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STRATEGIC MANAGEMENT APPROACHES AND TRANSPORT INFRASTRUCTURE PROJECT DELIVERY IN GHANA: ASSOCIATIONS ACROSS SIX FRAMEWORKS

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Abstract:

Purpose: This article examines associations between six strategic management approaches and perceived transport infrastructure project delivery in Ghana. Design/methodology: A pragmatist mixed-methods study used questionnaires with transport infrastructure administrators, consultants and contractors, complemented by user interviews. The six predictors were the Project Management Life Cycle (PMLC), Project Portfolio Management (PPM), SWOT, PESTEL, the Higgins 8S Model and Porter's Five Forces. Delivery was represented by cost effectiveness, time efficiency and quality output. Findings: The source reports R = .874 and R^2 = .764 for the six-predictor regression; unstandardised coefficients were positive for PMLC (B = .486), PPM (.396), Higgins 8S (.125), Five Forces (.115), SWOT (.105) and PESTEL (.088). However, inconsistencies among the published sums of squares, degrees of freedom, F-statistic and coefficient tests prevent independent confirmation of inferential significance. Consequently, the estimates are presented descriptively pending verification against the original statistical output. Originality/value: The article compares project-level, portfolio-level, organisational and strategic scanning approaches in one Ghanaian sectoral setting and identifies a focused agenda for improving delivery governance. Limitations: Cross-sectional self-reports, non-probability sampling for some groups and unverified test statistics preclude causal conclusions.

Key Words: Transport Infrastructure; Strategic Management; Project Delivery; Project Life Cycle; Portfolio Management; Ghana

Introduction:

Transport infrastructure supports mobility, market integration and access to essential services, while poorly delivered projects can impose fiscal and social costs extending well beyond a construction contract. Ghana's transport development ambitions must therefore be considered alongside the persistent management challenges of funding uncertainty, timetable slippage, project discontinuity and quality assurance. International evidence indicates that major infrastructure schemes are often exposed to optimism bias, implementation complexity and weak accountability (Flyvbjerg, 2014). These concerns make the governance of project selection, execution and organisational coordination a substantive public-management question rather than a purely technical construction issue.

Project management and strategic management provide different, partly complementary responses. The Project Management Life Cycle (PMLC) establishes phase-specific planning and controls; Project Portfolio Management (PPM) allocates scarce resources across competing investments; the Higgins 8S Model addresses organisational alignment. SWOT, PESTEL and Porter's Five Forces offer distinct forms of diagnostic analysis. Although these tools are widely described, evidence comparing their relationships with project delivery within a common empirical model is more limited, especially for Ghanaian transport infrastructure. A combined assessment is useful because an approach that improves appraisal may not make the same contribution as one that governs execution or institutional capacity.

This article asks: How are six specified strategic management approaches associated with the reported delivery of Ghanaian transport infrastructure projects when examined together? Its objective is to assess their joint explanatory association and describe their separately reported regression coefficients in relation to cost effectiveness, time efficiency and quality output. The analysis does not estimate distinct models for the three components of delivery, nor does it test interactions, mediation or causal pathways. Accordingly, language about effects in the source has been moderated to reflect the observational design and the available results.

The contribution is threefold. First, the six approaches are distinguished by level and function, avoiding the assumption that strategic tools are interchangeable. Second, the empirical claims are tied explicitly to the regression evidence actually supplied. Third, the implications prioritise testable governance improvements while acknowledging limitations in the published statistical tables. The article addresses the assessment of six approaches; development of an integrated three-component implementation model is a separate analytical task.

Literature Review and Theoretical Framework:

Systems Approach as the Primary Theoretical Lens:

General Systems Theory provides the most economical theoretical foundation for this article because the explanatory variables span interconnected organisational, project and external-environment activities (von Bertalanffy, 1968). A transport investment can be understood as a managed system: appraisal, authorisation, financing, procurement, execution and stakeholder communication depend on each other. A technically sound construction schedule may fail when financing is disrupted; a well-funded portfolio may still perform weakly when institutional responsibilities are misaligned. The systems perspective therefore supports examining the six approaches jointly rather than assuming they work in isolation.

The theory also limits interpretation. It offers a rationale for interdependence, but the available regression evaluates six additive associations with a single delivery construct. It does not empirically test synergy, dynamic feedback, interaction effects, or whether any approach transmits the influence of another. Such explanations remain possibilities for future research rather than findings of the current study. Project life-cycle concepts and organisational-resource arguments are retained within the substantive literature, without presenting them as additional co-equal theories unsupported by separate tests.

Project Control and Portfolio Governance:

The PMLC differentiates initiation, planning, execution, monitoring and control, and closure. It provides stage-specific opportunities for scope definition, risk review, resource tracking and corrective decisions (Kerzner, 2017). Patanakul et al. (2010) discuss the application of project-management tools at different life-cycle stages and their relationship to success. For transport infrastructure, an appropriate life-cycle discipline can make milestones and accountability more observable, yet its value depends on decision quality and whether information generated by monitoring affects corrective action. Accordingly, the presence of a life-cycle manual alone should not be conflated with effective implementation.

PPM operates at a different level: the organisation or public sector must decide which projects are initiated, deferred, funded and monitored together. Cooper et al. (2001) emphasise selection and balance in portfolios, while Meskendahl (2010) links portfolio practices with strategic alignment and organisational outcomes. Martinsuo (2013) cautions that portfolio practices are context-sensitive. In a public infrastructure setting, the relevant challenge is not simply choosing high-value projects but maintaining feasible commitments despite competing priorities and budget constraints. PPM may complement the PMLC by shaping the environment in which individual projects can be realistically completed; this complementarity, however, is not itself a tested statistical interaction in the present data.

Organisational Alignment and Strategic Diagnostics:

Higgins (2005) conceptualises strategy execution through alignment among organisational elements. In transport delivery this directs attention to whether mandates, decision procedures, people, resources and leadership arrangements support operational work. Organisational alignment is not equivalent to detailed work scheduling or capital selection: it concerns the conditions that allow plans to be implemented consistently across units. The eight-S framework thus adds an institutional dimension to the PMLC and PPM, although the present survey cannot isolate which specific organisational elements are most consequential.

SWOT juxtaposes strengths and weaknesses with opportunities and threats. Helms and Nixon (2010) show its continued use in strategic analysis but also highlight limitations when it becomes an unprioritised listing rather than a structured decision process. PESTEL systematically considers political, economic, social, technological, environmental and legal influences; these exposures are particularly salient when transport programmes face policy changes, exchange-rate pressure and regulatory requirements. In this study, PESTEL is a diagnostic approach, not an independently measured index of the macroeconomic environment. Without separate external indicators, it cannot establish that external shocks caused specific delivery outcomes.

Porter's Five Forces evaluates rivalry, entrants, substitutes and buyer/supplier bargaining power (Porter, 2008). Its original industry-competition purpose differs from the public-infrastructure setting, where procurement rules and government purchasing power may reshape market relationships. The framework is potentially relevant to contractor capacity, procurement concentration and supply risks, but the data do not test these mechanisms separately. It should therefore be treated as one measured strategic-management approach rather than proof that increased competition necessarily improves construction quality.

Critical Synthesis and Study Propositions:

The literature suggests a division of labour: PMLC addresses execution control, PPM addresses investment prioritisation, Higgins 8S addresses organisational coherence, and SWOT, PESTEL and Five Forces diagnose strategic conditions. These functions provide a conceptual basis for including all six simultaneously. They also expose potential overlap: project governance may be recorded in PMLC, PPM and organisational-alignment survey items, and respondents may rate general management maturity similarly across approaches. Without reported discriminant-validity statistics or multicollinearity diagnostics, a high overall R^2 cannot establish that each framework supplies an independent, stable contribution.

The original research expectation was a positive relationship between strategic management practice and project delivery. To match the actual model, the testable proposition is restricted to the collective association between the six reported predictors and the composite delivery outcome. Six coefficient estimates are also described. No hypotheses concerning separate cost, time and quality regressions, moderators, mediators or framework interactions are introduced because corresponding analyses are absent from the source.

Analytical Framework:

The analytical framework is deliberately minimal: PMLC, PPM, SWOT, PESTEL, Higgins 8S and Porter's Five Forces are the six observed predictors in a simultaneous multiple-regression model; transport infrastructure project delivery is the reported dependent construct covering cost effectiveness, time efficiency and quality output. The tested statistical specification comprises six direct additive terms. Coordination, learning, procurement discipline and stakeholder response are discussed only as plausible, untested explanations, not as additional nodes or established causal mechanisms. A diagram is omitted because this clearly defined regression specification communicates the observed relationships without suggesting unsupported pathways.

Research Methodology:

Design and Participants:

The source describes a pragmatist mixed-methods study combining a cross-sectional quantitative survey with face-to-face user interviews. The targeted groups were administrators and consultants associated with transport ministries and agencies, contractors delivering infrastructure works, and transport users. The source specifies a target population of 68 administrators/consultants, a calculated minimum administrator/consultant sample of 58, 15 targeted contractors and 70 targeted users. These figures are recruitment targets, not verified achieved response counts. The regression ANOVA reports a total degrees of freedom of 78, which would imply 79 complete observations if it derives from a conventional intercept-inclusive regression; this implication requires verification against the original case-processing summary.

Administrators/consultants were sampled through a stratified approach, contractors purposively on relevant project experience, and transport users by convenience. Questionnaires were administered in paper and electronic formats; a standardised interview guide was used for users. A pilot with 20 respondents was reported, and ministry performance reports informed instrument design. The source indicates voluntary participation, informed consent and confidentiality. It does not supply the final group-by-group achieved sample, missing-data handling or an interview coding matrix. Those cannot be reconstructed responsibly from the article text.

Measures and Analytical Strategy:

The dependent variable was a composite described as transport infrastructure project delivery determinants, comprising cost effectiveness, time efficiency and quality output. The six independent variables were respondents' assessments of adoption or perceived effectiveness of PMLC, PPM, SWOT, PESTEL, Higgins 8S and Porter's Five Forces. Because the scoring formula, response scale and individual item distributions are not reproduced, the analysis is interpreted at the level of reported regression constructs; the reported coefficients cannot be translated into concrete currency savings, months saved or objective engineering-quality gains.

The source states that quantitative analysis was performed using SPSS, with checks planned for sample adequacy, Cronbach's alpha and normality, and that interviews were handled through content analysis. However, the source provides no numerical reliability table, factor loadings, diagnostics or independently auditable qualitative quotations. It also contains a separate statement claiming SEM/AMOS estimation but supplies only ordinary multiple-regression-style model summary, ANOVA and coefficient tables. This article therefore describes the supplied results as a reported multiple linear regression and makes no claim that a structural-equation model or confirmatory factor analysis has been demonstrated.

For clarity, the stated additive specification is: Delivery = intercept + b_1(PMLC) + b_2(PPM) + b_3(SWOT) + b_4(PESTEL) + b_5(Higgins 8S) + b_6(Five Forces) + error. Each reported B is an unstandardised partial association conditional on the remaining predictors, assuming the regression output is authentic and internally reconciled. Coefficients on potentially different scales cannot be ranked as standardised relative importance. Significance is not re-estimated without the underlying dataset or original software output.

Results:

Model Summary as Originally Reported:

Table 1 preserves the principal model-fit quantities appearing in the original article. The reported multiple correlation is .874 and the reported coefficient of determination is .764, which the source interprets as approximately 76.4% of the observed variation in the composite outcome explained by the six approaches together. This is an in-sample descriptive claim, not an estimate of causally attributable improvement. The adjusted R^2 and standard error shown in the source are reproduced for transparency but cannot yet be accepted as a reconciled set with the reported degrees of freedom.

R	R^2	Adjusted R^2	Std. Error of Estimate
.874	.764	.758	1.41229

Table: Source-reported regression model summary; values reproduced without modification.

ANOVA and Arithmetic Consistency:

The published ANOVA is reproduced in Table 2. It reports F = 133.254 and a significance entry of .000, which in normal reporting would be expressed as $p < .001$. However, the numbers do not reconcile: the regression sum of squares (1,860.481) divided by six degrees of freedom is approximately 310.080, not the printed 265.783; the residual sum of squares (574.434) divided by 72 is approximately 7.978, not 1.995. Consequently, the F-ratio obtained from the printed sums of squares and degrees of freedom is approximately 38.87, not 133.254. The discrepancy is not a rounding issue.

Component	SS (Reported)	df	MS (Reported)	F (Reported)	P (Reported)
Regression	1,860.481	6	265.783	133.254	.000
Residual	574.434	72	1.995	—	—
Total	2,434.915	78	—	—	—

Table: Source-reported ANOVA. Internal arithmetic inconsistencies require checking against original SPSS output; no replacement inferential statistics are asserted.

The sums of squares themselves are broadly compatible with the stated R^2: 1,860.481 / 2,434.915 is about .764. Nevertheless, with six predictors and an implied 79 analysed cases, the conventional adjusted R^2 formula would yield about .744 rather than the printed .758. Similarly, the residual mean square implied by the ANOVA differs from the source-reported standard error of estimate. The correct reporting decision is to preserve the source numbers with explicit qualification, not to select one arbitrary recalculated version as verified truth.

Predictor Coefficients:

All six source-reported unstandardised B estimates are positive. The largest B is reported for PMLC (.486), followed by PPM (.396), Higgins 8S (.125), Five Forces (.115), SWOT (.105) and PESTEL (.088). These figures must not be read as a rigorous ranking of framework effectiveness because predictor-scale equivalence has not been established. Table 3 reproduces the original estimates and significance entries so that the original evidence remains inspectable.

Predictor	B	SE	Beta	t	p Shown
Constant	1.624	.496	—	3.278	.001
PMLC	.486	.100	.049	4.486	.000
PPM	.396	.079	.040	3.502	.000
SWOT	.105	.088	.108	2.183	.000
PESTEL	.088	.056	.328	5.576	.000
Higgins 8S	.125	.057	.135	2.185	.003
Five Forces	.115	.057	.121	2.017	.000

Table: Original coefficient table (unmodified source values). B = unstandardised coefficient; SE = standard error; Beta = standardised coefficient. Individual significance entries are not independently verified.

The coefficient table also contains contradictions. For example, .486 / .100 is about 4.86 rather than the printed t = 4.486; .396 / .079 is about 5.01 rather than 3.502; and .105 / .088 is approximately 1.19 rather than 2.183. Analogous discrepancies affect other entries. Some printed p-values are also implausible given the stated t-statistics and residual degrees of freedom. It would therefore be methodologically unsound to assert that all six predictors are statistically significant. The positive sign and numerical magnitude of the published B entries are reported as supplied, with inferential assessment pending a corrected regression output.

Qualitative Information and Unsupported Performance Percentages:

The source states that users were interviewed and that their perspectives were analysed, but does not present auditable coded themes, frequencies or representative quotations sufficient for a discrete qualitative-results claim. The mixed-methods design can be described, but triangulation or qualitative confirmation should not be overstated. Likewise, the original discussion refers to approximately 15% cost reduction and 20% improvement in delivery time without supplying a comparison table, estimator, confidence interval or underlying calculations. Those percentages are therefore excluded from the findings and are not repeated as established outcomes.

Discussion:

Project and Portfolio Disciplines:

At the descriptive level, the reported PMLC and PPM B values are larger than those of the other four approaches. That pattern is consistent with the argument that effective project delivery depends both on phase-specific control and on realistic allocation across concurrent commitments. Kerzner (2017) explains why structured execution practices matter throughout a project, and Patanakul et al. (2010) connect suitable tool use at particular phases to project success. The Ghanaian findings are therefore compatible with established project-control scholarship. They do not prove that introducing PMLC will independently reduce delays or overruns, because management capability, project difficulty and institutional support may affect both practices and perceived performance.

Similarly, the positive source-reported PPM coefficient is compatible with portfolio strategy literature (Cooper et al., 2001; Meskendahl, 2010). Public agencies must decide not only how to execute projects but which commitments can be funded to completion. Martinsuo's (2013) contextual perspective is especially relevant: the effectiveness of portfolio routines may depend on budgeting authority, organisational maturity and continuity of decision-making. The survey cannot establish whether a central portfolio office would generate a specific return, but the result supports evaluating stronger portfolio appraisal and review mechanisms.

Organisational Alignment and Environmental Assessment:

The positive Higgins 8S coefficient is consistent with the proposition that policies and plans require aligned structures, processes, staff and resources for execution (Higgins, 2005). The systems perspective clarifies why this is theoretically plausible: weaknesses in one administrative subsystem may disrupt otherwise well-planned delivery. Yet the reported model does not identify which of the eight elements are functioning well or poorly, and it does not estimate a mediator representing organisational capability. Policy guidance should accordingly favour institutional diagnostic reviews and prospective measurement rather than declare the 8S construct a confirmed causal pathway.

The comparatively smaller source-reported unstandardised coefficients for SWOT, PESTEL and Five Forces should not be interpreted as evidence that external scanning is negligible. Different measurement scales, concept overlap and the distance between strategic analysis and final delivery may affect coefficients. SWOT is most useful when internal and external observations are prioritised and acted upon (Helms & Nixon, 2010). PESTEL can help project teams monitor changing constraints, while Five Forces can orient procurement-market analysis (Porter, 2008). In a government procurement setting, these frameworks require adaptation; systematic application, not the completion of a template, is the relevant practical question.

What the Systems Lens Explains and Does Not Establish:

The overall pattern fits the Systems Theory proposition that planning, prioritisation, organisational coordination and environmental awareness belong to one interconnected delivery system (von Bertalanffy, 1968). Nonetheless, the analysis is additive rather than systemic in a statistical sense: it estimates no interactions, reciprocal relationships, feedback loops or time lags. Its R^2, even if confirmed, would describe sample fit rather than an observed performance gain attributable to applying the six tools. Moreover, positive self-reported associations may partly reflect respondent perceptions of general institutional competence. Theoretical consistency is therefore an interpretive argument, not substitute evidence for an omitted test.

Implications for Decision-Makers:

A cautious implementation agenda follows. Transport ministries and implementing agencies can pilot stage-gate reviews that document project readiness, release conditions and quality controls; portfolio reviews can expose over commitment before additional projects receive funding. They can also examine whether organisational mandates and information systems support delivery. Strategic analyses should be recorded as decisions with accountable follow-up rather than isolated planning exercises. Baseline and follow-up data on approved budgets, actual payments, planned and realised milestones, and independently inspected quality would permit evaluation of whether these changes produce measurable improvements.

Such initiatives should be staged, evaluated and compared rather than rolled out as validated remedies. In particular, agencies should avoid equating positive questionnaire responses with verified changes in actual contract costs, delivery times or engineering outcomes. Where performance data are available, designs using before-and-after comparisons with suitable control projects, longitudinal tracking or quasi-experimental analyses would better distinguish management effects from macroeconomic and project-selection influences.

Conclusion and Recommendations:

The study considers six management approaches in relation to a composite measure of transport infrastructure delivery in Ghana. The supplied regression reports an R^2 of .764 and positive unstandardised coefficients across all six approaches, with PMLC and PPM numerically prominent among the published B estimates. These are descriptive features of the supplied output; inconsistent ANOVA and coefficient calculations mean that the strength and significance of the relationships cannot yet be certified.

The main defensible conclusion is that the article offers a coherent, theoretically grounded comparative assessment whose inferential estimates require source-level verification.

For practice, authorities should consider controlled pilots of stage-gate project management, transparent portfolio prioritisation and organisational-alignment reviews, supported by practical training and independent performance measurement. SWOT, PESTEL and competition analysis should inform recorded procurement and strategic decisions without being treated as automatic predictors of success. For scholarship, priority should be given to repairing the statistical record, validating measurement scales, reporting the achieved sample by stakeholder group and examining cost, time and quality separately using objective longitudinal data. The six-predictor comparison should not be confused with a separately proposed integrated implementation model, whose effectiveness remains to be tested.

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