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Article

Project Scope Management and Robustness of Oil and Gas Producing Companies in Rivers State

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Abstract: The oil and gas producing companies of Rivers State operate within an exceptionally turbulent environment, yet many have proved unable to withstand the price shocks, regulatory upheaval, insecurity and community disruption that pervade the Niger Delta. This study examined the relationship between project scope management and the robustness of oil and gas producing companies in Rivers State, with project scope management operationalised through four dimensions, namely scope planning, requirements collection, work breakdown structure, and scope validation and control, while robustness was modelled as a single criterion construct. Anchored on the Contingency Theory and the Dynamic Capabilities Theory, the study adopted a positivist philosophy and a cross-sectional survey design. Primary data were gathered from 180 management staff of thirty-three oil and gas producing firms registered with the Nigerian Upstream Petroleum Regulatory Commission, drawn by simple random sampling from an accessible population of 480, using a structured 5-point Likert's scale questionnaire. The hypotheses were tested at the 0.05 level of significance using Partial Least Squares-Structural Equation Modelling via SmartPLS. Only the work breakdown structure had a strong, positive and significant relationship with robustness, whereas scope planning, requirements collection and scope validation and control recorded weak-to-negligible, positive and non-significant relationships; the four dimensions jointly explained 65.7% of the variance in robustness. The study concludes that the robustness-enhancing potency of scope management is concentrated in its decompositional, execution-oriented dimension, and recommends the institutionalisation of rigorous, deliverable-based work breakdown structures, while the other dimensions require contextual adaptation to the volatile Niger Delta environment.

Keywords: Project Scope Management, Work Breakdown Structure, Scope Validation and Control, Robustness, Oil and Gas Producing Companies

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1. Introduction

The oil and gas industry remains the fulcrum upon which the Nigerian economy turns, and the producing companies operating within it constitute the single most consequential cluster of enterprises in the country's productive landscape. For decades the sector has supplied the overwhelming share of national foreign-exchange earnings and a substantial proportion of federally collected revenue, while its upstream operations concentrated heavily in the Niger Delta [1]. Beyond their headline contribution to output and the treasury, these firms generate direct and indirect employment, catalyse local content, and finance infrastructure and social investment in host communities, so that their fortunes are tightly bound up with the welfare of the wider society [2]. Yet, the very

companies on which so much depends operate in an exceptionally turbulent environment. They contend with volatile crude prices, a shifting fiscal and regulatory regime, persistent insecurity, pipeline vandalism and crude theft, protracted host-community agitation, and an accumulating burden of environmental degradation and litigation [3]. It is against this backdrop that the construct of robustness acquires its salience. Robustness refers to the capacity of an organisation to absorb and withstand disturbances while continuing to perform its essential functions, retaining structural and operational integrity even as the environment deteriorates. Where resilience emphasises the ability to bounce back after a shock, robustness emphasises the strength to resist loss of functionality in the first place, and the two are best understood as complementary facets of the broader family of capabilities that allow firms to endure adversity [4]. A robust producing company is therefore one whose operations, supply arrangements and project systems are configured with sufficient redundancy, buffering and flexibility to keep delivering value when prices collapse, communities revolt or infrastructure fails.

Scholarship on how firms build such enduring strength points to a recognisable set of antecedents. Organisational robustness is nourished by dynamic capabilities that enable firms to sense threats, seize opportunities and reconfigure their resource base as conditions change; it is strengthened by resource-based initiatives, organisational learning and responsiveness to environmental dynamism; and it is reinforced by deliberate investments in flexibility and redundancy that give a firm the slack to keep operating when part of its system is compromised [5]. Running through these accounts is the common thread that robustness is achieved when a firm's internal arrangements are properly aligned with the demands of its environment, an alignment that lies at the heart of contingency reasoning. What the literature has been slower to interrogate is the specific managerial disciplines through which such alignment is engineered in project-intensive firms. This is where project scope management enters as a compelling and largely under-examined antecedent of robustness. Oil and gas production is quintessentially project-based work, executed through drilling campaigns, engineering-procurement-construction contracts, facility upgrades, turnarounds and decommissioning programmes, each of which succeeds or fails on the clarity with which its boundaries are defined and controlled. Project scope management is the set of processes that ensures a project includes all the work required, and only the work required, to deliver its objectives, thereby preventing the uncontrolled expansion of deliverables that erodes cost and schedule performance [6]. Where scope is poorly governed, firms experience scope creep, rework, disputes and abandoned projects, and these project-level failures accumulate into an organisation-level fragility that leaves the firm ill-equipped to withstand external shocks; conversely, disciplined scope management embeds the predictability, control and alignment that a firm needs to keep its project portfolio, and by extension its operations, intact under pressure. The construct is conventionally decomposed into four interrelated dimensions that frame this study: scope planning, the deliberate articulation of how scope will be defined, documented, validated and controlled; requirements collection, the systematic elicitation and documentation of stakeholder needs; the work breakdown structure, the hierarchical decomposition of scope into manageable work packages; and scope validation and control, the securing of formal acceptance of deliverables and the management of changes to the scope baseline [7]. Anchored on Contingency Theory and the Dynamic Capabilities perspective, this study examines the relationship between project scope management and the robustness of oil and gas producing companies in Rivers State.

1.1 Statement of the Problem

Despite their strategic centrality, oil and gas producing companies in Rivers State appear increasingly unable to hold together and keep functioning in the face of the shocks that assail them, and this weak robustness constitutes a serious and growing problem. Firms that once seemed impregnable now stall, downscale, divest their onshore

and shallow-water assets, or exit host communities altogether when confronted with price collapses, regulatory upheaval, insecurity and community resistance, revealing an underlying brittleness in their operating and project systems. The problem manifests in recurrent project cost overruns and schedule slippages, in capital projects that stall or are abandoned outright under the weight of scope creep and rework, and in production shut-ins during community disputes and infrastructure vandalism, all of which share the common signature of a loss of functionality under stress that a genuinely robust firm would have resisted.

The causes of this fragility are only partly external. While price volatility, insecurity and environmental conflict are real and severe, a significant portion of the problem is internal and managerial, rooted in how firms govern the scope of their projects [8]. Inadequate scope planning leaves projects without a coherent foundation for definition and control; superficial requirements collection breeds volatility and deliverables that miss stakeholder needs; weak work breakdown structures deprive projects of the scaffolding needed for orderly scheduling, costing and accountability; and lax scope validation and control permit the creep and unmanaged change that quietly drain resources. Where these disciplines are deficient, the firm's internal arrangements fall out of alignment with the demands of its turbulent environment, and contingency reasoning predicts exactly the kind of effectiveness deficit that weak robustness represents. The effects are corrosive and cumulative: poorly managed scope inflates cost and extends schedules, damages credibility with partners, regulators and host communities, and ultimately produces a fragile organisation that lacks the buffering, learning and adaptive competence needed to absorb shocks and keep functioning.

Scholars have proffered various remedies for the problem of weak robustness, emphasising dynamic capabilities, resource-based initiatives and organisational learning, investments in flexibility and redundancy, and the integration of project management with disciplined risk management [9]. Valuable as these prescriptions are, they have largely addressed robustness in the abstract or through supply-chain, manufacturing and generic project settings, leaving the specific managerial levers required for project-intensive oil and gas firms, insufficiently specified. Several gaps therefore persist: the scope-management literature is dominated by construction and software contexts in foreign jurisdictions and rarely connects the discipline to robustness; robustness itself remains under-theorised and under-measured as a construct distinct from resilience; Nigerian oil and gas studies have examined cost and delivery in isolation rather than tracing how the dimensions of scope management jointly shape a firm's capacity to withstand shocks; and few of these studies have modelled the relationship using a rigorous structural equation approach in the Rivers State setting. The point of departure for this study is its deliberate convergence on these gaps, reconceptualising project scope management as a strategic, capability-bearing antecedent of organisational robustness and testing that proposition directly among oil and gas producing companies in Rivers State. Therefore, this study examined the relationship between project scope management and the robustness of oil and gas producing companies in Rivers State. In specific terms, the study sought to:

i. examine the relationship between scope planning and the robustness of oil and gas producing companies in Rivers State;

ii. assess the relationship between requirements collection and the robustness of oil and gas producing companies in Rivers State;

iii. investigate the association between work breakdown structure and the robustness of oil and gas producing companies in Rivers State; and

iv. determine the relationship between scope validation & control and the robustness of oil and gas producing companies in Rivers State [10].

1.1.1. Contingency Theory: is traced to Lawrence and Lorsch, whose study of differentiation and integration established that there is no single best way to organise and that the most effective structure is the one that fits the demands of the organisation's environment. Its core proposition is that organisational effectiveness is a function of the fit between internal arrangements and contextual contingencies such as environmental uncertainty, technology and size, so that misfit depresses performance while fit enhances it. Recent evidence sustains this logic, with Amhalhal et al. showing that aligning managerial practice with organisational contingencies significantly improves performance. The theory's strengths lie in its realism, diagnostic power and empirical testability, while its weaknesses include the loose operationalisation of "fit" and a tendency toward environmental determinism that underplays managerial agency. It is highly relevant here because it frames project scope management as an internal capability whose contribution to robustness depends on its fit with the sector's uncertain, shock-prone environment, thereby supplying the rationale for hypothesising that disciplined, environment-aligned scope management strengthens a firm's capacity to withstand disruption [11].

1.1.2. Dynamic Capabilities Theory: was propounded by Teece et al. who defined dynamic capabilities as the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments, a framework Teece elaborated through the microfoundations of sensing, seizing and transforming, and which Teece has extended to conditions of deep uncertainty. The theory distinguishes higher-order, change-oriented capabilities from ordinary operational routines, contending that in turbulent settings survival depends less on static efficiency than on the capacity to renew and realign assets; consistent with this, Ali et al. show empirically that dynamic capabilities underpin organisational resilience to severe shocks. Its strengths include explanatory reach in high-velocity environments and the integration of strategy, learning and renewal, while its weaknesses are conceptual ambiguity, measurement difficulty and the risk of tautology [12]. It is directly relevant because project scope management can be construed as a capability-bearing routine through which firms sense stakeholder requirements, seize them through structured planning and decomposition, and transform their project systems through validation and control, justifying the expectation that stronger scope-management capabilities translate into greater robustness.

1.2 Conceptual Framework

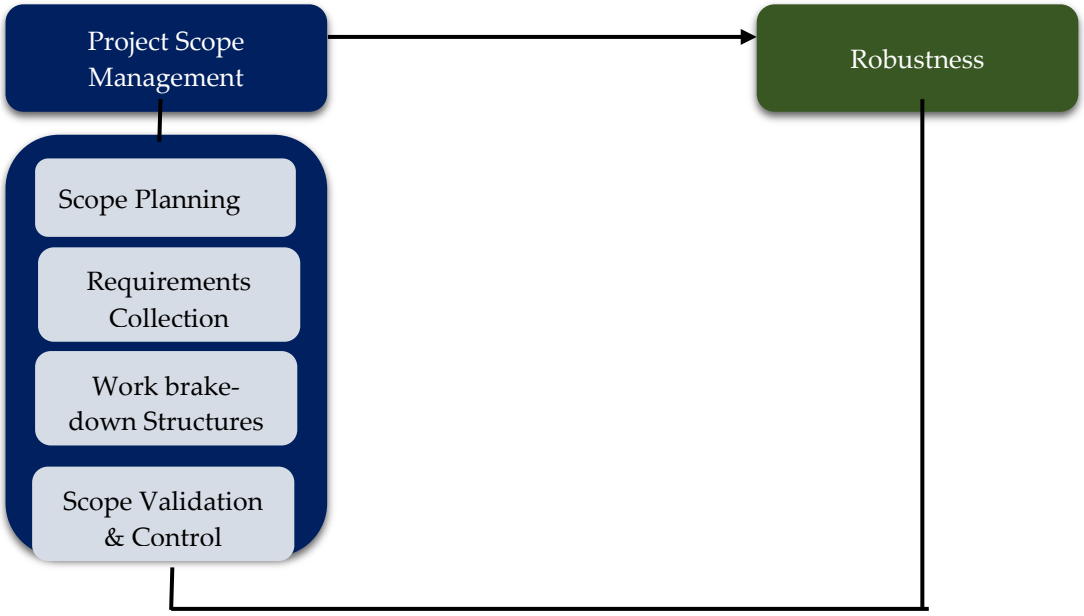

Figure 1: Conceptual Framework

Source: Conceptualized by the Researcher

1.2.1. Project Scope Management: denotes the constellation of processes that ensure a project embraces all the work required, and only the work required, to deliver its objectives, thereby fixing the boundaries within which resources are committed. In the Nigerian setting, project scope management is not a bureaucratic formality but the mechanism that determines whether a project remains predictable or drifts into the cost escalation, rework and abandonment that afflict the sector [13]. Prior work reveals both convergence and tension: Ogunberu et al. and Akintelu et al. establish that scope management significantly improves telecom project success and market share, while Ajmal et al. show that failure to govern scope produces scope creep; yet none extends the construct to organisational robustness, exposing a conceptual gap this study addresses. Positioned against contingency and dynamic capabilities reasoning, project scope management emerges as the aggregate predictor whose four proxies are argued to jointly condition robustness.

1.2.2. Scope Planning. Scope planning is the deliberate process of articulating how project scope will be defined, documented, validated and controlled, establishing the foundation on which every subsequent scope decision rests. Early clarity about activities, resources and boundaries pre-empts the ambiguity that later hardens into cost and schedule failure, a dynamic acutely relevant to firms operating amid regulatory flux and community volatility. The empirical record is instructively divided: Mwangi and Muchelule find scope planning strongly and significantly related to successful implementation, whereas Babalola and Lawal report that planning, when isolated among competing practices, exerts only an insignificant positive effect, signalling that its influence is contingent on context and on the practices with which it co-occurs [14]. It is therefore theorised as a necessary but conditional antecedent of robustness, tested in the first hypothesis.

1.2.3. Requirements Collection. Requirements collection is the systematic elicitation, documentation and management of the needs and expectations of a project's stakeholders, functioning as the bridge between what stakeholders want and what the project delivers. Incomplete or hurried elicitation seeds volatility and deliverables that miss their mark, whereas thorough collection aligns the project with genuine stakeholder need, an alignment especially consequential in the Niger Delta where host-community expectations can determine whether operations proceed or stall. The evidence is asymmetric: the requirements literature is dominated by software studies such as Palomares et al while Tor et al. show that only certain stakeholder groups significantly influence project success in Nigeria, thus complicating any assumption that more requirements activity uniformly improves outcomes [15]. It is retained as the second proxy on the expectation that disciplined requirements capture strengthens robustness by reducing the specification failures that precipitate disruption.

1.2.4. Work Breakdown Structure. The work breakdown structure is the hierarchical decomposition of the total scope of a project into progressively smaller, manageable work packages, providing the scaffolding for scheduling, costing, responsibility assignment and control. Its value lies in converting an abstract scope statement into an executable architecture, so that a robust decomposition sharpens definition and anticipates schedule and budget deviations before they materialize. The evidence is broadly affirming: Pelumi et al. report a moderate positive relationship with timely delivery, while Olaremi et al. find that the work breakdown structure significantly affects building-project delivery; yet both are set in construction and educational-works contexts with non-robustness criteria, leaving unresolved whether the decompositional discipline that aids delivery also confers the capacity to withstand shocks, the gap the third hypothesis confronts [16].

1.2.5. Scope Validation and Control. Scope validation and control together comprise the processes of securing formal acceptance of completed deliverables and managing changes to the scope baseline, constituting the project's defence against the uncontrolled

drift termed scope creep. The discipline preserves the integrity of the original scope by admitting only authorised resourced change, and its absence is repeatedly implicated in cost overruns. Okpo et al. identify change in scope as a significant inhibitor of oil and gas project delivery in Rivers State, while Ehiziojie et al. demonstrate, through a Nigerian pipeline that ballooned from 588.2 to 775.3 million dollars, a significant relationship between scope change and cost escalation; yet neither establishes a firm-level, multi-organisation link to robustness nor employs structural modelling. These gaps are interrogated in the fourth hypothesis [17].

1.2.6. Robustness. Robustness, the criterion variable, denotes an organisation's capacity to absorb and withstand disturbances while continuing to perform its essential functions, retaining operational and structural integrity even as its environment deteriorates. It is adjacent to, yet distinct from, resilience: whereas resilience emphasises recovery after a shock, robustness emphasises the strength to resist loss of functionality in the first instance, a distinction that matters greatly for firms that must keep producing through, not merely after, price collapses and community disruption. The construct remains contested and under-measured, and its antecedents have been examined largely through supply-chain and manufacturing lenses, while the managerial, project-based antecedent of scope management has been almost neglected in the Nigerian oil and gas context. Robustness is therefore adopted as a single criterion construct whose hypothesised dependence on the four scope-management proxies constitutes the analytical core of this research model.

1.3.1. Project Scope Management and Robustness. Ogunberu et al. investigated the application of project scope management practices on project success among telecommunication organisations in Nigeria, drawing 375 respondents from 25 purposively selected firms and analysing the data with descriptive statistics and multiple regression; they found that scope management practices significantly enhanced project success, accounting for about 65% of the variance, with customer expectation, customer satisfaction, resource allocation and project duration emerging as significant predictors [18]. Akintelu et al. examined project scope and market share among selected Nigerian telecommunication firms, studying 94 team members by total enumeration (74 usable) with descriptive and inferential statistics, and found that scope factors influenced market share. Both share a Nigerian setting and treat scope as a predictor, but neither adopts a robustness criterion, covers oil and gas, or models the four proxies jointly with PLS-SEM. The present study extends the pattern to the robustness of oil and gas producing firms in Rivers State.

1.3.2. Scope Planning and Robustness. Mwangi and Muchelule studied project scope management and the successful implementation of an infrastructural health programme in Nairobi County, sampling 92 technical personnel (78 returned) from a population of 120 and analysing the data with descriptive statistics, Pearson correlation and multiple regression; they found that scope planning bore a strong, positive and significant relationship with successful implementation. Babalola and Lawal assessed the effects of time-management practices on building-project delivery in Akure, Ondo State, sampling 208 professionals from 433 through stratified random sampling and analysing the data with multiple regression; they found that time-management practices explained about 34% of the variance in delivery, but that planning and scheduling exerted only insignificant positive effects while monitoring and evaluation was the significant predictor. Synthesising the two, scope planning is strongly significant in some settings yet weak when isolated, implying a contingent effect [19]. The present study expects a positive but context-dependent relationship with robustness.

1.3.3. Requirements Collection and Robustness. Palomares et al. conducted an extended interview study of requirements elicitation across twelve Swedish information-technology companies (24 practitioners), analysing the transcripts qualitatively, and found that the quality of elicitation, including technique choice, stakeholder involvement

and documentation rigour, strongly conditioned downstream project outcomes, with interviews the dominant technique. Tor et al. evaluated the influence of stakeholder engagement on the performance of construction projects in Nigeria, collecting data from 48 participants and analysing them with correlation and multiple regression; they found that employee and community engagement had significant positive effects on project success whereas customer and supplier engagement did not, indicating that requirements-oriented engagement is selective rather than uniform. Both link elicitation quality to project outcomes but neither adopts a robustness criterion or the oil and gas context [20]. The present study accordingly expects requirements collection to relate positively to the robustness of producing firms in Rivers State.

1.3.4. Work Breakdown Structure and Robustness. Pelumi et al. examined the effect of the work breakdown structure on the timely delivery of projects at Lagos State University, studying 40 professional staff by census and analysing the data with percentages and regression. They found a moderate positive and significant effect of work breakdown structure on the timely delivery of projects. Olaremi et al. investigated monitoring and evaluation practices on building-construction delivery among tertiary institutions in Ondo State, surveying 105 professionals and using multiple logistic regression; they found that the work breakdown structure, alongside benchmarking, earned value analysis and other techniques, significantly affected project delivery. Both establish the work breakdown structure as a consistent, significant contributor to delivery within Nigeria, but neither tests robustness or employs PLS-SEM. The present study extends this to the robustness of oil and gas producing firms in Rivers State [21].

1.3.5. Scope Validation and Control and Robustness. Okpo et al. examined the factors influencing oil and gas project delivery in Nigeria from a cost-management perspective, drawing a purposive, snowball-assisted sample of 36 construction professionals in the Rivers State oil and gas sector and analysing the data with mean item score and the Chi-square statistic; they found that change in scope, alongside low skills, poor estimating and the non-involvement of core professionals, significantly inhibited cost management and delivery. Ehiziojie et al. investigated the impact of scope change on project cost performance through a Nigerian pipeline whose budget rose from 588.2 to 775.3 million dollars, applying correlation and regression to a single-project case, and found a statistically significant positive relationship between scope changes and cost escalation. Both affirm that unmanaged scope change inflates cost and undermines delivery, yet neither establishes a firm-level link to robustness nor employs structural modelling. The present study accordingly expects scope validation and control to relate positively to robustness [22].

Consistent with the foregoing review, the following null hypotheses were advanced:

H_{01}: There is no significant relationship between scope planning and robustness of oil and gas producing companies in Rivers State.

H_{02}: There is no significant relationship between requirements collection and robustness of oil and gas producing companies in Rivers State.

H_{03}: There is no significant association between work breakdown structure and robustness of oil and gas producing companies in Rivers State.

H_{04}: There is no significant relationship between scope validation and control and robustness of oil and gas producing companies in Rivers State.

2. Materials and Methods

This study adopted across-sectional survey design anchored on the positivist tradition, allowing primary data to be gathered from respondents at a single point in time. The target population comprised all oil and gas producing firms operating in

Rivers State, while the element of accessible population was delimited to 480 middle-to-top management staff drawn from the 33 oil and gas producing firms in Rivers State, which are registered with the Nigerian Upstream Petroleum Regulatory Commission (NUPRC). Management staff occupying positions such as Operations, Logistics, Health-Safety-and-Environment, Administrative and Human Resource Managers were regarded as the most appropriate respondents, since their responsibilities place them close to the planning, coordination and execution of projects and to how their organisations withstand operational disturbances. Using the Krejcie and Morgan table, a sample of 214 respondents was determined from the accessible population of 480, and the simple random sampling technique was applied with the aid of a computer-generated table of random numbers, granting every element an equal and independent chance of selection. Data were collected by means of a structured questionnaire and responses elicited on a five-point Likert-type scale. Face and content validity were established through expert scrutiny, and a reliability cut-off of 0.70 was adopted. Of the 214 copies administered, 182 were retrieved and 180 (84.11%) were found usable, a rate comfortably above the minimum for . Hypotheses were tested at the 0.05 level of significance by means of Partial Least Squares-Structural Equation Modelling (PLS-SEM) via SmartPLS 4.1.1.9 (Ringle, Wende, & Becker, 2024), a technique preferred for its robustness, its tolerance of non-normal data and small-to-moderate samples, and its prediction-oriented logic. The analysis proceeded in the customary two stages of measurement-model and structural-model evaluation. By the decision rule, a relationship was significant where the t-value exceeded 1.96 and the p-value fell below 0.05, and non-significant otherwise.

3. Results

3.1 Questionnaire Response Rate

As revealed in table 1, of the 214 copies of the questionnaire administered, 182 (85.05%) were retrieved; on screening, 12 (5.61%) were defective and discarded, leaving 180 copies (84.11%) properly completed and retained for analysis. The retained sample of 180 valid cases remains comfortably above the minimum requirement for PLS-SEM.

Table 1. Questionnaire Response Rate

Questionnaire	Frequency	Percentage (%)
Number Administered	214	100.00
Number Retrieved	182	85.05
Defective Responses	12	5.61
Number Used	**180**	**84.11**

Source: Field Survey, 2026.

Table 2. Descriptive Statistics for SCOPE PLANNING

	N	Mean		Std. Deviation	Variance	Skewness	Kurtosis		
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
i. In our company, all activities to be carried out during project execution are clearly defined during scope planning in my organization.	180	2.89	.099	1.167	1.363	.019	.205	-.737	.407
ii. In our firm, the resources and materials required for each project are set out in the scope plan before execution begins.	180	2.98	.093	1.096	1.201	-.024	.205	-.826	.407
iii. In our firm, project duration and milestones are clearly established at the scope planning stage.	180	2.86	.094	1.107	1.226	.144	.205	-.424	.407
iv. In our organization, a documented scope management plan guides how scope will be defined, validated and controlled.	180	2.82	.095	1.121	1.256	.204	.205	-.467	.407
v. In our firm, the views of key project stakeholders are taken into account during scope planning.	180	2.94	.089	1.047	1.097	.054	.205	-.321	.407
vi. Scope planning is treated as a mandatory step before any project is initiated in my organization.	180	2.56	.084	.998	.997	.368	.205	.129	.407

Source: SPSS Survey Data, 2026

Table 3. Descriptive Statistics for REQUIREMENTS COLLECTION

	N	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
I. In our firm, stakeholder needs and expectations are systematically elicited before project deliverables are fixed, in our organisation.	180	2.91	.095	1.122	1.259	.109	.205	-.641	.407
II. Appropriate techniques (interviews, meetings, workshops) are used to gather project requirements in our firm.	180	2.94	.097	1.149	1.320	.026	.205	-.784	.407

III. Requirements gathered from stakeholders are properly documented and traceable in our firm.	180	3.60	.110	1.302	1.695	-.629	.205	-.619	.407
IV. Host communities and other affected stakeholders are consulted in defining project requirements in our firm.	180	2.86	.087	1.033	1.068	-.200	.205	-.548	.407
V. Collected requirements are reviewed and validated with stakeholders before execution in our firm.	180	2.89	.094	1.110	1.233	.183	.205	-.715	.407
VI. In our firm, incomplete or unclear requirements are resolved before work commences on the project.	180	3.01	.087	1.025	1.050	.012	.205	-.357	.407
Valid N (listwise)	180								

Source: SPSS Survey Data, 2026

Table 4. Descriptive Statistics for WORK BRAKE-DOWN STRUCTURES (WBS)

	N	**Mean**		**Std. Deviation**	**Variance**	**Skewness**		**Kurtosis**	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
i. In our firm, projects are decomposed into smaller, manageable work packages before execution.	180	2.89	.099	1.167	1.363	.019	.205	-.737	.407
ii. Our work breakdown structure clearly assigns responsibility for each work package.	180	2.98	.093	1.096	1.201	-.024	.205	-.826	.407
iii. Our work breakdown structure forms the basis for scheduling and cost estimation in my organisation.	180	2.94	.089	1.047	1.097	.054	.205	-.321	.407
iv. In our firm, the work breakdown structure improves the efficient utilisation of project resources.	180	2.99	.098	1.157	1.338	-.170	.205	-.734	.407
v. In our company, the work breakdown structure enhances communication and coordination among project teams.	180	3.11	.091	1.073	1.152	.194	.205	-.541	.407
vi. In our organisation, deliverables are tracked and monitored against	180	3.49	.097	1.147	1.316	-.312	.205	-.609	.407

the work breakdown structure throughout the project.	

Source: SPSS Survey Data, 2026

Table 5. Descriptive Statistics for SCOPE VALIDATION & CONTROL

	N	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
I. Completed deliverables are formally reviewed and accepted against the agreed scope in our firm.	180	3.53	.122	1.447	2.093	-.535	.205	-1.089	.407
II. Changes to the project scope are only admitted through a formal change-control process, in our firm.	180	3.86	.107	1.265	1.600	-.758	.205	-.665	.407
III. In our company, every approved scope change is matched with corresponding adjustments to time, cost and resources.	180	3.53	.115	1.365	1.862	-.492	.205	-.963	.407
IV. In our firm, uncontrolled expansion of project scope (scope creep) is actively prevented in my organisation.	180	3.55	.112	1.327	1.760	-.400	.205	-1.020	.407
V. In our organization, scope changes are communicated promptly to all relevant stakeholders.	180	3.70	.114	1.345	1.809	-.570	.205	-.955	.407
VI. In our company, regular scope reviews are conducted to keep the project aligned with its baseline.	180	3.04	.096	1.141	1.301	-.012	.205	-.669	.407

Table 6: Descriptive Statistics for ROBUSTNESS

	N	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
i. My organisation continues to perform its core functions even during major disruptions.	180	3.26	.092	1.090	1.189	-.240	.205	-.673	.407
ii. My organisation withstands external shocks (price shocks, community disruptions, security threats) without losing operational integrity.	180	2.74	.095	1.121	1.257	.089	.205	-.615	.407
iii. My organisation maintains sufficient buffers and redundancy to keep operating when part of its system fails.	180	3.16	.100	1.185	1.404	.071	.205	-.870	.407
iv. My organisation adapts its operations quickly to changing conditions without collapsing.	180	3.17	.095	1.118	1.251	.031	.205	-.651	.407
v. My organisation recovers essential operations rapidly after a disruptive event.	180	3.10	.098	1.165	1.357	.052	.205	-.837	.407
vi. My organisation consistently meets its obligations to stakeholders	180	3.37	.091	1.082	1.170	-.268	.205	-.403	.407

despite a turbulent operating environment.

Source: SPSS Survey Data, 2026

The item and construct means were interpreted against a criterion mean of 3.0 on the five-point scale, such that means of 3.0 and above reflect a comparatively high level of the attribute while means below 3.0 indicate a comparatively low level. As revealed in Tables 2-6 and summarised in Table 7, the pattern is generally moderate and uneven. Scope planning recorded the lowest grand mean (2.84), lying below the criterion and indicating that the deliberate articulation and documentation of scope is comparatively weakly practised among the firms [23]. Requirements collection (3.04) and the work breakdown structure (3.07) hovered marginally above the criterion, reflecting moderate practice, while scope validation and control returned the highest grand mean (3.54), suggesting that formal acceptance and change-control activities are the most consciously practised of the four dimensions. Robustness itself recorded a moderate grand mean (3.13), indicating that firms perceive themselves to withstand disturbances only to a middling degree. Notably, the dimension most strongly practised in descriptive terms, scope validation and control, is not the one most strongly associated with robustness in the structural analysis that follows, a divergence taken up in the discussion [24].

Table 7. Summary of Descriptive Statistics (N = 180)

Construct	Item Mean Range	Grand Mean	Remark (criterion 3.0)
Scope Planning	2.56 – 2.98	2.84	Low
Requirements Collection	2.86 – 3.60	3.04	Moderate
Work Breakdown Structure	2.89 – 3.49	3.07	Moderate
Scope Validation & Control	3.04 – 3.86	3.54	Moderate–High
Robustness	2.74 – 3.37	3.13	Moderate

Source: SPSS/SmartPLS Output of Research Data, 2026.

3.2 Measurement Model Evaluation

Following the two-stage PLS-SEM procedure, the reflective measurement model was evaluated first, examining indicator reliability, internal consistency reliability, convergent validity and discriminant validity. Indicator reliability was judged from the outer loadings, internal consistency from Cronbach's alpha and composite reliability, convergent validity from the average variance extracted at the 0.50 benchmark, and discriminant validity from both the Fornell–Larcker criterion and the heterotrait–monotrait (HTMT) ratio at the 0.85 upper bound [25].

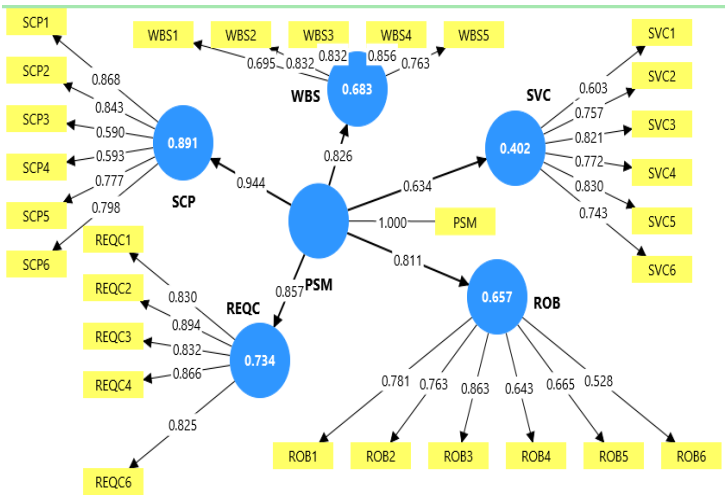

Figure 2. Measurement (Outer) Model.

Source: SmartPLS 4.1.1.9 Output of Research Data, 2026.

Table 8. Result Summary for the Reflective Measurement Model

Construct	Loading (β)	Ind. Rel. (β^2)	AVE	CR (rho_c)	α
Scope Planning (SCP1–SCP6)	0.590–0.868	0.348–0.753	0.567	0.885	0.845
Requirements Collection (REQC1–REQC6; REQC5 deleted)	0.825–0.894	0.681–0.799	0.722	0.928	0.904
Work Breakdown Structure (WBS1–WBS6; WBS6 deleted)	0.695–0.856	0.483–0.733	0.636	0.897	0.856
Scope Validation & Control (SVC1–SVC6)	0.603–0.830	0.364–0.689	0.575	0.889	0.852
Robustness (ROB1–ROB6)	0.528–0.863	0.279–0.745	0.512	0.860	0.817

Thresholds: loading > 0.70; $\beta^2 > 0.50$; AVE > 0.50; CR > 0.70; α = 0.70–0.90. Source: SmartPLS 4.1.1.9 Output of Research Data, 2026.

As shown in Figure 2 and Table 8, the retained outer loadings ranged from 0.528 to 0.894. During purification, REQC5 and WBS6 were deleted because their loadings fell substantially below the acceptable range; a few retained indicators (SCP3, SCP4, SVC1, WBS1, ROB4, ROB5 and ROB6) loaded below 0.70 but were retained because their deletion would not have raised the composite reliability or average variance extracted of their constructs above the required thresholds and because they contribute to content coverage [26]. Convergent validity was firmly established, with every average variance extracted exceeding 0.50 (0.512–0.722), and internal consistency was satisfactory, with Cronbach's alpha (0.817–0.904) and composite reliability (0.860–0.928) all above 0.70. The reflective measurement model therefore satisfied indicator reliability, internal consistency and convergent validity.

Table 9. Discriminant Validity : Fornell–Larcker Criterion

	SCP	REQC	WBS	SVC	ROB
SCP	0.753				
REQC	0.691	0.850			
WBS	0.736	0.619	0.798		
SVC	0.696	0.526	0.605	0.758	
ROB	0.636	0.664	0.576	0.576	0.715

Diagonal values are the square roots of the AVE.

Table 10: Discriminant Validity : Heterotrait–Monotrait (HTMT) Ratio

	SCP	REQC	WBS	SVC	ROB
SCP					
REQC	0.767				
WBS	0.845	0.684			
SVC	0.828	0.552	0.680		
ROB	0.801	0.727	0.512	0.606	

All ratios below the 0.85 threshold (Henseler et al., 2015). Source: SmartPLS 4.1.1.9 Output of Research Data, 2026.

As shown in Tables 9 and 10, the square root of each construct's average variance extracted exceeded its correlations with all other constructs, and every HTMT ratio fell below the 0.85 conservative threshold, ranging from 0.512 to 0.845; the variance inflation factors were likewise acceptable, with only SVC5 (4.743) and SVC6 (3.655) exceeding the stricter 3.3 guideline while remaining below the ceiling of 5. Discriminant validity was therefore confirmed under both criteria, and the measurement model was judged fit for structural assessment [27].

3.3 Structural Model Evaluation

The structural model was appraised through the coefficient of determination (R^2) for predictive accuracy, the effect size (f^2), and predictive relevance, before the examination of the path coefficients, t-statistics and p-values. In line with Hair et al. R^2 values of 0.75, 0.50 and 0.25 describe substantial, moderate and weak predictive accuracy, and f^2 values of 0.02, 0.15 and 0.35 denote small, medium and large effects; strength of paths was interpreted with the Cohen (1988) benchmarks, wherein β values of 0.10–0.29, 0.30–0.49 and 0.50–1.0 denote weak, moderate and strong correlations [28]. As reported in Table 4.6, robustness, the sole endogenous criterion, recorded an R^2 of 0.657 and an adjusted R^2 of 0.653, indicating that the four scope-management dimensions jointly explain approximately 65.7% of the variance in the robustness of oil and gas producing companies in Rivers State, a moderate-to-substantial level of predictive accuracy. Within the higher-order specification, the second-order project scope management construct further accounted for 89.1% of the variance in scope planning, 73.4% in requirements collection, 68.3% in the work breakdown structure and 40.2% in scope validation and control [29]. The effect sizes were uniformly large, the project scope management construct exerting effects of 8.142 on scope planning, 2.760 on requirements collection, 2.154 on the work breakdown structure, 0.674 on scope validation and control, and, most consequentially, 1.915 on robustness itself. With respect to predictive relevance, on the strength of the moderate-to-substantial R^2 for robustness and the uniformly large effect sizes, the model demonstrates adequate explanatory and predictive capacity for the endogenous criterion.

Table 11. Predictive Accuracy (R^2) and Effect Size (f^2)

Construct	R^2	Adjusted R^2	f^2 (effect of PSM)
Robustness (ROB)	0.657	0.653	1.915 (large)
Scope Planning (SCP)	0.891	0.889	8.142 (large)
Requirements Collection (REQC)	0.734	0.731	2.760 (large)
Work Breakdown Structure (WBS)	0.683	0.680	2.154 (large)
Scope Validation & Control (SVC)	0.402	0.396	0.674 (large)

Source: SmartPLS 4.1.1.9 Output of Research Data, 2026.

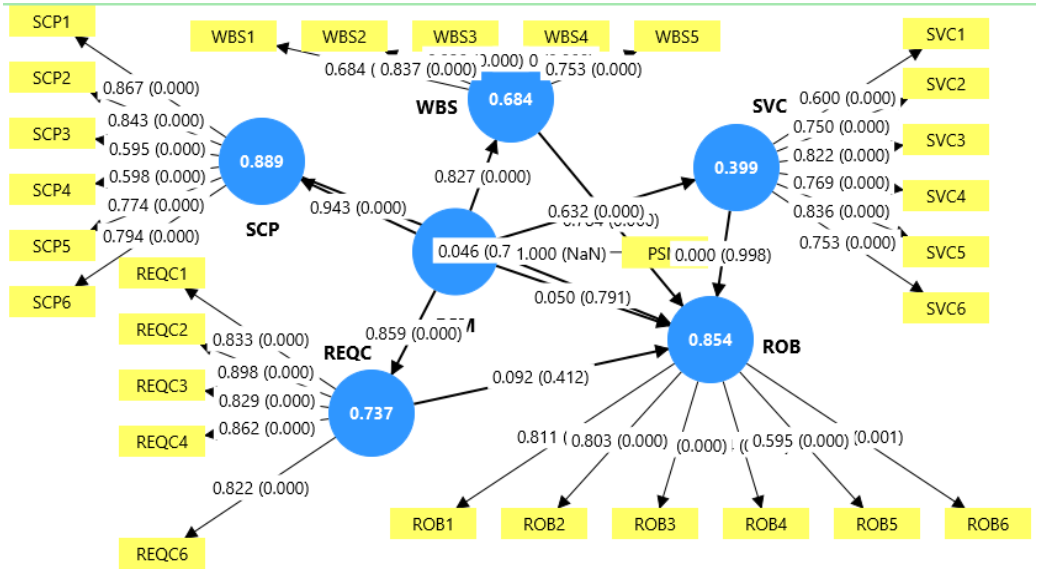

Figure 3. Structural Model showing the beta values and p-values.

Source: SmartPLS 4.1.1.9 Output of Research Data, 2026.

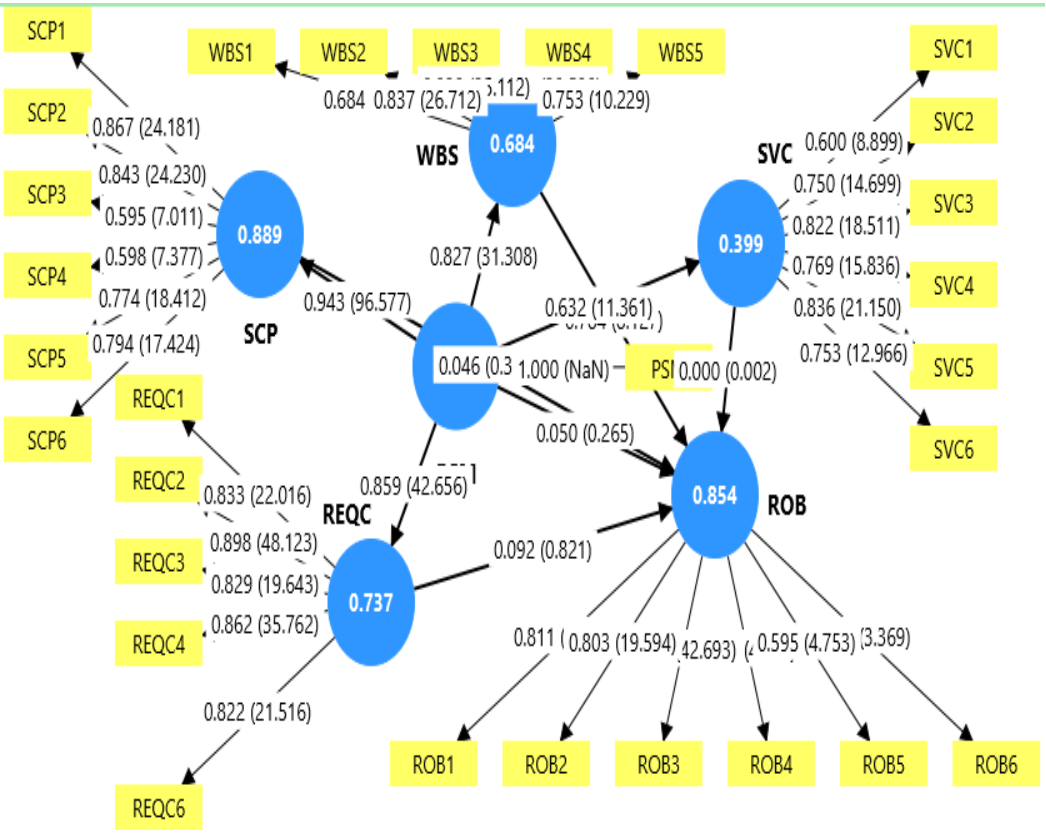

Figure 4. Structural Model showing the beta values and t-values. Source: SmartPLS 4.1.1.9 Output of Research Data, 2026.

Table 12. Results of Hypotheses Testing (Total Effects)

Relationship	β	STDEV	T-stat	P-value	Decision on Null
SCP → ROB (H01)	0.046	0.151	0.308	0.758	Supported (Retained)
REQC → ROB (H02)	0.092	0.112	0.821	0.412	Supported (Retained)
WBS → ROB (H03)	0.784	0.096	8.127	0.000	Not Supported (Rejected)
SVC → ROB (H04)	0.000	0.053	0.002	0.998	Supported (Retained)

R^2 (ROB) = 0.657. One null hypothesis was rejected and three were retained. Source: SmartPLS 4.1.1.9 Output of Research Data, 2026.

4. Discussion

I. **Scope Planning and Robustness.** The hypothesis (H_{01}) stated that there is no significant relationship between scope planning and robustness. As shown in Figures 3 & 4, and Table 12, the finding revealed that scope planning has a weak, positive and non-significant relationship with robustness (β = 0.046; t = 0.308; p = 0.758), and the null hypothesis is therefore supported. The implication is that the mere articulation of a formal scope plan does not, in itself, strengthen a firm's capacity to absorb shocks, plausibly because planning is often a static, front-loaded and compliance-oriented ritual that is quickly overtaken by the price collapses, community disruptions and security threats of the Niger Delta [30]. The finding was somewhat surprising given the theoretical centrality accorded to planning, yet it accords with Babalola and Lawal, who found planning insignificant when isolated among competing practices, while diverging from Mwangi and Muchelule, who

reported a strong significant effect on implementation success, a divergence attributable to differences in criterion (robustness versus implementation success) and sector. Theoretically, the Contingency Theory reconciles the result, since a rigid, document-centric plan is a poor fit for a volatile, externally driven environment; and from the Dynamic Capabilities perspective, scope planning functions largely as a sensing routine such that absent complementary seizing and reconfiguring, does not translate into robustness [31].

II. **Requirements Collection and Robustness.** The hypothesis (H_{02}) stated that there is no significant relationship between requirements collection and robustness. As shown in Figures 3 & 4, and Table 12, the finding revealed that requirements collection has a very weak, positive and non-significant relationship with robustness ($\beta = 0.092$; $t = 0.821$; $p = 0.412$), and the null hypothesis is therefore supported. The implication is that the systematic elicitation of stakeholder needs before execution does not independently enhance shock-resistance, plausibly because requirements captured at the outset decay rapidly amid fluid host-community expectations, abrupt regulatory shifts and volatile joint-venture priorities unless continuously revalidated. The finding was partly surprising but coheres with Tor et al. who found stakeholder engagement selective, with only employee and community engagement significant, while diverging from Palomares et al. whose software-context study linked elicitation quality strongly to project outcomes [31]. Theoretically, the Contingency Theory indicates that the effect of requirements collection is contingent on which stakeholders are engaged and on environmental conditions, so that generic elicitation is a poor fit for the multi-stakeholder Niger Delta and from the Dynamic Capabilities standpoint, requirements collection is a sensing microfoundation that, without seizing and transforming routines, cannot by itself furnish the adaptive capacity underpinning robustness.

III. **Work Breakdown Structure and Robustness.** The hypothesis (H_{03}) stated that there is no significant association between work breakdown structure and robustness. As shown in Figures 3 & 4, and Table 12, the finding revealed that the work breakdown structure has a strong, positive and significant relationship with robustness ($\beta = 0.784$; $t = 8.127$; $p = 0.000$), and the null hypothesis is therefore rejected. By the Cohen (1988) benchmark, a β of 0.784 denotes a strong correlation, making the work breakdown structure the single dominant predictor of robustness [32]. The implication is profound: the hierarchical decomposition of scope into clearly assigned, buffered and monitored work packages furnishes the executable architecture that enables a firm to keep functioning through disruption, localising the impact of shocks to discrete packages that can be isolated and reconfigured without loss of overall integrity. The finding was expected and corroborates Pelumi et al. and Olaremi et al. who linked the work breakdown structure to timely and orderly delivery. The present study extends this to the deeper criterion of robustness and records an even stronger effect [33]. Theoretically, the study supports the Dynamic Capabilities Theory, with the work breakdown structure operating as a capability-bearing routine through which firms seize and transform their resource base into reconfigurable modules, and it equally supports the Contingency Theory, since its decompositional discipline is well fitted to complex, multi-contractor petroleum projects.

IV. **Scope Validation and Control and Robustness.** The hypothesis (H_{04}) stated that there is no significant relationship between scope validation & control and robustness. As shown in Figures 3 & 4, and Table 12, the finding revealed that scope validation and control has a negligible, effectively neutral and non-significant relationship with robustness ($\beta = 0.000$; $t = 0.002$; $p = 0.998$), and the null hypothesis is therefore supported. The implication is that the existence or sophistication of formal change-control processes does not independently predict shock-resistance,

plausibly because scope changes in the Rivers State petroleum environment are overwhelmingly driven by exogenous forces such as community protests, regulatory reversals, force-majeure events and unilateral joint-venture decisions, which lie beyond the reach of any internal control system, and because validation and control may operate as after-the-fact documentation that trails rather than governs project decisions [34], [35]. The finding was surprising and counterintuitive and represents perhaps the study's most original contribution, standing in contrast to Okpo et al. and Ehiziojie et al. who found scope change as a significant driver of poor cost and delivery outcomes. The divergence is instructive, since both treated scope change as a disruptor of cost rather than testing formal validation and control as a predictor of robustness. Theoretically, the Contingency Theory offers the most coherent reading, the volatile Niger Delta demanding adaptive, relationship-based change governance rather than rigid, document-driven control, and from the Dynamic Capabilities standpoint, scope validation and control appears to be discharged ceremonially rather than as a genuine transforming capability, thus forfeiting its theorised capacity to renew the firm's project systems in the face of shocks.

5. Conclusion

The study concludes that project scope management is a consequential antecedent of the robustness of oil and gas producing companies in Rivers State, but that its capacity to strengthen shock-resistance is realised principally through the rigorous decomposition of project scope into executable, reconfigurable work packages, while its remaining dimensions require deliberate contextual adaptation to the volatile, politically complex operating environment of the Niger Delta if their latent contribution is to be unlocked. Based on the findings of the study, the following recommendations are proffered: Project directors, project management offices and chief engineers of oil and gas producing companies in Rivers State should institutionalise the rigorous use of deliverable-based work breakdown structures across every project, in order to strengthen the firm's capacity to absorb operational shocks. This should be done by mandating a standardised protocol that decomposes total scope into clearly defined work packages, assigns unambiguous responsibility, embeds schedule and cost buffers at the package level, links each package to earned-value indicators through a work-breakdown-structure dictionary, and enforces continuous package-level tracking, so that disruptions are localised and reconfigured without loss of integrity. Arising from the non-significant relationship between scope planning and robustness, the senior management and corporate planning leads of oil and gas producing companies in Rivers State should reorient scope planning from a static, compliance-oriented ritual into a dynamic, contingency-sensitive and continuously updated capability, in order to unlock its currently unrealised contribution to robustness. This should be done by adopting rolling-wave and scenario-based planning that explicitly models price collapses, community disruptions and security threats, by integrating the scope plan with the work breakdown structure and control mechanisms, and by revising it as environmental conditions evolve. Based on the non-significant relationship between requirements collection and robustness, the project managers, community-liaison officers and stakeholder-management leads of oil and gas producing companies in Rivers State should redesign requirements collection as a continuous, stakeholder-differentiated and dynamically revalidated process, in order to reduce the specification failures that precipitate disruption. This should be done by prioritising elicitation from the high-impact stakeholder groups such as employees, host communities and regulators, as well as maintaining traceable requirements registers, and instituting periodic re-elicitation cycles that keep the baseline aligned with the fluid Niger Delta environment. Arising from the non-significant relationship between scope validation and control and robustness, the

executive leadership, project management offices and change-control boards of oil and gas producing companies in Rivers State should replace rigid, document-driven change control with an adaptive, two-tier, digitally enabled change-governance system, calibrated to the sector's externally driven change environment, in order to convert validation and control into a genuine robustness-enhancing capability. This should be done by establishing a rapid-response triage tier that fast-tracks externally imposed, force-majeure-equivalent changes and a deliberative tier that subjects internally initiated changes to full impact assessment, supported by digital platforms that enable real-time tracking and dynamic baseline updating.

REFERENCES

[1] M. M. Ajmal, M. Khan, A. Gunasekaran, and P. T. Helo, "Managing project scope creep in construction industry," *Engineering, Construction and Architectural Management*, vol. 29, no. 7, pp. 2786–2809, 2022.

[2] S. O. Akintelu, A. O. Ogunberu, and A. O. Binuyo, "Project scope and market share of selected telecommunication firms in Nigeria," *International Journal of Applied Management and Technology*, vol. 24, pp. 1–17, 2025.

[3] I. Ali, A. Arslan, M. Chowdhury, Z. Khan, and S. Y. Tarba, "Reimagining global food value chains through effective resilience to COVID-19 shocks and similar future events: A dynamic capability perspective," *Journal of Business Research*, vol. 141, pp. 1–12, 2022.

[4] A. Amhalhal, J. Anchor, N. S. Tipi, and S. Elgazzar, "The impact of contingency fit on organisational performance: An empirical study," *International Journal of Productivity and Performance Management*, vol. 71, no. 6, pp. 2214–2234, 2022.

[5] H. I. Babalola and O. M. Lawal, "Effects of time management practices on the performance of building project delivery in Akure, Ondo State, Nigeria," *International Journal of Environmental Design and Construction Management*, vol. 6, pp. 1–14, 2024.

[6] S. Bamidele and N. I. Erameh, "Environmental degradation and sustainable peace dialogue in the Niger Delta region of Nigeria," *Resources Policy*, vol. 80, p. 103274, 2023.

[7] J. Cohen, *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. Hillsdale, NJ, USA: Lawrence Erlbaum Associates, 1988.

[8] J. W. Creswell and J. D. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 5th ed. Thousand Oaks, CA, USA: Sage Publications, 2018.

[9] H. Do, P. Budhwar, H. Shipton, H.-D. Nguyen, and B. Nguyen, "Building organizational resilience, innovation through resource-based management initiatives, organizational learning and environmental dynamism," *Journal of Business Research*, vol. 141, pp. 808–821, 2022.

[10] L. Donaldson, *The Contingency Theory of Organizations*. Thousand Oaks, CA, USA: Sage Publications, 2001.

[11] S. Duchek, "Organizational resilience: A capability-based conceptualization," *Business Research*, vol. 13, no. 1, pp. 215–246, 2020.

[12] L. Ehiziojie, O. A. Adebara, U. D. Okoro, S. Ajayi, and K. Adeloye, "Mitigating the impact of scope change on project cost performance in the global oil and gas industry: Innovative strategies and sustainable solutions from the Nigerian experience," *Futurity Proceedings*, vol. 1, pp. 1–18, 2024, doi: 10.5281/zenodo.13993544.

[13] C. Fornell and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error," *Journal of Marketing Research*, vol. 18, no. 1, pp. 39–50, 1981.

[14] J. F. Hair, G. T. M. Hult, C. M. Ringle, and M. Sarstedt, *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Thousand Oaks, CA, USA: Sage Publications, 2014.

[15] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *European Business Review*, vol. 31, no. 1, pp. 2–24, 2019.

[16] J. F. Hair, G. T. M. Hult, C. M. Ringle, and M. Sarstedt, *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 3rd ed. Thousand Oaks, CA, USA: Sage Publications, 2022.

[17] J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," *Journal of the Academy of Marketing Science*, vol. 43, no. 1, pp. 115–135, 2015.

[18] J. Hillmann and E. Guenther, "Organizational resilience: A valuable construct for management research?" *International Journal of Management Reviews*, vol. 23, no. 1, pp. 7–44, 2021.

[19] J. Hulland, "Use of partial least squares (PLS) in strategic management research: A review of four recent studies," *Strategic Management Journal*, vol. 20, no. 2, pp. 195–204, 1999.

[20] M. A. Jarrah, J. Baker, and I. Altarawneh, "Toward successful project implementation: Integration between project management processes and project risk management," *Problems and Perspectives in Management*, vol. 20, no. 3, pp. 258–268, 2022.

[21] M. Kamalahmadi, M. Shekarian, and M. Mellat Parast, "The impact of flexibility and redundancy on improving supply chain resilience to disruptions," *International Journal of Production Research*, vol. 60, no. 6, pp. 1992–2020, 2022.

[22] R. V. Krejcie and D. W. Morgan, "Determining sample size for research activities," *Educational and Psychological Measurement*, vol. 30, no. 3, pp. 607–610, 1970.

[23] P. R. Lawrence and J. W. Lorsch, *Organization and Environment: Managing Differentiation and Integration*. Boston, MA, USA: Harvard Business School Press, 1967.

[24] L. W. Mwangi and Y. Muchelule, "Project scope management and successful implementation of infrastructural health program in Nairobi County," *International Journal of Management and Commerce Innovations*, vol. 10, no. 1, pp. 140–148, 2022, doi: 10.5281/zenodo.6563125.

[25] J. C. Nunnally and I. H. Bernstein, *Psychometric Theory*, 3rd ed. New York, NY, USA: McGraw-Hill, 1994.

[26] [26] A. O. Ogunberu, S. O. Akintelu, and T. O. Olaposi, "Application of project scope management practices on project success among telecommunication organizations in Nigeria," *International Journal of Development and Sustainability*, vol. 7, no. 2, pp. 518–532, 2018.

[27] A. H. Okpo, U. N. Sylvester, and J. Offiong, "Factors influencing oil and gas project delivery in Nigeria: Cost management perspective," *International Journal of Engineering Management*, vol. 7, no. 1, pp. 1–8, 2023, doi: 10.11648/j.ijem.20230701.11.

[28] S. O. Olaremi, A. D. Dada, A. F. Lawal, E. Adisa, E. F. Ojefia, and A. A. Garbati, "Monitoring and evaluation practices on building construction project delivery among tertiary institutions of Ondo State, Nigeria," *Journal of Applied Sciences and Environmental Management*, vol. 28, no. 12, pp. 4007–4017, 2024.

[29] C. Palomares, X. Franch, C. Quer, P. Chatzipetrou, L. López, and T. Gorschek, "The state-of-practice in requirements elicitation: An extended interview study at 12 companies," *Requirements Engineering*, vol. 26, no. 2, pp. 273–299, 2021, doi: 10.1007/s00766-020-00345-x.

[30] R. O. Pelumi, O. I. Olateju, I. I. Oshin, and W. G. Odukaiye, "Work breakdown structure and timely delivery of project: A study of Lagos State University," *LASU Journal of Transport & Logistics*, vol. 4, no. 1, pp. 1–10, 2022.

[31] C. M. Ringle, S. Wende, and J.-M. Becker, *SmartPLS 4*. Bönningstedt, Germany: SmartPLS GmbH, 2024. [Online]. Available: https://www.smartpls.com

[32] D. J. Teece, "Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance," *Strategic Management Journal*, vol. 28, no. 13, pp. 1319–1350, 2007.

[33] D. J. Teece, "The evolution of the dynamic capabilities framework," in *Artificiality and Sustainability in Entrepreneurship*, R. Adams, D. Grichnik, A. Pundziene, and C. Volkmann, Eds. Cham, Switzerland: Springer, 2023, pp. 113–144.

[34] D. J. Teece, G. Pisano, and A. Shuen, "Dynamic capabilities and strategic management," *Strategic Management Journal*, vol. 18, no. 7, pp. 509–533, 1997.

[35] M. A. Tor, N. Gambo, T. A. Muritala, and F. A. Ogedengbe, "Evaluating the influence of stakeholder engagement on the performance of construction projects in Nigeria," *Journal of Information Systems Engineering and Management*, vol. 10, no. 32s, pp. 856–868, 2025.