routines that remain valuable after opening day. An unsafe project can produce the opposite legacy: mistrust, delay, reputational exposure, avoidable human suffering and missed opportunities for institutional learning. Therefore, the proposed framework should be read as a development framework as much as a safety framework. Its central message is that construction safety becomes sustainable only when accountability travels from strategy to design, from design to site, and from site to regional legacy. This perspective gives Saudi giga-project leaders a practical route for demonstrating that rapid transformation and responsible development can advance together. The framework can also support journal-quality empirical work because each layer can be converted into variables, indicators and testable propositions. For example, future studies can examine whether early design risk reviews predict fewer critical control failures, or whether welfare audit closure predicts stronger safety climate. Researchers can also compare projects that rely on traditional inspection with projects that combine digital permits, worker

feedback and board-level assurance. Such evidence would help distinguish symbolic safety governance from governance that measurably improves regional development performance. Overall, the framework favors disciplined assurance, transparent reporting, regional learning, worker dignity, contractor capability, preventive decision making, cross project coordination, evidence based supervision, heat risk control, supplier development, emergency readiness, fair procurement, responsive leadership, clear accountability, continuous improvement and practical knowledge transfer, so future development remains safer, credible, resilient, inclusive and useful for Saudi regions beyond the temporary construction phase and across every asset lifecycle stage successfully.

13 CONCLUSION

Safe construction governance can become one of the strongest enablers of sustainable regional development in Vision 2030 giga-projects. The evidence reviewed here shows that safety performance depends on leadership commitment, risk-based planning, worker participation, contractor maturity, digital assurance and transparent reporting. When these elements are integrated, safety becomes a regional value system that protects people, reduces disruption, improves productivity, strengthens local capability and supports public confidence.

The proposed Safe Construction Governance for Regional Value framework offers a practical way to align site controls with Vision 2030 outcomes. It encourages project leaders to govern safety from board mandate to regional legacy, not only from induction room to incident report. Saudi Arabia's giga-projects have the scale, investment and institutional momentum to set a global benchmark. Achieving that benchmark will require treating every worker's safety, every contractor's competence and every community's trust as part of national transformation itself.

Tables and Graphical Representations

Table 1: Review methodology and search logic

Review element	Specification used in this paper
Review type	Integrative narrative review with thematic synthesis, appropriate for combining academic studies, policy documents and project governance evidence.
Period covered	2020-2025, matching the requested contemporary citation window.
Core search terms	Vision 2030 giga-projects; Saudi construction safety; occupational safety climate; OHS management systems; digital construction safety; BIM AI IoT safety; megaproject governance; sustainability reporting.
Included sources	Peer-reviewed articles, official Saudi regulatory and Vision 2030 sources, giga-project sustainability materials, and global governance or buildings-sector reports.

Review element	Specification used in this paper
Exclusion logic	Sources older than 2020, unrelated to construction governance, or promotional items without usable governance or safety mechanisms were excluded.
Analysis method	Sources were coded by safety problem, governance mechanism and regional development outcome, then synthesized into five framework domains.

Table 2: Safe construction governance domains for regional value creation

Governance domain	Main mechanism	Regional development contribution	Example indicators
Leadership accountability	Board-level mandate, client standards, visible executive review and fair enforcement.	Builds trust, reduces disruption and signals that transformation will not trade safety for speed.	Executive site visits; critical action closure; serious incident review completion.
Risk-based planning	Design risk review, constructability, high-risk work controls, emergency and logistics planning.	Prevents losses, supports schedule reliability and reduces pressure on local emergency services.	Design hazards eliminated; readiness reviews; emergency drill performance.
Worker welfare and voice	Multilingual communication, rest, heat control, health surveillance, grievance systems and worker participation.	Improves social sustainability, retention, dignity and workforce confidence.	Training coverage; welfare audit closure; grievance resolution; heat-stress compliance.
Digital assurance	BIM, IoT, dashboards, digital permits, drones and AI-supported inspection prioritization.	Improves evidence, portfolio learning and early risk detection across dispersed sites.	Critical control verification; near-miss quality; dashboard action closure.
Supply-chain maturity	Prequalification, contractor capability development, common induction and supplier mentoring.	Creates local professional capability and safer Saudi construction markets beyond the project.	Supplier maturity scores; Saudi safety career pathways; subcontractor training hours.
Transparent reporting	Balanced ESG, OHS, welfare and resilience disclosure linked to SDGs and Vision 2030.	Strengthens investor confidence and public legitimacy while enabling benchmarking.	Leading indicators disclosed; lessons shared; regional legacy metrics reported.

**Figure 1: Safe Construction Governance for Regional Value framework**

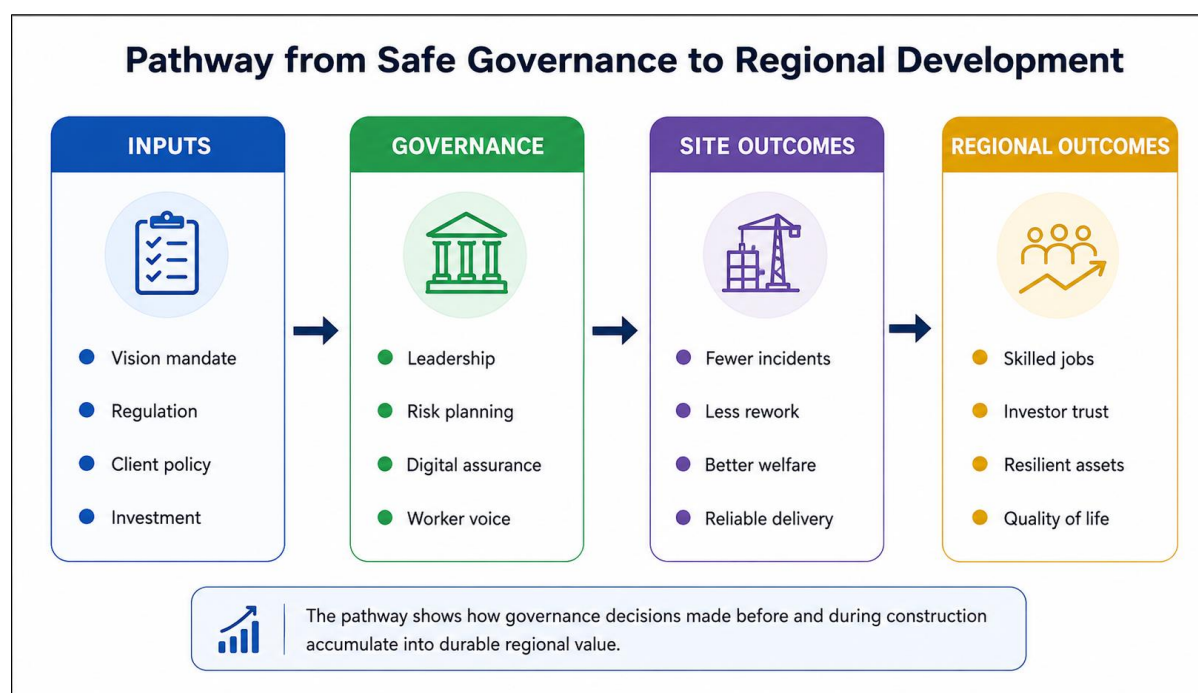


Figure 2: Pathway from safe governance to sustainable regional development

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