



Article

Project Leadership Functions and the Associated Behaviour for Projects and Project Organisations

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Abstract: Individuals and their leadership competencies have been the sole focus of project leadership research, rather than the project leadership's behaviour and functions in project and organisational settings. As a result, this study investigates the project leadership functions and behaviours required for various project and organisational situations in order to propose a project leadership model that will be effective in all project and organisational situations. The model that was developed and tested in this study theorised about the project leadership function that project leaders are expected to perform as a result of their positions. It also described how project leaders could tailor their leadership functions and behaviours to address issues related to positions, organisational situations, and project situations. Three hypotheses were developed and tested using structural equation modelling to validate the model. The model's perceptive power demonstrates adequate validity. The model's validity implies that there are appropriate project leadership functions for different leadership levels and circumstances. The model's validity also implies that each project leadership behaviour has its own value, as conditions and necessities dictate. The study assumes that a project leader can embrace project leadership by combining a few different project leadership functions and behaviours.

Keywords: project leadership; project leadership theory; project leadership model; organisational leadership



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1. Introduction

Project success is a direct reflection of the project manager; it is their responsibility to go beyond managing details and reporting project status, as well as to add value by providing leadership [1–3]. Leadership qualities impact project performance, either positively or negatively [4]. Furthermore, project leadership is essential in project management because it is necessary to ensure that project management processes run smoothly [5–7]. In an effort to establish the importance of project leadership in project management, project leadership has been linked to project team effectiveness [8,9], organisational innovativeness [10–12], job satisfaction [13], the success of change initiatives [14], work motivation and employee performance [15], project performance and success [16–20], and the subordinate's job attitudes and job outcomes [21,22]. These studies have captured the leadership element of project managers and revealed project leadership as an essential aspect of project management.

Aside from their significance, project leadership roles in project management have been established in the literature. For example, Ref. [23] discovered that project leadership influences safety communication and performance. According to [24,25], project leadership influences project managers' behaviour and style. According to [26], project leadership

significantly impacts the implementation effectiveness of information technology projects. As [4] revealed, project leadership significantly affects innovative employee behaviour, commitment, trust, and perceptions of empowerment. Ref. [2] investigated the relationship between various leadership styles and project success. Refs. [27,28] established a link between effective project leadership and specific forms of power and politics within a virtual project environment.

Individuals and their leadership competencies have been the sole focus of project leadership research, rather than the project leadership model in project and organisational settings [29,30]. The lack of an analysis or model explaining project leadership behaviour and functions is a significant gap in the literature. Additionally, there is no general agreement among the standards for project management concerning the functions and behaviours that should be expected of project leaders. It is still not completely clear what kinds of functions and behaviours are anticipated of project leaders on the basis of their roles. Likewise, there is a need for additional research on how project leaders can adapt the functions and behaviours of their leadership to meet the requirements of their roles, the circumstances of their organisations, and the contexts of their projects.

Leadership behaviours improve project leadership effectiveness, resulting in high project success [24,31,32]. Ref. [33] also noted that the functions and behaviours associated with project leadership should be selected on the basis of the positions held by the project leaders. This implies that a project leader must be able to function in various complex and diverse organisational settings [34]. These abilities enable project leaders to choose a leadership style appropriate for the situation and aligned with the organisation's goals [35]. Ref. [30] also stated that project leadership roles depend on the project leaders' managerial positions. This implies that different projects necessitate distinct project leadership approaches. Furthermore, it suggests that the competence of project leaders be chosen to meet the needs of organisations and specific types of projects. As a result of uncertainty, rapidly changing environments, globalization, and the increasing complexity of projects and organisations, a project leadership model is required [36].

The diverse interests and competencies of project stakeholders have also exacerbated the need for a project leadership model. This diversity necessitates a shift in behaviour for the project leader, whose job is to ensure their performance and satisfaction. As [9] point out, the project leader should cultivate relationships with various stakeholders. According to [37], project leaders must understand stakeholders' requirements, needs, and expectations and create an appropriate work environment to motivate them. As noted by [38], project leaders must recognise that the success of a project is dependent on stakeholders who have specific sets of skills and expertise. These various requirements necessitate various project leadership behaviours and functions.

Project leadership, according to [35,39–41], requires a model that is effective in all project and organisational situations. Because the role of professionals working on projects as administrators, coordinators, and directors is rapidly evolving from project manager to project leader, such a model is required to clarify project leadership functions [42]. As a result, this study aims to look into the project leadership functions and behaviours needed for various project and organisational situations in order to propose a project leadership model that will work in all project and organisational situations. This study's specific objectives will be (i) to identify the project leadership functions required for various project and organisational situations; (ii) to identify the project leadership behaviours required for various project and organisational situations; and (iii) to develop a project leadership model that best explains the interrelationships between project leadership functions and behaviours.

2. Literature Review

2.1. Project Leadership Functions

Project leadership's function is critical in developing a vision, mission, goals, and objectives [43–45]. Project leadership entails developing strategies, policies, and methods to

achieve organisational goals effectively and efficiently, as well as directing and coordinating efforts and organisational activities [46]. All levels of project leaders share these project leadership functions. Still, top-level project leaders achieve the mission and vision and deal with external changes [47,48]. Another important project leadership function of top-level project leaders is to inspire other project leaders to solve problems in novel ways [43]. Because of this arrangement, each project leadership level is given a different leadership function.

The extent of the project leadership function represents the leadership function appropriate for various levels of leadership. It describes the expected levels of power and authority, as well as leadership efficacy and responsibility, at various leadership levels [49]. The extent of leadership function refers to the fact that different stages of leadership authority, power, and responsibility should influence leadership behaviour. Mental abilities, emotional abilities, and the ability to perform complex tasks all impact project leadership. Only top-level project leaders have the maturity, capacity, and experience to perform specific project leadership functions [9].

Furthermore, different leadership functions are appropriate for various combinations of tasks and positions [37]. To be effective in these situations, individuals must be capable of performing leadership functions tailored to the needs and requirements of various tasks and positions. For these reasons, project leaders are expected to be able to perform the necessary leadership functions for different tasks and positions. One of the study's objectives is to investigate the project leadership functions required for various positional, project, and organisational situations.

2.2. Project Leadership Behaviours

Traditionally, the behavioural models for leaders have been authoritarian leadership, democratic leadership, and laissez-faire leadership [50]. A controlling, directive, or coercive leader who rarely makes decisions based on input from their subordinates exhibits authoritarian leadership behaviour [51]. Authoritarian leadership is distinguished by a top-down approach to objectives and a focus on results, while coordination between superiors and subordinates is not highly valued [26]. Aside from authoritarian leadership, other extremes of the leadership behaviour spectrum are laissez-faire leadership and subordinate-centric leadership [51]. Between these two extremes is the democratic leadership style, which combines both leadership behaviours by enabling subordinates to participate in decision-making while benefiting from the leader's input [26]. Democratic leadership behaviour is visible in rigidly integrated corporations.

Recent research has shown that different conditions influence a project leader's behaviour, emphasizing the importance of matching project leadership behaviour to the leadership situation [15,52]. Ref. [15] state that no single best project leadership behaviour applies to all organisations, contexts, or situations. Depending on the circumstances of and within the project, project leadership behaviours vary across project lifecycles. The same is true for organisations. As a result, using appropriate leadership behaviour that fits the situation is critical to effective project leadership. Appropriate project leadership behaviour is also essential when the project leader faces numerous uncertainties when leading a project [9]. Furthermore, using multiple leadership behaviours rather than just one to achieve desired results has become the hallmark of successful project leaders [51].

Because projects are temporary organisations that can be treated as organisations, leadership situations requiring multiple leadership behaviours apply to projects and organisations [53]. Megaprojects, for example, are analogous to multinational corporations. They are both of great socioeconomic and political interest. They are both under intense pressure, which can impair decision quality and jeopardize their sponsors' and stakeholders' strategic goals. According to [19,20], megaprojects and multinational organisations are more likely to succeed when project leadership is high. Poor decisions or leadership can cost megaprojects and multinational corporations [9]. For megaprojects and multinational corporations, more than a lower level of training and experience is required. Thus, this

research aims to determine whether project managers should adopt different behaviours in more straightforward and complex projects.

2.3. Interrelationships between Project Leadership Functions and Behaviours—The Development of the Project Leadership Model

This research proposes a project leadership model that explains the relationship between project leadership behaviour and function in various project and organisational contexts. Refs. [9,54,55] all support the model. Transactional leadership styles were associated with low-complexity projects, while transformational leadership styles were associated with medium-complexity projects, according to [54]. According to [16], the complexity of projects necessitates dynamic project leadership in which different members can contribute to project goals. Ref. [55] asserted that project leaders require a diverse set of leadership competencies to navigate such complexities and successfully complete projects. Ref. [9] reasoned that project leaders should lead projects in accordance with the time, cost, and quality goals that had been established.

Following the findings of [10,56], a complementary approach to project leadership is required to engage employees with one another and, as a result, change the organisational climate to support innovation. Refs. [57,58] argue that different leadership behaviours give organisations a competitive advantage for each need. Because there is no optimal leadership behaviour or fixed functions, other leadership behaviours should be used throughout the project lifecycle and for different project expectations and complexity, according to these authors. This method is becoming increasingly crucial for project success and organisational performance. The following assumptions were derived from the preceding arguments and used to develop the model:

- Leaders' development and abilities to master leadership behaviour evolve as they advance up the leadership ladder [55]. As a result, top project leaders must perform at the highest level of leadership function because leadership experience and the lessons learned from that experience are the most potent forces for leadership development [58]. Furthermore, the highest leadership efficacy and responsibility levels can only be found at the top, where the most power and authority reside [53]. To summarise, project leadership and project leaders' positions overlap. The level of leadership functions at each level determines the degree of overlap.
- Leadership is a broad term that encompasses positions, authority, and responsibilities. This means that leadership is a position as well as a responsibility [16]. It also implies that the leadership function is concerned with the structure and distribution of power, authority, and responsibilities. In contrast, leadership behaviour is concerned with the manner in which power and authority are used [57].
- Different project and organisational situations necessitate varying degrees of leadership function (varying degrees of power, authority, responsibility, and efficacy) [59]. Organisations have a hierarchy of needs that necessitate varying degrees of leadership [55]. Similarly, projects require varying degrees of leadership function based on complexity, expectations, and stakeholder capacity [59,60].
- There is no optimal leadership style for project leaders. Project leaders must be able to use all of the leadership behaviours in order to select the best ones for various positions, projects, and organisational situations [58].
- Top project leaders are the most valuable assets of organisations and projects [61]. As a result, they must participate in a company's direction, strategy, high-level leadership, effectiveness, and philosophy, characterize the organisation's vision, establish common organisational values and concepts, capitalize on opportunities, promote innovation, evaluate risk, and lead the organisation in achieving its organisational objectives [57]. Similarly, their leadership functions are critical to project success as well as the formation of organisational culture and values [61].

As shown in Figure 1, the assumptions are synchronized to propose the project leadership model. By connecting project leadership to project leadership behaviour, the model

was created. In the model, the information in the first column is a representation of the titles that describe the variables in the rows that correspond to the other three columns. For example, 'project leadership position' is a title in the first column, while the remaining three columns have titles that indicate upper-level, middle-level, and lower-level project leadership, respectively. Different project leadership positions, organisational situations, project situations, and project stakeholders' capacities moderated the link. According to the model, project leadership functions and behaviours are determined by project leadership position. All behaviours are required to be an effective top-level leader [50]. Because their leadership functions only include conflict resolution, motivation, and planning, laissez-faire leadership is appropriate for lower-level project leaders [51]. Lower-level project leaders are primarily active during an organisation's growth stage. They are also in charge of the organisation's basic operations and safety.

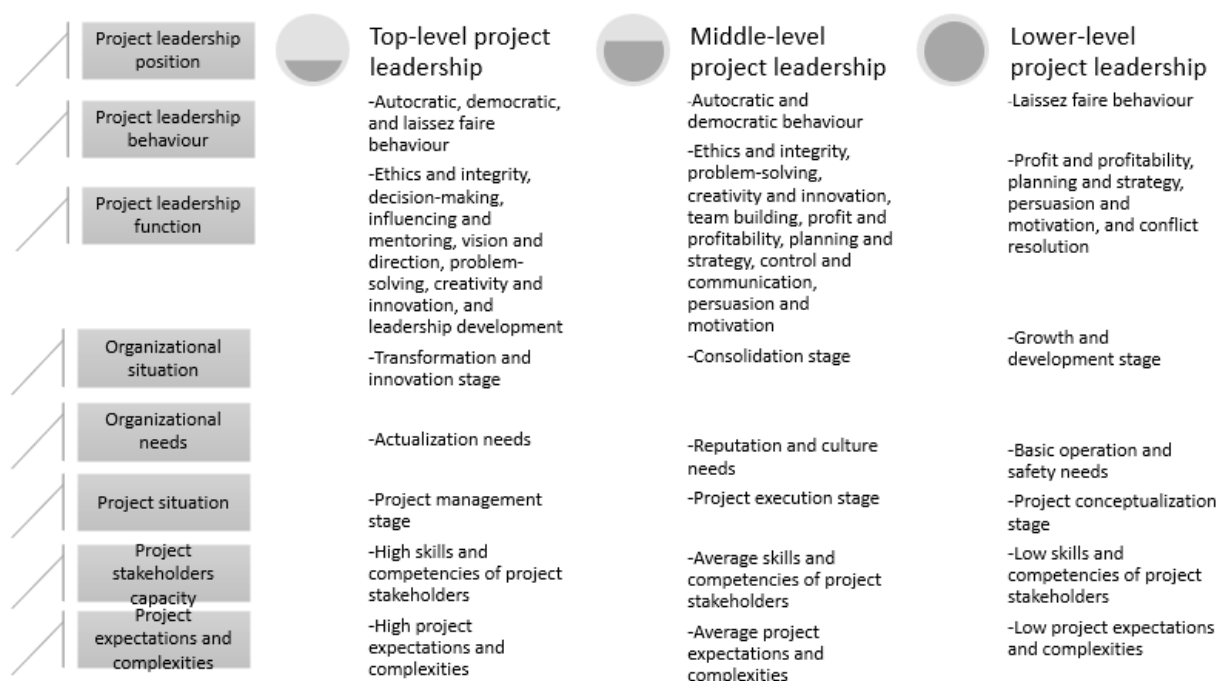


Figure 1. Project leadership model.

Middle-level project leaders are more active during an organisation's consolidation stage. They protect the organisation's reputation and culture by performing functions such as team building, communication, and control [49]. Top-level project managers oversee an organisation's actualization requirements [47]. They are primarily required to deliver projects with high expectations and to interact with highly knowledgeable project stakeholders [43]. The model's postulates are tested using the hypothesized model shown in Figure 2. The hypothesized model yields the following hypotheses:

Hypothesis 1. *There is a link between project leadership function and behaviour.*

Hypothesis 2. *The project leadership function is affected by leadership positions, project and organisational situations, and organisational needs.*

Hypothesis 3. *Project leadership behaviour is affected by leadership positions, organisational situations, project expectations, and project stakeholders' capacity.*

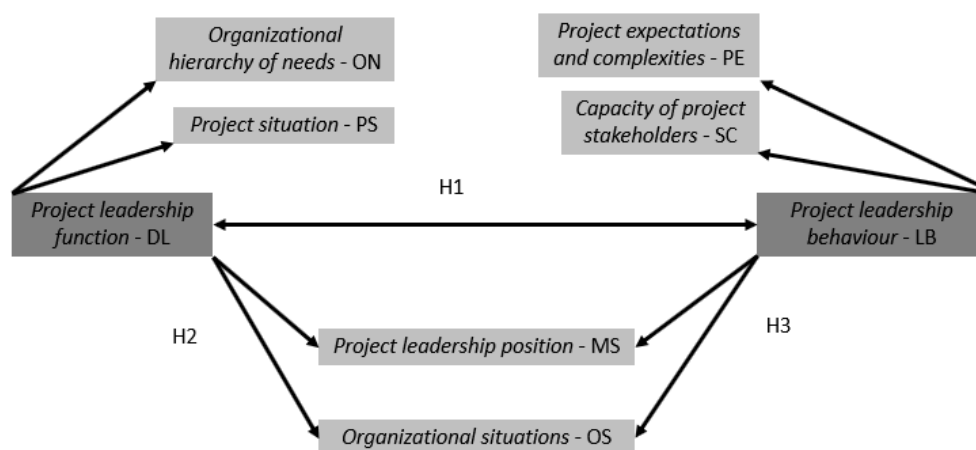


Figure 2. Hypothesized model.

3. Research Methods

This study used a deductive approach, an objective ontological assumption, a value-free axiological assumption, and a quantitative research strategy based on a positivist research philosophy. The researcher in positivist research philosophy is an objective analyst who, as a result, dissociates self from personal values and works independently. This study's research participants are project leaders in top, middle, and lower-level positions in project management organisations across Nigeria. To be eligible, participants had to have worked on projects, held project leadership positions, or played a role in project leadership. Furthermore, they must have the qualifications of a project leader (a minimum of a BSc degree). A total of 296 participants were selected at random from various organisations for the study, but only 214 completed the questionnaire entirely. According to [62], this falls within the acceptable range for the sample size indicated for structural equation models with ten parameters, which is 200. As can be seen in Figure 2, the structural model that will be examined as part of this research consists of eight parameters. Table 1 summarises the profiles of the 214 research participants. As shown in Table 1, 10.28% said they had served as top-level project leaders, 48.59% said they had served as middle-level project leaders, and 41.12% said they had served as lower-level project leaders.

Table 1. Profile of research participants.

Profile	Percent
Minimum educational qualification of the project leaders:	
BSc	18.69%
MSc	66.82%
PhD	14.48%
Project leadership level:	
Top-level	10.28%
Middle level	48.59%
Lower level	41.12%
Project leadership positions on projects:	
Project leadership	1.40%
Construction leadership	11.21%
Site supervision and leadership	15.42%

Table 1. *Cont.*

Profile	Percent
Safety leadership	6.54%
Quality control and leadership	5.60%
Schedule and time leadership	4.67%
Procurement control and leadership	11.21%
Stakeholder management	3.73%
Contract administration	13.08%
Conflict resolution	1.86%
Human Resources management	5.14%
Cost control	7.00%
Level of project leadership experience from the project executed:	
High	14.48%
Middle	64.01%
Low	21.49%
Level of power and authority on the project executed:	
High	13.08%
Middle	65.88%
Low	21.02%
Gender:	
Male	76.63%
Female	23.36%

Safety leadership (6.54%), quality control and leadership (5.60%), procurement control and leadership (11.21%), stakeholder management (3.73%), contract administration (13.08%), conflict resolution (1.86%), human resources management (5.14%), and cost control (7.00%) were the roles that project leaders played on the projects in which they participated. Approximately 14.48% thought their project leadership experience was high, 64.01% thought it was moderate, and 21.49% thought it was low. Only 13.08% of project leaders reported having a high level of power and authority over the projects in which they participated. At most, 65.88% of project leaders reported having middle-level power and authority in the projects they participated in. In comparison, 21.02% reported having low power and authority in the projects they participated in. The findings demonstrated that the project leaders have the necessary experience and capacity to comprehend the questionnaire's questions.

Using both online and paper questionnaire survey models, the study's questionnaire was divided into three sections: The first section elicited information about the participants' project leadership profiles. Participants were asked to choose the appropriate project leadership functions and behaviours in various project, position, and organisational situations in the second and third sections. The research participants rated the degree of project leadership functions appropriate for leadership positions on a three-point rating scale (1 = low-level leadership, 2 = middle-level leadership, 3 = top-level leadership). This study made use of a 3-point Likert scale because it offers a smaller number of options and hence less time wasted, which may encourage the respondents to finish all questions in a timely manner, thereby generating a higher response rate. It provides the respondents with a straightforward choice to choose from. During the process of analysis, a 3-point Likert scale makes it simple to determine the degree of an opinion or even a neutral answer [63]. According to [64], there is no correlation between the number of scale points used for

Likert-type items and the reliability or validity of the results. The research participants also used a three-point rating scale to indicate the appropriate project leadership functions for project situations (1 = concept stage, 2 = execution stage, 3 = project management stage), organisational situations (1 = growth and development stage, 2 = consolidation stage, 3 = transformation, and innovation stage), and organisational hierarchy of needs (1 = basic operation and safety, 2 = culture and reputation, 3 = vision actualization).

Refs. [43,46] provided the variables for measuring project leadership functions. These include team building, profit, ethics, integrity, profitability, decision making, planning and strategy, control, communication, and command. Some others are influencing, mentoring, persuasion, motivation, vision, direction, conflict resolution, problem-solving, creativity, innovation, and leadership development. The research participants rated the appropriate leadership behaviours based on the capacity of project stakeholders and the project's expectations and complexity on a three-point scale of 1 = low, 2 = average, and 3 = high. The research participants used a three-point rating scale of 1 = growth and development stage, 2 = consolidation stage, 3 = transformation stage, and 4 = innovation stage to indicate the appropriate project leadership behaviours for different stages. The research participants used a three-point rating scale of 1 = growth and development stage, 2 = consolidation stage, 3 = transformation stage, and 4 = innovation stage to indicate the appropriate project leadership behaviours for different organisational situations. The variables used to measure project leadership behaviour were based on [50]'s concept of leadership behaviour—autocratic behaviour, democratic behaviour, and laissez-faire behaviour.

The constructs whose relationships are described in the hypothesis were defined using the measured variables. The questionnaire data were analysed to identify significant variables for the constructs. The significant variables for each construct were used to test hypotheses by examining each hypothesized relationship between the constructs as stated in hypotheses 1, 2, and 3. The validity of the model depicted in Figure 2 was established through the process of comparing its output to data sets that were in agreement with the hypotheses. The analysis was performed using structural equation modelling with maximum likelihood estimation (MLE-SEM) described by [65]. Before proceeding with the structural model analysis, the discriminant validity and internal consistency of the measurement variables were examined to identify the weak ones that should be discarded. The data was cleaned, converted, and integrated so that it would be of higher quality and better suited for SEM analysis. By converting it to a SEM-compatible format, this was possible.

Cronbach's coefficient was calculated to assess the variables' dependability. The degree of leadership function is 0.89, leadership behaviour is 0.85, leadership position is 0.77, organisational situation is 0.77, and project situation is 0.88. Cronbach's coefficients for the organisational hierarchy of needs, project complexity and expectations, and capacity of project stakeholders are 0.79, 0.75, and 0.87, respectively. Cronbach's coefficient values above 0.7 are considered acceptable. Confirmatory factor analysis was used to assess construct validity and internal consistency. Varimax rotation factors were consistent with the variables' conceptualized factor structure. The number of acceptable factors in each data set was determined by eigenvalues greater than one. All of the variables had satisfactory reliability and validity. As a result, they were excluded from the final analysis.

4. Results

4.1. Project Leadership Functions

The questionnaire variables' mean item scores (MS) were used to establish the critical project leadership functions (Table 2) for the various position, projects, and organisational situations. As to significant leadership functions, Table 2 shows that setting up ethics and integrity (MS = 4.21), decision making (MS = 3.76), influencing and mentoring (MS = 4.04), vision and direction (MS = 3.68), problem solving (MS = 3.68), and leadership development (MS = 4.42) are the primary jobs of top-level project leadership. Lower-level project leadership is relied upon to perform leadership functions like motivation (MS = 3.88) and

conflict resolution (MS = 4.22). The project leadership function inferable from middle-level project leadership incorporates guaranteeing profit and profitability (MS = 3.68), team building (MS = 3.95), planning and strategizing (MS = 3.87), communicating (MS = 4.03), and innovation (MS = 4.01). Table 2 reveals that at the concept phase of projects, project leaders are relied upon to play out the following leadership functions: ethics and integrity (MS = 3.97), team building (MS = 4.40), planning and strategy (MS = 4.41), vision and direction (MS = 3.68), and innovation (MS = 4.01). Leadership development, problem-solving, conflict resolution, persuasion, motivation, influencing and mentoring, control, communication, command, and decision making are the project leadership functions required from project leaders at the project execution stage.

Table 2. Project leadership functions (Mean item score ≥ 3.61).

Project Leadership Functions	Project Leadership Positions	Project Situations	Organisational Situations	Organisational Needs	Project Leadership Behaviour
Ethics and integrity	4.21 Top-level leadership	3.97 Concept stage	4.41 Growth and development stage	4.58 Culture and reputation	3.67 Autocratic
Team building	3.95 Middle-level leadership	4.40 Concept stage	4.01 Transformation and innovation stage	4.40 Vision actualisation	3.66 Democratic
Profit and profitability	3.68 Middle-level leadership	3.84 Project management stage	4.01 Growth and development stage	4.34 Basic operation and safety	4.01 Autocratic
Decision making	3.76 Top-level leadership	3.74 Execution stage	3.66 Transformation and innovation stage	4.08 Vision actualisation	4.45 Democratic
Planning and strategy	3.87 Middle-level leadership	4.41 Concept stage	3.71 Growth and development stage	4.16 Vision actualisation	4.22 Democratic
Control, communication, and command	4.03 Middle-level leadership	4.01 Execution stage	3.65 Consolidation stage	3.94 Basic operation and safety	4.37 Autocratic
Influencing and mentoring	4.04 Top-level leadership	3.88 Execution stage	3.66 Transformation and innovation stage	3.68 Culture and reputation	3.94 Democratic
Persuasion and motivation	3.88 Lower-level leadership	3.75 Execution stage	4.44 Transformation and innovation stage	3.77 Vision actualisation	3.84 Democratic
Vision and direction	3.68 Top-level leadership	3.68 Concept stage	4.04 Transformation and innovation stage	3.64 Vision actualisation	4.12 Autocratic
Conflict resolution	4.22 Lower-level leadership	3.66 Execution stage	3.81 Transformation and innovation stage	3.88 Basic operation and safety	3.65 Democratic
Problem-solving	3.68 Top-level leadership	3.61 Execution stage	3.65 Transformation and innovation stage	3.73 Basic operation and safety	3.65 Democratic
Creativity and innovation	4.01 Middle-level leadership	4.01 Concept stage	4.22 Transformation and innovation stage	4.43 Vision actualisation	4.23 Democratic
Leadership development	4.42 Top-level leadership	4.04 Execution stage	4.34 Growth and development stage	3.66 Culture and reputation	3.62 Laissez-faire

At the project management stage, project leaders are needed to protect profitability (MS = 3.84). It very well may be seen from the outcomes for organisational situations in Table 2 that eight project leadership functions are credited to the transformation and innovation stage, four leadership functions are ascribed to the growth and development stage,

and just a single leadership function (control, communication, and command) is credited to the consolidation stage. For the organisational hierarchy of necessities, the results in Table 2 give six leadership functions for vision actualization, four leadership functions for basic operation and safety, and three leadership functions for culture and reputation. While undertaking project leadership functions, Table 2 reveals that project leaders should utilize autocratic behaviour for ethics and integrity (MS = 3.67), profit and profitability (MS = 4.01), communication (MS = 4.37), and vision (MS = 4.12). Democratic behaviour is credited to creativity and innovation (MS = 4.23), problem solving (MS = 3.65), conflict resolution (MS = 3.65), persuasion and motivation (MS = 3.84), planning and strategy (MS = 4.22), decision making (MS = 4.45), and team building (MS = 3.66). Leadership development (MS = 3.62) is the only project leadership function where laissez-faire behaviour is material.

4.2. Project Leadership Behaviours

The consequences of the significant project leadership behaviour for the different positions, projects, and organisational situations are presented in Table 3. As displayed in the table, projects with elevated expectations and complexity require autocratic behaviour (MS = 4.44), projects with normal expectations and complexity need democratic behaviour (MS = 3.65), and projects with low expectations and complexity need laissez-faire behaviour (MS = 4.01). For project stakeholders with low capacity, project leaders need to embrace autocratic behaviour (MS = 4.56), while for project stakeholders with normal capacity, project leaders should utilize democratic behaviour (MS = 4.55). At the growth and development stage, leaders in project management organisations are relied upon to embrace autocratic behaviour (MS = 4.40). The consolidation stage is an organisational situation that necessitates the utilization of democratic behaviour (MS = 3.78). Laissez-faire behaviour is connected to the transformation and innovation stage (MS = 3.66). Table 3 shows that all the project leadership behaviours are helpful for various positional, project, and organisational situations.

Table 3. Project leadership behaviours (mean item score \geq 3.61).

Project Leadership Behaviour	Project Expectations and Complexity	The Capacity of Project Stakeholders	Organisational Situations
Autocratic behaviour	4.44 High expectations	4.56 Low capacity	4.40 Growth and development stage
Democratic behaviour	3.65 Average expectations	4.55 Average capacity	3.78 Consolidation stage
Laissez-faire behaviour	4.01 Low expectations	4.02 High Capacity	3.66 Transformation and innovation stage

4.3. Testing the Project Leadership Model

The results of the MLE-SEM are introduced in Figure 3 and Table 4. The parameter estimates show a decidedly critical relationship (COV_DL_LB) between project leadership function (DL) and project leadership behaviour (LB) ($r = 1.17$; $z = 10.722$). The project leadership function was found to have a strong positive relationship with leadership position ($r = 0.807$; $z = 10.414$), organisational situations ($r = 0.694$; $z = 10.239$), organisational needs ($r = 0.965$; $z = 10.821$), and project situations ($r = 0.720$; $z = 10.361$). The connections between project leadership behaviour and leadership position ($r = 0.503$; $z = 9.666$), organisational situations ($r = 1.073$; $z = 11.029$), project expectations ($r = 0.518$; $z = 10.063$), and project stakeholders' capacity ($r = 0.787$; $z = 10.704$) were found to be positively significant. The strength and significance of the relationships between the variables give insight into the nature and strength of the interplay between them. The prescient force of the structural equation model shows an acceptable legitimacy (χ^2 : 140.438). This indicates that all three hypotheses are measurably significant.

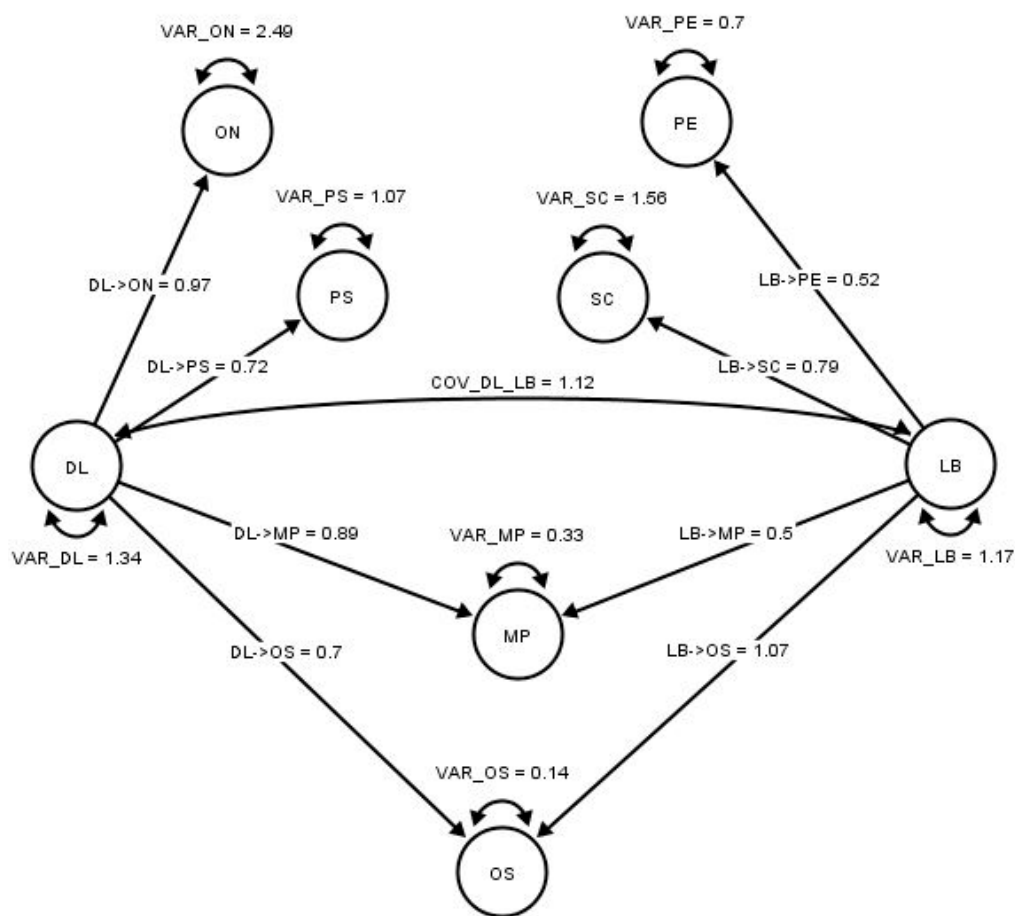


Figure 3. Path model for the hypotheses.

Table 4. Parameter estimates for the path model.

Relationships	The Magnitude of Relationship (r)	Standard Error	Significance of Relationship (z)
LB->OS	1.073857500113927	0.09736576043724104	11.029108130944064
DL->MP	0.8077398441270782	0.07755862576565797	10.414571379431734
DL->OS	0.69429340479779	0.06780543600955237	10.239494731661022
LB->MP	0.5033837029537329	0.052076072425521855	9.666314672130124
COV_DL_LB	1.1173371222484454	0.10420739576699692	10.722243983015959
DL->ON	0.9651354445830407	0.0891886947977365	10.821275575024275
DL->PS	0.7200255103951971	0.06949271720268724	10.361165016689752
LB->PE	0.5182034577476311	0.05149132816611202	10.063897673718897
LB->SC	0.7874384143877303	0.07355985609893684	10.704730217642599

χ^2 : 140.438; restricted degrees of freedom: 12; degrees of freedom (indep.): 28; χ^2 from independent: 759.095; RMSEA (Kulback Leibler): 0.685; RMSEA (classic): 0.204; SRMR (covariances only): 0.189; CFI (to independent model): 0.824; TLI (to independent model): 0.677.

Project leadership behaviour significantly impacts organisational situations ($r = 1.07$) and has the most negligible impact on leadership positions ($r = 0.50$). The project leadership function recorded the most effect on organisational needs ($r = 0.80$) and the most negligible effect on organisational situations ($r = 0.69$). These outcomes empirically demonstrate that project leadership behaviour and function should be constrained by organisational necessities and circumstances, project expectations, stakeholders’ capacities, and managerial positions. Figure 4 presents the validated project leadership model based on the

findings in Tables 2–4. In order to establish that the model is valid, we assessed the fit indices as well as the parameter estimates. The assessment determined whether or not the estimated parameters supported the model’s presumptions and whether or not fit indices captured the overall discrepancy between the observed data and the relationships that the model inferred.



Figure 4. Validated project leadership model.

5. Discussion of Findings

Limited information is available about the project leadership work project leaders are expected to do, as evidenced by their administrative, project, and organisational positions. Furthermore, it is still being determined how project leaders can select their initiative capabilities to resolve administrative issues, authoritative circumstances, and project conditions. The current study addressed this issue by identifying the project leadership functions and behaviours needed for different project and organisational scenarios. The study also aimed to create a project leadership model that best explains the interdependence of project leadership functions and behaviours. The findings of the study are examined in the following sub-areas.

5.1. Project Leadership Function

The findings revealed that top-level project leadership is required to carry out six functions: ethics and integrity, decision making, influencing and mentoring, vision and direction, problem solving, and leadership development. This finding was consistent with the conceptual model’s postulation (Figure 2) and the arguments of [24]. The conceptual model recommended seven leadership functions for top-level project leaders, eight for middle-level project leaders, and four for lower-level leaders. Except for “creativity and innovation,” which was postulated in the model but not confirmed by the results, the findings agreed with the postulations for top-level project leaders. This suggests that other levels of leadership perform the function of creating something new using a creative mind and brain [43,46]. This could be due to the fact that high-level project leaders are usually in charge of approving and validating advancements or creative ideas [4]. As a result, it would be preferable if they came from different levels of leadership. Furthermore, creating

something new allows the other levels of leadership to develop their leadership skills and competencies.

According to the conceptual model, lower-level management is responsible for profit and profitability, planning and strategy, persuasion and motivation, and conflict resolution [4]. The findings only confirmed persuasion, motivation, and conflict resolution as lower-level leadership functions. The results show that the project leadership function of middle-level project leadership includes creativity and innovation, planning and strategy, profit and profitability, control, communication and command, and team building. These functions are designed with the idea that middle-level project leadership is the pivot of project leadership. Their functions indicate that they should assist upper- and lower-level project leadership [31]. Creativity, innovation, and team building prepare them for middle-level project leadership and empower them to support top-level leadership. The leadership functions supporting lower-level project leadership are communication and command, planning and strategizing, and ensuring profitability [43].

The findings of this study agreed with the conceptual model's theory that practically all project leadership functions are required during the conceptual phase of projects. It also supports [16]'s argument. The justification for this could be that the conceptual project stage is critical to project delivery because it covers ideal investigation, conceptualization, and project viability assurance. At this stage, project leadership is required to ensure that the concept being developed addresses genuine client needs [31]. This necessitates careful consideration, decision making, problem solving, innovation, and creativity. The findings of this study on the leadership functions that project leaders must provide during the project execution and management stages are consistent with the conceptual model's postulates. According to the conceptual model, the "consolidation stage" is the organisational situation that necessitates all project leadership functions. The findings demonstrated that the "transformation and innovation stage" necessitates all leadership functions.

The findings in Table 3 supported the vast majority of the project leadership functions proposed for the "vision actualization needs" in the conceptual model. Even though the model suggested that "reputation and culture needs" necessitate the most significant number of leadership functions, the results revealed that "vision actualization needs" necessitate the most significant number of project leadership functions. This finding highlights the significance of vision realization in leadership. It implies that vision is essential in organisational life because it determines the motivation for leadership and organisation. This means that vision realization should be given the most extensive project leadership function.

5.2. Project Leadership Behaviour

According to the findings on project leadership behaviour, democratic leadership behaviour is beneficial for carrying out project leadership functions such as team building, decision making, planning and strategy, influencing and mentoring, persuasion and motivation, conflict resolution, problem solving, creativity, and innovation [26,66]. Autocratic leadership's advantages are ethics and integrity, profit and profitability, vision and direction, control, communication, and command [26]. Laissez-faire leadership was only recently recognised as beneficial to leadership development [15,19,20]. According to the conceptual model, democratic behaviour is appropriate for project stakeholders with normal capacity, reputation, and cultural needs, as well as the consolidation stage—the findings back up this claim. Autocratic behaviour was deemed appropriate for high-complexity projects, project stakeholders with limited capacity, and the growth and development stage [15,53]. This is only marginally different from the postulation in the conceptual model.

5.3. Project Leadership Model

The three hypotheses describing the model's hypothesized relationships were tested using MLE-SEM and supported by the MLE-SEM results. The first hypothesis proposes a link between project leadership function and behaviour. This theory suggests that proper

project leadership behaviour should be embraced in order to achieve adequacy in completing project leadership functions. This study's findings revealed that democratic behaviour is strongly associated with team building, decision making, planning and strategy, influencing and mentoring, persuasion and motivation, conflict resolution, problem solving, creativity, and innovation. Ethics, integrity, profit and profitability, control, communication, command, vision, and direction are strongly associated with autocratic behaviour. The findings also revealed that leadership development as a project leadership function should be left to chance. This finding suggests that project leaders' use of proper project leadership behaviour determines the adequacy of their project leadership functions [9,58].

Hypothesis 2 asserts that leadership positions, project and organisational situations, and organisational needs all have an impact on the project leadership function. The findings of this study support this proposition by recommending that different levels of leadership positions, organisational situations, project situations, and organisational needs necessitate distinct project leadership functions. Top-level project leaders are more appropriate for specific project leadership functions than other levels of leaders due to their level of education, experience, and training [61]. Certain project leadership functions may be prioritized over others in organisational and project situations. Furthermore, project leadership functions should be carried out following organisational requirements [43,54]. The findings of this study provide support for the theory in Hypothesis 3 by indicating that, for effective project leadership, leadership behaviour should be dependent on positions or levels, organisational situations, the capacity level of project stakeholders, and the level of complexity and expectations of projects [61].

5.4. Practical Implications

The practical implications of the findings are as follows: (i) leadership behaviours should be considered when performing project leadership functions; (ii) appropriate project leadership functions and behaviours should be perceived for various leadership levels, project situations and needs, as well as organisational needs and situations; and (iii) leadership development should take project leader profiles into account. A middle-level project leader must be developed following the leadership functions expected of the top-level project leader; (iv) project leaders must be chosen for projects based on their competencies as well as the peculiarities of the projects; (v) the project leadership functions and behaviours to be demonstrated by various levels of leaders can be determined and measured adequately; and (vi) while one project leadership behaviour is not superior to another, each has its utility as circumstances and requirements dictate. Similarly, leadership has boundaries that can be established by the project leadership functions associated with the given power and obligation.

5.5. Research Implications

The study's research implications are (i) that project leaders' performance on projects and in organisations can be negatively affected if they do not adjust their leadership behaviour and functions to their leadership positions and the requirements and circumstances of projects and organisations; (ii) that project leaders advancing from a lower-level to a middle-level and then to top-level leadership should only be permitted to lead their organisations in specific circumstances. This will benefit their professional development as well as the growth and success of organisations and projects. As these project leaders advance, they will dominate and raise the level of their leadership functions, as well as foster new applications for various leadership behaviours; (iii) understanding the relationship between leadership behaviour, level of leadership function, leadership positions, project and organisational situations, organisational needs, and project stakeholders' capacity can aid in achieving an undeniable level of performance in organisations and projects; (iv) The findings of this study imply that there are various elective mixes of leadership functions and conduct by which a project leader can consciously conduct themselves expertly and succeed leadership-wise; (v) the findings recommend how leadership development pro-

grammes could be designed to prepare and guide project leadership development and professional growth; and (vi) the study's findings uphold and mirror the distinct leadership functions and conduct expected of various leadership positions.

5.6. Limitations and Future Studies

The study's findings should be interpreted with the limitations in mind. The model focuses on project and organisational level factors and ignores the effects of national culture on project leadership functions and behaviours. Distinctive social qualities and convictions may influence project leadership function and behaviour. Another limitation of the finding was that most respondents were male. Such irregularities in respondents' sexual orientation may influence the study's findings in that, compared to males, females may have a distinct perspective on project leadership functions and choice of leadership behaviour for various organisational and project needs and circumstances. A multi-group investigation of the project leadership model among males and females could yield more helpful information.

Only thirteen project leadership functions and three project leadership behaviours were examined in this study. Additional project leadership functions and behaviours may be employed in future studies. Another limitation of the study was the fact that it was carried out solely in Nigeria. As a result, the study's findings should be generalized and interpreted cautiously. Additionally, the number of participants in the study could make the results less applicable to a wider population. Future research should look into this topic in different national cultures and across different sizes of project management organisations. Future research could build on and validate the current project leadership model by investigating the role of leadership vision in various positional, project, and organisational contexts. It will be fascinating to see how transactional, authentic, charismatic, and transformational leadership styles influence project leadership functions performed by various levels of leaders in various project and organisational contexts. The application of artificial intelligence-based modelling as a means of enhancing the SEM-based modelling that was carried out in this study presents an intriguing possibility for further investigation in the future.

6. Conclusions

The study concludes that project leadership functions should be completed in accordance with the needs of organisations and projects. Top-level project leadership is required to carry out most project leadership functions among the three levels of project leadership. To perform the project leadership function, project leaders are most needed during the concept phase of projects. The transformation and innovation stage requires the most project leadership functions, whereas vision actualization is the organisational need that requires the most project leadership functions. The majority of project leadership roles require both democratic and autocratic behaviour. The least beneficial of the three leadership practices is *laissez-faire* behaviour.

Their proper leadership behaviour determines the viability and adequacy of project leaders' leadership functions. Furthermore, the needs of organisations, projects, and stakeholders would be easily met if project leaders performed their duties and acted appropriately. Each project leadership behaviour has value depending on the circumstances and requirements. Similarly, project leadership has limitations determined by the project leadership functions associated with the given power and responsibility. According to the study's findings, a project leader can use several different combinations of project leadership functions and behaviours to embrace project leadership.

This study adds to the project leadership literature by empirically determining the project leadership behaviours that should be highlighted and specified for various project situations. The study demonstrated project leadership behaviours and appropriate functions for a specific situation. The research provides several specific theoretical contributions based on the findings that support project leadership's personal introspection and growth. The study focuses on the behaviours that project managers can use to improve their adapt-

ability and leadership abilities in a variety of situations. The research also clarifies project leadership roles. Understanding project leadership roles is critical for differentiating project leadership from project management.

The findings of this study add to project leadership theory and literature. The study validated a model that clarifies project leadership functions and explains how project leadership can improve its effectiveness. The model assigned specific project leadership behaviours and functions to various project and organisational contexts. To deliver successful projects, the validated model in the study would be helpful for the development of project leadership and for improving project leadership competence. This would aid in the achievement of effective project leadership and the resolution of project delivery challenges.

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