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The Role of the Construction Industry in Nation Building and the Performance of Pakistan's Construction Industry over the Last Decade (2015 – 2025)— A Secondary Data Based Research

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Abstract— *The construction industry contributes to nation-building through the creation of physical infrastructure, productive assets, housing, public facilities, employment and improved spatial connectivity. This paper examines these contributions and reviews the development of Pakistan's construction industry over FY2015–16 to FY2024–25, with particular attention to infrastructure and highway projects. A secondary-data research design is adopted because no primary survey or project-level dataset was supplied. Evidence is drawn from Pakistan Economic Surveys, Pakistan Bureau of Statistics national accounts, the Planning Commission, the National Highway Authority, the State Bank of Pakistan, the Pakistan Credit Rating Agency and peer-reviewed research on project delivery. The evidence indicates a sector with important economic linkages but a relatively modest direct share of GDP, pronounced cyclical volatility and sensitivity to public development expenditure, borrowing costs, input-price inflation and macroeconomic restrictions. Official reporting recorded construction growth of 13.10% in FY2015–16; PACRA's PBS-based series shows a GDP contribution around 2.7–2.9% in FY2019–FY2023; the State Bank reported contractions in FY2023 and FY2024; and the Pakistan Economic Survey reported a recovery of 6.61% in FY2025. The National Highway Authority managed a 14,480-km network in FY2024–25, with a budget allocation of Rs 161.264 billion for 105 projects. The paper argues that construction supports nation-building only when capital investment is converted into reliable, inclusive, climate-resilient and economically productive assets. It proposes an integrated performance framework covering project preparation, procurement, delivery, asset management, domestic capability and transparent outcome measurement. Findings are descriptive and do not establish causal effects of construction investment on national development.*

Keywords— ***construction industry; nation-building; Pakistan; infrastructure development; highway projects; economic growth; project management.***

I. INTRODUCTION

Nation-building is a multidimensional process through which a state develops the institutions, productive capacity, social infrastructure, territorial integration and public services required to improve population welfare. Construction contributes by creating durable physical assets: roads, bridges, railways, ports, airports, dams, irrigation systems, power facilities, schools, hospitals, housing and industrial premises. These assets can reduce transaction costs, connect markets, improve access to services, support private investment and strengthen public service delivery. Their value, however, is not inherent in construction expenditure. It depends on

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whether projects are selected on sound economic grounds, delivered efficiently, maintained over their service lives and aligned with regional and social needs.

In Pakistan, construction has a dual role. It is an economic sector purchasing materials, machinery, transport, fuel, professional services and labour; and it is an enabling sector creating infrastructure used by agriculture, manufacturing, trade, education, healthcare and other services. A road project generates short-term demand for cement, steel, bitumen, aggregates, plant and labour. Once operational, it may reduce travel time, improve freight reliability, expand access to markets and connect settlements to economic centres. Construction-phase effects and operation-phase effects must be distinguished because expenditure during construction is not equivalent to long-term development impact.

The last decade has not been a period of uninterrupted expansion. Pakistan's construction activity has been influenced by CPEC-related programmes, public development spending, private housing, monetary tightening, inflation in construction inputs, foreign-exchange and import constraints, floods, taxation changes and shifts in development priorities. PACRA (2024) describes a sharp rise in nominal market size through FY2022–23 alongside weaker construction gross fixed capital formation (GFCF) in FY2023. Nominal market value can increase because prices rise even when real output or physical investment weakens.

This paper therefore avoids treating one growth rate or market-size estimate as a complete measure of industry performance. It examines value added, capital formation, employment, industrial linkages, infrastructure delivery, project governance, and the quality and sustainability of completed assets. The principal period is FY2015–16 to FY2024–25. Subsequent evidence is used only where clearly identified.

Background and Industry Context

- **Scope and definition**

Construction is understood in the national-accounts sense as the production of buildings and civil-engineering works, including new construction, major alterations and repair. The wider construction ecosystem includes cement, steel, bricks, glass, ceramics, aggregates, bitumen, equipment, fuel, transport, engineering design, surveying, project management, testing and facilities management. These linkages are economically important but should not be confused with direct construction value added in GDP.

The industry includes public and private activity. Public demand is channelled through federal and provincial development programmes, autonomous bodies and utilities. Private demand includes housing, commercial buildings, industrial facilities, real estate development and privately financed infrastructure. Highway delivery involves the Planning Commission, Ministry of Finance, NHA, provincial Communication and Works departments, WAPDA, local governments, procurement regulators, consultants, contractors, suppliers and affected communities.

- **Macroeconomic and demographic setting**

Infrastructure demand is shaped by population growth, urbanisation, regional disparities, climate exposure and the need to improve access to basic services. The Pakistan Economic Survey 2024–25 reports a population of approximately 241.5 million in the 2023 census and an average annual population growth rate of 2.55% between 2017 and 2023 (Finance Division, Government of Pakistan, 2025). Such demographic pressure raises demand for housing, water, transport, schools, hospitals, sanitation and energy.

The demographic setting creates an opportunity and a constraint. A large working-age population can provide labour for construction and related industries, but the economic benefit depends on skills, productivity, formal employment, occupational safety and training. Labour-intensive construction may generate jobs, yet informal and low-skilled employment may provide limited long-term human-capital accumulation. A nation-building strategy should connect infrastructure programmes with technical education, apprenticeships, professional accreditation and safe working conditions.

- **Construction as a project-based production system**

Construction output is produced through temporary project organisations and geographically dispersed supply chains. Unlike standardised manufacturing, construction is site-specific, exposed to weather and ground conditions, dependent on permits and land

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access, and delivered through contractual relationships among multiple organisations. Project managers must integrate scope, time, cost, quality, resources, procurement, risk, stakeholders, health and safety, and environmental management. Weakness in one interface can affect the whole delivery system. Delayed land possession can prevent access to a work front; late payment can restrict material procurement; incomplete design can generate variations; and poor utility coordination can cause rework.

These characteristics explain why the contribution to nation-building cannot be judged only by projects announced. A project becomes a national asset when it is completed to specification, connected to a functioning network, operated safely, maintained adequately and used by the population or productive economy it was intended to serve.

Problem Statement

Pakistan's construction industry has demonstrated the capacity to deliver major roads, motorways, dams, power facilities, ports, urban transport systems and public buildings. Nevertheless, available evidence points to volatility in sectoral performance and persistent project-delivery weaknesses. The central problem is not an absence of construction activity; it is the difficulty of consistently converting financial allocations and physical works into timely, cost-effective, high-quality and economically productive assets.

This problem matters from an Engineering Project Management perspective. Development expenditure is scarce and competes with recurrent spending, debt servicing and social-sector requirements. Cost escalation or prolonged delay can displace other public priorities. Infrastructure benefits are often delayed until an asset becomes operational; unfinished or poorly connected projects cannot deliver intended benefits. Construction is exposed to input-price volatility, financing conditions, land and utility interfaces, procurement risks and contractor cash-flow constraints. Weak post-completion maintenance can erode asset value and increase whole-life costs.

Pakistani empirical research supports the relevance of these concerns. Khan and Umer (2020) used structured questionnaires and interviews, relative importance index analysis, Pearson correlation and linear regression to study the impact of delays on construction cost. Their abstract reports that design, procurement and on-site causes significantly affected delays, and that delay had a significant effect on project cost. A study of uncertainty in Pakistani public-sector construction projects surveyed 216 professionals and identified competitive tendering, incomplete design and specifications, late payments, conflict management, delayed site possession, force majeure and work acceleration among important uncertainty factors (Buildings, 2018).

A second problem concerns measurement. National accounts provide an important macroeconomic view, but do not reveal whether a highway reduced freight costs, improved access to schools, created durable employment or delivered value for money. Nominal market size can rise because of inflation without a commensurate increase in real output. Rigorous assessment must distinguish macroeconomic contribution, project delivery performance and long-term development outcomes.

Research Gap

Existing evidence is distributed across separate domains. National accounts measure sectoral value added and capital formation; economic surveys describe infrastructure programmes and sectoral growth; financial-sector reports assess market size and business conditions; academic studies examine project delays, procurement uncertainty and stakeholder relationships. These sources are valuable, but do not automatically provide an integrated account of how construction contributes to nation-building over a decade.

The gap is an integration and measurement gap, not a claim that Pakistan's construction industry has never been studied. A decade-based synthesis is needed to connect construction's direct macroeconomic role, upstream and downstream industrial linkages, public infrastructure assets, project-management constraints and expected development outcomes. Available aggregate statistics do not provide a consistent national time series of project-level cost overrun, schedule variance, quality performance, maintenance expenditure and realised socioeconomic benefits across public and private projects.

This paper addresses the gap through a structured secondary-data synthesis and a proposed performance framework. It does not estimate a causal relationship between construction spending and GDP, employment or poverty. Such a claim would require a harmonised dataset, defensible identification strategy

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and controls for macroeconomic conditions, population, sector composition and project selection.

Research Aim, Objectives and Questions

- **Aim**

To critically evaluate the contribution of Pakistan's construction industry to nation-building and analyse its economic and infrastructure performance during FY2015–16 to FY2024–25, identifying project-management and institutional improvements that could strengthen development impact.

- **Objectives**

1. Examine the economic, industrial, employment and social-infrastructure channels through which construction contributes to nation-building in Pakistan.
2. Analyze available official indicators of construction-sector growth, GDP contribution, capital formation and infrastructure investment over the selected decade.
3. Review documented constraints affecting construction project delivery, including procurement, design, financing, payment, coordination and cost escalation.
4. Assess the role of highway and strategic transport infrastructure in national connectivity and regional development using official programme evidence.
5. Develop an integrated performance framework and practical recommendations for improving conversion of construction investment into sustainable public value.

Research Questions

1. Through which economic and social mechanisms does construction contribute to nation-building in Pakistan?
2. How did the construction industry perform in available macroeconomic indicators during FY2015–16 to FY2024–25?
3. What project-management and institutional constraints reduce the effectiveness of construction investment?
4. How have highway and strategic transport programmes contributed to national connectivity, and what limits benefit realisation?
5. What measures could improve project delivery, asset performance and long-term development impact?

Hypotheses

Formal statistical hypotheses are not tested in this secondary descriptive study. Available data are not sufficiently harmonised at project level to estimate a causal model. A subsequent primary study could test associations between project-preparation quality, procurement efficiency, payment timeliness, stakeholder coordination and cost/schedule performance. These are proposed for future testing, not findings of this paper.

II. LITERATURE REVIEW

- **Construction and economic development**

Construction contributes through direct, indirect and induced channels. Direct value added includes output of construction establishments and contractors. Indirect effects arise when demand stimulates suppliers of cement, steel, aggregates, bitumen, equipment, transport, fuel and engineering services. Induced effects may occur when wages and business income are spent elsewhere. These effects should not be added without an input-output or social-accounting framework because doing so can double count economic activity.

The development contribution depends on the type and use of the asset. A productive transport link can lower logistics costs and connect firms to markets; a water project can support irrigation or municipal supply; a school or hospital can expand access to human-development services; and industrial infrastructure can support investment. Conversely, a poorly selected project can absorb scarce capital while generating limited benefits. The policy question is not simply how much a country builds, but whether it builds the right assets, in the right places, to the required standard and maintains them.

- **Pakistan-specific sector evidence**

The Pakistan Economic Survey 2015–16 reported construction-sector growth of 13.10%, compared with 6.24% in FY2014–15. It also reported construction's share as 12.29% of industrial-sector value added (Finance Division, Government of Pakistan, 2016). This was a period of strong activity associated with

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public development expenditure and infrastructure programmes. The annual rate is not evidence that growth was sustained throughout the decade.

PACRA's April 2024 sector study, drawing on PBS, State Bank of Pakistan and FBR sources, reports construction's contribution to GDP at approximately 2.9% in FY2019, 2.8% in FY2020, 2.7% in FY2021, 2.9% in FY2022 and 2.8% in FY2023. The same report lists nominal market size increasing from Rs 1,175 billion in FY2019 to Rs 2,190 billion in FY2023. Construction GFCF is reported at Rs 44,489 million in FY2019, Rs 50,961 million in FY2020, Rs 50,710 million in FY2021, Rs 95,807 million in FY2022 and Rs 76,967 million in FY2023 (PACRA, 2024).

The difference between nominal market growth and real sector performance is important. PACRA reports nominal market-size growth of 33.8% in FY2022 and 18.4% in FY2023, while GDP contribution remained around 2.8%. The rise in nominal value cannot be interpreted as a corresponding rise in physical output or productivity. In FY2023, high input prices, wages, borrowing costs and slower development spending weighed on activity; floods and restrictions affecting subsidised housing finance were also identified as adverse factors (PACRA, 2024).

- **Public infrastructure and transport connectivity**

Transport infrastructure connects production locations, labour markets, ports, border crossings, cities and rural settlements. The Pakistan Economic Survey 2024–25 states that NHA manages 48 national highways, motorways and strategic roads with a total network length of 14,480 km. It reports an NHA FY2024–25 budget of Rs 161.264 billion for 105 projects: 90 ongoing projects allocated Rs 149.28 billion and 15 new schemes allocated Rs 11.98 billion (Finance Division, Government of Pakistan, 2025). These figures demonstrate the scale of the federal highway programme, but budget allocations are not actual expenditure, completed assets or realised economic benefits.

The same Economic Survey reports eight completed CPEC transport projects totalling US$6.7 billion, with 888 km of motorways and highways constructed and another 853 km in progress through local funding. Operational projects include the Multan–Sukkur Motorway, Hakla–D.I. Khan Motorway, Havelian–Thakot section of the Karakoram Highway and Khuzdar–Basima road (Finance Division, Government of Pakistan, 2025). Their long-term impact depends on traffic demand, border and port efficiency, maintenance, road safety, complementary logistics facilities and local economic response.

- **Project delivery, delay and cost performance**

Khan and Umer (2020) provide Pakistan-specific empirical evidence on delay and cost. Their study used questionnaires and interviews, ranked delay causes using relative importance index, examined stakeholder correlations using Pearson's correlation and developed linear regression models. The authors report that design, procurement and on-site causes significantly affected delay, and that delay significantly affected project cost. The cross-sectional design limits generalisation to every project category, but demonstrates that project-management processes influence economic value.

The study published in Buildings (2018) on uncertainty in Pakistani public-sector construction projects surveyed 216 professionals. It identified competitive tendering, incomplete design and specifications, late payments, conflict management, delayed possession of sites, force majeure and work acceleration as important uncertainty factors influencing transaction costs. These findings are relevant to public infrastructure, where design maturity, land access, approvals, cash flow and contract administration affect delivery.

Project performance is a system outcome. Procurement cannot compensate for immature design; contractor mobilisation cannot overcome inaccessible land; additional resources cannot solve unresolved utility relocation; and acceleration can create quality or safety risks if the revised method is not assessed. Mature project management integrates front-end planning, risk allocation, procurement strategy, contract administration, stakeholder coordination, quality assurance and operational readiness.

Theoretical Perspectives

- **Infrastructure-led development and public value**

Infrastructure-led development explains how physical networks can reduce spatial and economic frictions. Roads, ports, railways, energy systems and water infrastructure can lower the cost of moving goods and people, expand access to services and enable private investment. Infrastructure is an

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enabling condition, not a guarantee of growth. Benefits depend on complementary policies, institutional quality, demand, maintenance and equitable access. Corridor infrastructure may generate national connectivity benefits while nearby communities experience limited local development unless feeder roads, services and economic linkages are provided.

- **Resource-Based View**

The Resource-Based View argues that organisations can develop sustained performance advantages through resources and capabilities that are valuable, difficult to imitate and effectively organised (Barney, 1991). For construction firms, capabilities include experienced project teams, equipment fleets, procurement networks, cost-control systems, quality laboratories, digital planning, safety culture and complex-contract management. RBV is relevant to domestic contractor capability, but it is an organisational-level lens and cannot alone explain national development.

- **Project management and systems thinking**

Project management provides the operational bridge between national investment priorities and completed assets. The PMBOK framework emphasises integration of scope, schedule, cost, quality, resources, procurement, risk and stakeholders. A systems perspective recognises that project outcomes emerge from interactions among these domains. A low tender price may be offset by claims, variations, delay or poor quality if procurement evaluation does not consider capability and risk.

- **Sustainable development and whole-life asset management**

Sustainable construction considers environmental and social impacts across planning, construction, operation and decommissioning. Whole-life asset management recognises that capital expenditure is only one part of total asset cost. Design resilience, material durability, drainage, climate adaptation, routine maintenance and rehabilitation cycles affect long-term value. This is important in Pakistan because roads, bridges, dams and urban infrastructure face floods, heat, erosion, water scarcity and other climate-related hazards.

Conceptual Framework

The proposed framework links construction investment to nation-building through five stages. Stage 1 is strategic selection: projects are prioritised against economic, social, regional and environmental needs. Stage 2 is project readiness: feasibility, design, land, environmental approvals, utilities and financing are mature before construction. Stage 3 is efficient delivery: scope, schedule, cost, quality, safety, risk and stakeholder interfaces are managed. Stage 4 is operational performance: the asset is commissioned, connected to networks, maintained and accessible. Stage 5 is development impact: the asset contributes to productivity, mobility, service access, resilience, employment or regional inclusion.

Stage	Core question	Potential indicators
Strategic selection	Is this the right project and is public value justified?	Economic appraisal, demand forecast, social benefit, regional coverage
Project readiness	Is the project sufficiently prepared to tender and build?	Design maturity, land possession, approvals, utility clearance, funding certainty
Delivery	Is the project delivered efficiently and to specification?	Cost variance, schedule variance, change orders, defects, safety
Operation and maintenance	Is the asset functional, accessible and maintained?	Asset availability, maintenance backlog, condition rating, reliability
Development impact	Does the asset produce intended wider benefits?	Travel time, logistics cost, service access, traffic safety, local economic activity

This outcome-oriented framework prevents the analytical error of equating allocation with expenditure, expenditure with completed output, and completed output with development impact. Each transition requires evidence. Road length is an output; reduced travel time is an outcome; higher regional productivity is a potential impact that must be evaluated against other influences.

III. RESEARCH METHODOLOGY

- **Philosophy and approach**

The study adopts a pragmatic evidence-synthesis orientation using secondary quantitative indicators and qualitative document analysis. A purely quantitative design would be inadequate because macroeconomic series do not capture institutional explanations or project quality. A purely qualitative design would underuse official data on sector growth, capital formation and infrastructure programmes. The design is therefore a structured mixed-evidence review, not a primary mixed-method field study.

- **Design and period**

The main observation window is FY2015–16 to FY2024–25. Financial-year data are used as published. Where a report uses provisional or revised estimates, this status should be retained. The research uses descriptive longitudinal comparison and qualitative thematic synthesis to analyse project-management constraints and nation-building mechanisms.

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- **Sources and inclusion criteria**

Priority is given to official sources: PBS national accounts; Pakistan Economic Survey publications; Planning Commission PSDP documents; NHA and transport-sector reporting; and State Bank of Pakistan reports. PACRA is included as a sector research source because it consolidates official data and analyses financing and business conditions. Peer-reviewed Pakistani studies are included where methods and findings directly relate to project delay, cost, uncertainty or institutional performance. Sources are included when publication identity, reporting period and attributed evidence can be identified. Unsupported claims and unverifiable statistics are excluded.

- **Population, sampling and data collection**

Because this is a secondary-data study, there is no human respondent population, survey sample or primary sampling procedure. The documentary population comprises official national accounts, annual economic surveys, infrastructure programme reports and relevant peer-reviewed studies. Purposive document selection includes sources directly addressing construction output, investment, employment, infrastructure delivery or project performance. Extracted data should be recorded with indicator name, unit, fiscal year, price basis, status (actual, revised or provisional), publication date and URL.

- **Variables and operational definitions**

Variable	Operational meaning	Source / caution
Construction real growth	Annual percentage change in real construction value added	PBS / Economic Survey; use consistent national-accounts base
Construction GDP share	Construction value added as percentage of GDP	PBS; distinguish current-price share from constant-price growth
Construction GFCF	Gross fixed capital formation attributed to construction or related assets	PBS / PACRA; confirm classification and price basis
Public infrastructure allocation	Budgeted development allocation for infrastructure agencies/projects	PSDP / Economic Survey; allocation is not expenditure
Physical infrastructure output	Road length, project count, completed facilities	NHA / Economic Survey; output is not impact
Project delivery performance	Cost/schedule variance, delay causes, quality and change control	Project records or peer-reviewed studies; no complete national series
Nation-building outcome	Connectivity, access, resilience, productivity and service availability	Requires outcome evaluation; cannot be inferred from expenditure alone

Data analysis

The quantitative component uses descriptive analysis: annual growth rates, sector shares, nominal market-size changes and GFCF trends as reported. Comparisons are made only where definitions and price bases are sufficiently clear. The qualitative component uses thematic synthesis to classify constraints into project preparation, procurement, finance and cash flow, design and change management, stakeholder coordination, contractor capability, quality, safety, environment and asset maintenance.

Correlation and regression are not performed because a harmonised annual dataset with adequate observations and control variables was not assembled. A ten-observation annual series would be too small for a credible multi-variable regression, particularly where macroeconomic shocks and structural breaks are present. Cronbach's alpha is not applicable because no multi-item survey scale was administered. These techniques are reserved for a future study with suitable data.

Reliability, validity and ethics

Reliability is strengthened by prioritising official publications and recording reporting period, unit and data status. Construct validity is addressed by distinguishing real growth, nominal market size, GDP share, GFCF, budget allocation, actual expenditure, physical output and development outcome. Triangulation is used where possible by comparing Economic Survey statements with PBS-based PACRA tables or State Bank analysis. Ethical risk is low because public documents are used and no personal data are collected.

Limitations

The principal limitation is the lack of a consistent, publicly accessible, decade-long project-level dataset covering public and private construction across provinces. National accounts are subject to revisions and methodological changes; market-size estimates may be nominal; employment data may aggregate broad categories; and project status reports may not provide comparable baselines. The study is therefore a structured synthesis, not a causal impact evaluation.

IV. RESULTS AND STATISTICAL ANALYSIS

- **Growth at the beginning of the decade**

The Pakistan Economic Survey 2015–16 reported real construction growth of 13.10%, up from 6.24% in FY2014–15 (Finance Division, Government of Pakistan, 2016). This indicates strong expansion at the start of the selected decade. It is consistent with increased development and infrastructure activity. It is not a decade-wide average or a measure of productivity.

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Indicator	FY2014–15	FY2015–16	Interpretation
Real construction growth	6.24%	13.10%	Reported annual growth accelerated
Construction share of industrial sector	—	12.29%	Construction was a material component of industrial value added
Source	Pakistan Economic Survey 2015–16	Pakistan Economic Survey 2015–16	Historical official estimate; later revisions may affect comparability

- **Sector share, market size and capital formation, FY2019–FY2023**

PACRA's 2024 sector study provides a compact series. Construction's GDP contribution remained in a relatively narrow band of 2.7–2.9%, while nominal market size rose from Rs 1,175 billion to Rs 2,190 billion. Construction GFCF rose sharply in FY2022 before falling in FY2023. This pattern is consistent with an industry exposed to price changes and investment cycles.

Indicator	FY19	FY20	FY21	FY22	FY23
GDP contribution (%)	2.9	2.8	2.7	2.9	2.8
Nominal market size (Rs billion)	1,175	1,243	1,383	1,850	2,190
Nominal market-size growth (%)	-8.8	5.8	11.3	33.8	18.4
Construction GFCF (Rs million)	44,489	50,961	50,710	95,807	76,967
GFCF growth (%)	-47.7	-40.0	-40.3	12.7	-9.4

Source: PACRA (2024), citing PBS, SBP and FBR. Market size is nominal and should not be treated as real output growth. A descriptive calculation of nominal market-size change between FY2019 and FY2023 is (2,190 − 1,175) ÷ 1,175 × 100 = approximately 86.4%. This is a nominal increase over four intervals, includes price effects and is not an 86.4% increase in physical construction output.

- **Recent contraction and recovery**

The State Bank of Pakistan's Annual Report for FY2024 reports that construction value added declined by 9.2% in FY2023 and by 1.5% in FY2024. It attributes weakness to high borrowing costs, slower development spending, domestic uncertainty, escalating material costs, taxes, duties and wages (State Bank of Pakistan, 2024). The Pakistan Economic Survey 2024–25 subsequently reports construction growth of 6.61% in FY2025, compared with a contraction of 1.14% in the preceding year, attributing the recovery partly to a low base and higher public-sector development spending (Finance Division, Government of Pakistan, 2025).

Fiscal year	Reported real construction growth	Source / interpretation
FY2015–16	13.10%	Pakistan Economic Survey 2015–16
FY2022–23	-9.2%	SBP Annual Report FY2024; contraction
FY2023–24	-1.5%	SBP Annual Report FY2024; contraction moderated
FY2024–25	6.61%	Pakistan Economic Survey 2024–25; recovery from low base

These are selected observations, not a continuous annual series. They come from different annual publications and should be checked against the latest revised PBS national-accounts series before econometric analysis. FY2025 growth does not prove a sustained expansion path.

- **Highway infrastructure scale and investment**

The NHA network length of 14,480 km and FY2024–25 portfolio of 105 projects indicate the scale of federal road infrastructure. The allocation of Rs 161.264 billion is a budget measure; it does not establish that the full amount was released, spent or converted into completed projects within the fiscal year. Allocation, release, expenditure, physical progress, completion and post-completion performance are separate stages.

NHA indicator (FY2024–25)	Reported value	Measurement meaning
Managed network	14,480 km	Network length under NHA
Total projects	105	Portfolio count
Ongoing projects	90	Count; allocation Rs 149.28 billion
New schemes	15	Count; allocation Rs 11.98 billion
Total NHA budget	Rs 161.264 billion	Budget allocation, not verified actual expenditure

The Economic Survey's CPEC transport section reports eight completed transport projects totalling US$6.7 billion, 888 km of highways and motorways constructed and 853 km in progress through local funding (Finance Division, Government of Pakistan, 2025). These are programme outputs. Impact evaluation requires traffic volumes, freight travel times, vehicle operating costs, road safety, regional market access, maintenance condition and local employment.

- **Employment and industrial linkages**

Construction supports engineers, technicians, surveyors, operators, drivers, skilled trades, labourers, supervisors, safety personnel and administrative staff. It also creates demand in supplier industries. PACRA (2024) identifies construction's connections with building materials, machinery and related inputs. However, employment estimates differ across sources and years, and this paper does not combine inconsistent labour-force figures into a decade trend.

The nation-building implication is that employment quantity should be assessed alongside job quality. A stronger industry would expand certified skills, apprenticeships, formal contracts, occupational safety, professional roles for women and pathways from labouring work into technical and supervisory careers. Without these measures, construction may generate temporary employment but contribute less to durable human-capital development.

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Results summary

Dimension	Evidence-based result	Interpretation
Economic contribution	GDP share about 2.7–2.9% in FY2019–FY2023	Direct share modest; wider linkages and asset effects broader
Growth volatility	13.10% in FY2015–16; contractions in FY2023/24; 6.61% in FY2025	Cyclical and sensitive to fiscal and macroeconomic conditions
Capital formation	GFCF fell 9.4% in FY2023 after 12.7% growth in FY2022	Investment momentum uneven
Highway infrastructure	NHA network 14,480 km; 105 projects budgeted FY2024–25	Large portfolio requires strong governance and asset management
Delivery constraints	Design, procurement, on-site, payment and site-possession risks in studies	Preparation and contract administration are critical

Discussion

- **What the decade evidence says**

The evidence suggests three broad phases. First, a strong growth period around FY2015–16, when construction growth reached 13.10% and infrastructure investment was an important demand driver. Second, expansion in nominal market value through FY2022–23, accompanied by a relatively stable GDP share and a decline in construction GFCF in FY2023. Third, contractions in FY2023 and FY2024 followed by a reported recovery in FY2025. These phases demonstrate responsiveness to fiscal, monetary and cost conditions.

The evidence cautions against simplistic conclusions. A stable GDP share does not mean the industry is stagnant; rising nominal market size does not necessarily mean real output increased; and a higher development allocation does not guarantee completed assets. Better sector evaluation combines real value added, capital formation, employment, material prices, project delivery, quality and asset outcomes.

- **Construction as an instrument of economic integration**

Highway and transport projects can support nation-building by reducing spatial isolation and connecting producers to markets, ports, industrial centres and public services. NHA's network and CPEC transport projects illustrate the scale of this function. Benefits are likely to be greater when corridors are integrated with feeder roads, logistics hubs, border facilities, rail links, industrial zones and local development plans. A motorway that bypasses a district may improve through-traffic but provide limited direct access to local producers unless interchanges and feeder networks are planned.

The economic case for a road should be assessed through lifecycle and network analysis rather than construction cost alone. Measures include traffic demand, travel-time reliability, vehicle operating costs, crash rates, freight flows, access to services, maintenance cost, flood resilience and distribution of benefits among regions and income groups. Ex-post evaluation tests whether forecasts were realised.

- **Why project management determines development return**

Pakistani empirical literature points to design, procurement, site and stakeholder problems as important causes of delay and cost escalation. These are not merely administrative issues. They determine how quickly public capital becomes a usable asset and how much additional cost is incurred before benefits begin. Poorly coordinated procurement can mobilise a contractor before design and site access are mature. Late payment can weaken cash flow and slow procurement. Incomplete specifications can trigger variations and disputes. Unresolved utility conflicts can interrupt construction and create rework.

For highway projects, risks are consequential because work is linear and geographically distributed. A delayed land parcel, bridge, railway crossing, utility relocation or material source can disrupt continuity along a corridor. Effective management requires a project-wide critical-path view, interface registers, chainage-wise readiness assessments, realistic cash-flow forecasts, risk ownership, change control and coordinated inspection and approval processes.

- **Domestic industry capability**

A nation-building construction strategy should strengthen domestic engineering and contracting capability. This includes professional project management, competent design, survey and geotechnical services, accredited laboratories, equipment maintenance, digital quantity and cost control, contract administration and quality assurance. Contractor capability should be assessed using relevant experience, financial capacity, key personnel, equipment resources, safety performance and quality systems, not solely tender price.

Procurement must remain competitive and transparent. Excessively restrictive qualification requirements can limit competition, while weak qualification can expose projects to delivery failure. The appropriate balance is risk-based prequalification, clear evaluation criteria, fair risk allocation, timely certification and payment, and effective dispute avoidance.

- **Sustainability, resilience and public value**

Pakistan's exposure to floods, extreme heat, water stress and fragile terrain makes climate resilience

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central to construction management. Infrastructure design should incorporate hydrological and geotechnical risk, drainage capacity, slope protection, material durability, emergency access and maintainability. Construction-stage controls should address borrow pits, quarries, dust, noise, waste, water use, traffic disruption and worker safety. Resilient design may increase initial capital cost but reduce expected lifecycle losses where hazard exposure is material.

Nation-building also requires distributional analysis. A project may increase national connectivity while imposing local displacement, access restrictions, environmental burdens or unequal benefit distribution. Social safeguards, consultation, livelihood restoration and safe local access are therefore integral to project performance.

Practical Implications

- **Government and public-sector clients**

Government departments should strengthen front-end project preparation and avoid construction procurement before feasibility, design, land acquisition, utility relocation, environmental approvals and funding are sufficiently advanced. Appraisal should compare alternatives, assess demand and distributional effects, include lifecycle costs and specify measurable benefits. PSDP monitoring should report allocations, releases, expenditure, physical progress, revised cost, completion and post-completion service indicators.

- **Project managers and consultants**

Project managers should maintain integrated baselines for scope, schedule and cost, supported by risk registers, interface registers, procurement schedules, change logs and cash-flow forecasts. Consultants should ensure timely review of submissions, clear interpretation of specifications, documented instructions and consistent quality surveillance. Early-warning indicators include slow design approvals, unresolved utilities, delayed material approvals, payment certification backlogs, low productivity and repeated non-conformities.

- **Contractors and domestic firms**

Contractors should invest in planning capability, equipment reliability, skilled operators, procurement systems, cost accounting, quality laboratories, safety management and digital reporting. The emphasis should shift from short-term resource deployment to predictable production and first-time quality. Firms should build financial resilience through realistic bidding, cash-flow planning, timely subcontractor payment and transparent cost control.

- **Universities and professional bodies**

Engineering education and professional development should integrate construction economics, project controls, procurement, contract administration, asset management, climate resilience, digital engineering, quality systems and leadership. Research partnerships among universities, government agencies and contractors could support anonymised project-performance datasets and independent ex-post evaluations.

Recommendations and Proposed National Construction Performance Framework

The following framework is a practical improvement model, not a tested intervention. Its effectiveness should be evaluated through pilot projects and transparent performance data.

Pillar	Recommended action	Lead responsibility	Evidence of performance
Project readiness	Require design, land, utilities, approvals, funding and risk readiness before tender	Planning Commission / client	Readiness score; unresolved interfaces at award
Procurement quality	Proportionate prequalification; evaluate capability, safety, quality and lifecycle value	Procuring agencies	Audit trail; contractor capacity and history
Integrated controls	Maintain scope, schedule, cost, risk, cash-flow and change baselines	Project director / PMC	Cost and schedule variance; change-order trend
Payment discipline	Monitor certification timelines and payment arrears	Client finance / contract administration	Days from certification to payment
Quality and productivity	Use inspection/test plans, calibrated labs and first-time acceptance	Contractor / consultant	NCR rate; rework cost; accepted output
Domestic capability	Support training, apprenticeships and professional certification	PEC / universities / industry	Certified workforce; training hours
Climate resilience	Integrate hazard screening, resilient design and maintenance plans	Designers / client	Climate-risk assessment; service interruptions
Asset management	Create asset registers, condition surveys and funded maintenance	NHA / provincial agencies	Maintenance backlog; asset condition
Transparency	Publish project data and conduct independent ex-post evaluation	Planning / evaluation units	Open dashboard; benefits reports

- **Implementation sequence**

1. Establish common definitions for allocation, release, expenditure, physical progress, completion, cost overrun and schedule delay.
2. Pilot the framework on representative highway and public-building projects in more than one province.
3. Create a standard data template covering original/revised cost, baseline/actual dates, scope changes, quality, safety, procurement, payment and operational readiness.
4. Introduce independent readiness reviews before procurement and gateway reviews during implementation.

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5. Link contractor performance records to future prequalification through transparent, auditable criteria.
6. Complete post-construction evaluations after assets have operated long enough for benefits to be observed, and feed lessons into future appraisal.

- **Suggested performance indicators**

At project level, cost performance can be measured as (actual final cost − approved baseline cost) ÷ approved baseline cost × 100, provided baseline and scope changes are treated consistently. Schedule delay can be measured as actual completion date minus baseline completion date, with extensions of time and employer-caused delays separately disclosed. Quality can be monitored through first-time inspection acceptance, non-conformance frequency, rework cost and defects during the defects-liability period. Operational performance should include asset condition, availability, maintenance backlog and user-service outcomes.

At sector level, the dashboard should combine real construction value-added growth, construction GDP share, GFCF, formal and informal employment indicators, material-price indices, public development expenditure, project completion rates and asset-condition indicators. These measures should be reported separately rather than compressed into one composite index unless a transparent weighting and validation method is established.

V. CONCLUSION

The construction industry is an important instrument of nation-building in Pakistan because it creates the physical systems on which economic activity, public services and regional connectivity depend. Its contribution extends beyond direct GDP value added: it stimulates upstream industries, employs a diverse workforce and creates assets that can improve mobility, market access, water security, energy supply, housing and social services. However, construction activity does not automatically produce national development. Benefits depend on project selection, readiness, delivery efficiency, quality, equitable access, climate resilience and long-term maintenance.

Evidence for FY2015–16 to FY2024–25 shows a volatile industry. Construction growth was reported at 13.10% in FY2015–16. PACRA's PBS-based series shows GDP contribution of approximately 2.7–2.9% over FY2019–FY2023, while nominal market size increased and GFCF weakened in FY2023. The State Bank reported contractions in FY2023 and FY2024, followed by 6.61% construction growth in FY2025 in the Pakistan Economic Survey. The NHA network and project portfolio demonstrate the scale of public highway investment, while CPEC transport reporting illustrates the role of corridor development in national and regional connectivity.

The central management conclusion is that Pakistan must move from an expenditure-and-output orientation toward a readiness, performance and public-value orientation. Project preparation, procurement, design coordination, payment discipline, contractor capability, quality assurance, safety, climate resilience and asset management should be treated as an integrated delivery system. This paper provides a secondary-evidence synthesis; it does not claim primary survey results or causal estimates.

Research Limitations and Future Research

The paper is limited by the absence of a harmonised national dataset covering project-level cost and schedule performance, employment quality, quality defects, asset condition and realised socioeconomic outcomes across the full decade. Available indicators are drawn from sources with different reporting periods, definitions and revisions. PACRA's market-size series is nominal and should not be treated as real output. NHA budget allocations are not equivalent to expenditure or completed infrastructure. CPEC project lengths and counts are programme outputs, not direct estimates of economic impact.

Future research should assemble a project-level panel dataset for a representative sample of federal and provincial infrastructure projects. It should include project type, province, original and revised cost, planned and actual completion dates, procurement method, design maturity, land readiness, payment delays, variation orders, contractor category, quality performance, safety, maintenance provision and operational outcomes. A quantitative study could test associations between project readiness, contract administration and cost/schedule performance while controlling for project size, complexity, inflation, geography and funding source.

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A mixed-method follow-up could interview project directors, consultants, contractors, procurement specialists and community representatives. For highway schemes, ex-post evaluation could compare pre- and post-construction travel times, freight costs, traffic volumes, crash rates, market access and local economic activity. Where comparison corridors or phased implementation provide a credible counterfactual, quasi-experimental methods may estimate impacts. Causal claims should be reserved for designs that address selection bias and confounding.

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