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Mitigating the impact of cross-culture on project team effectiveness in the Nigerian oil and gas industry: The mediating role of organizational culture and project leadership

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ABSTRACT

This paper investigates the interplay between cross-culture, organisational culture, path-goal leadership, and team effectiveness in Nigerian oil and gas projects. Employing a quantitative research approach with a philosophical assumption between positivism and relativism, the study examines path-goal leadership and organisational culture as mediating variables. A survey instrument was administered to 230 participants using judgmental recruitment, with a response of 91.3%. A partial least square structural equation modelling approach was implemented for data analysis. The findings reveal that high achievement and directive leadership styles in the Nigerian oil and gas industry lead workers to adopt a long-term orientation cross-culture to effectively adapt to the project working environments. Additionally, the dimensions of organizational culture exert a dominant influence on defining project environments in the industry. To enhance ownership and shared leadership, the study recommended the need to strike a balance between achievement-oriented and shared leadership throughout the project duration. Moreover, proactive occupational health measures can help manage the possible health effect of adaptive work behaviour. Furthermore, industry-wide project audits based on the study's variables can enhance leadership policies and promote a people-oriented leadership approach. The research presented in this study offers both theoretical and practical implications in the Nigerian oil and gas industry.

1. Introduction

The people-centred factors influencing team performance in projects from a cross-cultural perspective have yet to be extensively studied in the literature. Ruqaishi and Bashir (2015) identified four main interrelated causes of project delays in the oil and gas industry: inadequate or poor definition of scope, incompetence of the project manager or workers, delays in remuneration and payments to contractors, and a lack of project ownership. Based on their findings, Ahmed and Philbin (2022) imply a positive link between leadership competencies and project success. In other words, their research findings suggest that when project leaders possess certain skills, qualities, or competencies, it leads to positive outcomes for the projects they oversee. As a project leader, it becomes essential to identify and cultivate the relevant competencies associated with successful project management. These may include communication, decision-making, problem-solving, strategic thinking, team building, and the ability to motivate and inspire the team. Furthermore, the study highlighted that the project leadership competencies adopted can vary across different cultures and environments. Hence, an interrelationship exists between culture, leadership, and project success. Atesmen (2015) reported that project failure is mainly caused by poor project leadership. Equally, Pyzdek and Keller (2013) suggested that the significance of project leadership becomes evident during scope definition, goal setting, and objective clarification to project owners, sponsors, and the team. Similarly, Umuteme and Adegbite (2022) emphasized the significance of adopting the Path-Goal leadership approach in fostering people-centred leadership to enhance team effectiveness and facilitate prompt project delivery.

The existence of cultural influence and different types of leadership in projects has been recognized as factors that significantly amplify the impact on the value system within a project team (Heifetz, 1994). Cultural dimensions within projects can manifest in the forms of

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cross-culture and organizational culture. As noted by Hofstede (2011), culture has the power to shape individuals' minds by establishing shared values that are specific to the members of a particular group. Empirical evidence consistently supports the notion that culture has a beneficial impact on the psychological processes of reasoning (Shiraev & Levy, 2010). Cultural influences contribute positively to the way individuals think and make rational decisions, highlighting the important role culture plays in shaping cognitive processes For projects in the oil and gas industry, the influence of globalization on cross-culture within a project team is also visible, especially in communication (Kuster et al., 2011; Lonner, 2011). Cross-cultural conflicts can arise in a project team, as studies suggest that team members are more inclined to the cultures of their respective nations (Hofstede et al., 1990; Snaebjornsson et al., 2015). This nature of conflict can negatively impact the team's effectiveness if the right leadership approach is not adopted. To enhance team effectiveness amidst cross-cultural differences, establishing norms aligned with project requirements is crucial. This integration of organizational culture into projects mitigates the impact of cultural variations and promote a work environment that can stimulate high productivity.

Norms are established to govern the behaviour of team members who strongly desire to see the project succeed (Lonner, 2011). This is significant because, to improve team productivity, a project team must encourage shared leadership roles and advocate for individual and mutual accountability (Katzenbach & Smith, 2001). As a result, this study investigates the project team's effectiveness in terms of productivity, socializing process, and group experience, as suggested in (Hackman, 2002; Wageman et al., 2005). The competing values framework (Cameron & Quinn, 2011) and the Denison model are the two main frameworks for studying organizational culture (Denison et al., 2014). However, the dimensions of the Denison model are more in line with the purpose of this study and will be thoroughly discussed in the literature review. There is currently no study that comprehensively investigates the interrelation between cross-culture, leadership, and team effectiveness in one construct, which is the main research gap that was closed in this paper. This study explores the interrelationship between cross-culture, organizational culture, project leadership, and team effectiveness in two separate models. Model 1 studied the mediated impact of project leadership on the direct causal relationship between cross-cultural dimensions and team effectiveness. At the same time, Model 2 investigated the mediating effect of organizational culture on the direct causal relationship between cross-cultural dimensions and team effectiveness. The intent is to examine which corporate culture and project leadership approach have a more mediating effect on the impact of cross-culture on the effectiveness of project teams.

The existing literature on team effectiveness in the literature (Hackman, 2002; Katzenbach & Smith, 2001; LaFasto & Larson, 2001; Lombardo & Eichinger, 1995; Rubin et al., 1977), has failed to investigate the impact of cross-culture on team effectiveness and has overlooked the mediating effects of leadership and organizational culture on this relationship. While each model contributes valuable insights into team effectiveness, it is important to consider the limitations of these models, particularly in addressing the impact of cross-cultural dynamics, organizational culture, and leadership in diverse team environments. The current study aim to bridge these gaps and further enhance our understanding of team effectiveness in complex organizational settings. The impact of cross-culture on team effectiveness can manifest in several ways. For example, cultural differences may affect communication patterns and understanding, potentially leading to misinterpretations or misunderstandings. Different cultural norms and expectations around decision-making, hierarchy, and individualism versus collectivism can also impact team cohesion, collaboration, and the ability to reach consensus. Therefore, the effectiveness of project teams relies on the objectives, the culture within the organization, and the nature of tasks. Suggesting that the desire to improve team effectiveness can impact the composition of teams, the skills of team members, and the style of team leadership (Hackman, 2002; Kozlowski et al., 2016). According to the literature (Kloppenborg & Petrick, 1999), the effectiveness of a team relies on various elements, with communication patterns playing a crucial role in shaping the display of moral values such as honesty, courage, and prudence among team members. Effective project leaders delegate and shares leadership responsibilities, while demonstrating strength and clear focus (Atesmen, 2015; Cobb, 2012; Kloppenborg, 2015). Implying the need for effective leadership steer to enhance team effectiveness. Again, the project's objectives align with the organization's culture, but agreed changes are necessary, as recognized by the organizational leadership (Kloppenborg, 2015). Therefore, a comprehensive understanding of the impact of cross-culture on team effectiveness, along with the mediating effects of leadership and organizational culture, is necessary to develop strategies for improving team effectiveness in project management.

Thus, the objectives of this study include the following:

(i) Investigate the impact of different leadership styles, particularly high achievement and directive leadership styles, on project success in the Nigerian oil and gas industry.
(ii) Examine the role of adaptability and cross-cultural orientation of workers in the project working environment and its influence on project success.
(iii) Identify the dominant control variables of organizational culture and their effect on project outcomes in the Nigerian oil and gas industry.
(iv) Analyze the influence of organizational culture on project environments and its implications for managing cultural transitions to enhance project success.
(v) Evaluate the importance of competence development training for new entrants in the Nigerian oil and gas industry to ensure knowledge transfer, continuity, and a skilled workforce for sustained project success.

This study mirrors the Nigerian oil and gas industry, with over 70 years of oil and gas exploitation and exploratory activities, and has become the main economic stay of the nation (NNPC, 2020). Thus, providing insight into the question – "if either leadership or organisational culture is more effective in reducing the effect of cross-cultural conflicts on the effectiveness of the team." The ranking of the dimension of each concept will form the basis for decision-making to enhance project success in the oil and gas industry. Consequently, the rationale for above objectives are as follows: The first objective is important because the Nigerian oil and gas industry has been a significant economic driver for the nation for over 70 years. Leadership styles play a crucial role in guiding project teams, setting goals, and improving performance (Atesmen, 2015). Understanding the effectiveness of leadership styles in this industry can help decision-makers identify the most suitable leadership approach to enhance project success. On the second objective, and given the nature of the Nigerian oil and gas industry (Umuteme & Adegbite, 2022), which involves interactions with diverse cultural backgrounds, understanding how workers adapt and align their behaviours with project objectives and values is essential. Examining their adaptability can provide insights into furthering collaboration, effective communication, and cultural integration, all of which contribute to successful project outcomes. Also, on the third objective, organizational culture plays a significant role in shaping project environments and affecting team dynamics. Identifying the dominant control variables in the organizational culture of the Nigerian oil and gas industry allows project managers to align project objectives, processes, and decision-making with cultural norms, ultimately promoting smoother coordination and increased synergy among team members, leading to improved project success. The fourth objective relates the Nigerian oil and gas industry's on understanding how organizational culture influences project environments and enables decision-makers to anticipate potential resistance to change, develop strategies to manage

cultural transitions effectively and improve the implementation of project initiatives and increased chances of success. Finally, the fifth objective recognizes the importance of competence development, which is essential for sustained project success in the oil and gas industry.

The remaining sections of this paper is presented as follows: the literature review now emphasizes previous theoretical and empirical studies with the intention of shedding light on the relationship between theory and practice. The third part presents the background information on this study and the adopted methodology. Following the analysis and findings of the research, we provided discussions and implications of the results. Finally, the paper summarises the key points, followed by a conclusion, recommendations, and future research directions and limitations.

2. Literature review

The literature review section aims to appraise existing knowledge of the relationship between the four concepts studied in this paper. It starts with an evaluation of existing models of team effectiveness and followed by the definition of each concept. This will be followed by extracting the theoretical and conceptual relationship between the constructs, which will later form the questions for the survey instrument. This study investigates four constructs: cross-culture, organisational culture, project leadership, and team effectiveness. Thus, it is important to clarify how these concepts relate to each other in a project environment in the Nigerian oil and gas industry.

2.1. Models of team effectiveness

The GRPI model, coined by Rubin, Plovnick, and Fry in 1977, represents an acronym for Goals, Roles, Procedures, and Interpersonal relationships. The model highlights the importance of the team's goals in determining the effectiveness of the team. These goals shape the team's identity, the roles and procedures within the team, and the interpersonal relationships necessary for fostering team cohesiveness. While acknowledging the significance of team cohesion, the team effectiveness model lacks a comprehensive explanation of the leadership's role in team development and addressing performance issues. Additionally, the model fails to explain how the cross-culture within the team and the organizational culture influences the entire team development process.

The Wisdom of Teams model, developed by Katzenbach and Smith (1993), emphasizes the importance of commitment within teams. It states that teams are propelled by a meaningful purpose and specific goals, and they establish a shared approach to accomplish those goals by overcoming barriers that hinder collaboration. The model highlights the need for problem-solving skills, technical expertise in task execution, and effective interpersonal communication to foster enhanced teamwork. Additionally, personal and mutual accountability are crucial factors driven by the high-performance expectations set by team leaders. The authors argue that teams themselves define their goals and working approach. However, this understanding of teams differs from the observations in project teams within the oil and gas industry. In such contexts, organizational leadership typically defines the goals, while the working approach is influenced by the organizational culture and professional standards. While the skills required for project teams are complementary, they are often developed before the project begins and serve as the basis for recruiting the team members.

The "T7 Model," developed by Michael Lombardo and Robert Eichinger (Lombardo & Eichinger, 1995), is a framework that focuses on identifying key leadership competencies and skills necessary for success in various organizational settings. It provides a systematic approach to understanding and evaluating leadership potential and development. The T7 Model serves as a guide for assessing and developing leaders by evaluating their proficiency in each of these competencies. It helps organizations identify areas of strength and areas for improvement in their leadership talent, enabling targeted development initiatives to enhance overall effectiveness and success. The effective functioning of a team relies on the leadership's ability to mediate between the team's characteristics and its needs. The extent to which the team receives support from organizational leadership is a key factor in determining its effectiveness, as outlined by the organizational culture framework. However, the T7 model fails to address the specific impact of cross-cultural dimensions on the five internal factors. Additionally, in a project setting, the two external factors are not entirely external to the team because leadership plays a crucial role in shaping goals, policies, standards, and procedures necessary for successful project completion. Furthermore, the collective approach and tactics employed by the team to achieve goals are strongly influenced by organizational leadership. Therefore, this research aims to fill both gaps by thoroughly examining the role of cross-culture in shaping the team's direction in achieving project goals, rather than solely focusing on the goals of the team.

In 2001, Frank LaFasto and Carl Larson conducted a comprehensive study of 600 teams across various industries. Based on their insightful observations and findings, this model was subsequently developed. This model places a strong emphasis on team membership, considering it as the central aspect. Every team member demonstrates qualities of openness, supportiveness, proactiveness, and demonstrate a positive disposition towards the goals of the team. Nonetheless, one aspect that was not addressed is the impact of cross-cultural dynamics on team members' behaviour and how the pursuit of team membership may require individuals to make compromises regarding their personal interests for the sake of the team. In order to achieve a successful project, it is imperative for the team to possess the requisite skills and demonstrate team-oriented behaviours. Proficiency in skills ensures competence, while team-centric behaviours such as efficient communication and collaboration promote unity, productivity, and favourable results.

The Hackman model of team effectiveness proposes that the existence of a cohesive team and a supportive structure can be strengthened through the dimensions of the organizational culture (Hackman, 2002). The establishment of a clear and compelling direction is facilitated when leadership enforces norms, standards, and policies that are focused on project delivery. Therefore, this study asserts that the three measured outcomes of team effectiveness outlined in Hackman's model - namely, productive output, socializing processing, and group experience (Wageman et al., 2005)- are directly influenced by cross-cultural dynamics, organizational culture, and leadership behaviour.

The various team effectiveness models discussed in this analysis (Table 1), provide valuable insights into the factors that contribute to successful teamwork. However, it is important to note that these models have limitations. They often fail to fully address the impact of cross-cultural dynamics on team development and behaviour, as well as the influence of organizational culture and leadership on team effectiveness. In project teams within industries like oil and gas, the goals and working approach are often shaped by organizational leadership and cultural factors, challenging the notion that teams solely define their goals and working methods. To enhance the understanding of team effectiveness in complex and diverse environments, future research should aim to bridge the gaps between these models and explore the role of cross-culture in shaping team direction and achieving project goals. Additionally, studies should investigate how leadership and organizational culture influence the internal dynamics of teams, considering the specific impact of cross-cultural dimensions. By addressing these gaps, this study aims to provide further understanding of team effectiveness from a culture-driven perspective and contribute to the advancement of knowledge and practices in team dynamics, ultimately leading to more successful and productive teams in the future.

2.2. Conceptual framework

2.2.1. Organisational culture (OC) theory

The four dimensions of OC measured in this study are from the Denison model (Denison et al., 2014) and include mission, adaptability,

Table 1
Gap analysis of exiting team effectiveness models.

Model of Team Effectiveness	Core Emphasis	Limitations
GRPI Model (Rubin et al., 1977)	The team's roles are determined by the shared objectives, which can be modified by the team to improve their overall efficiency.	In the oil and gas industry, project teams have predetermined goals and recruit members accordingly, making partial support for alternative positions unlikely. The team effectiveness model acknowledges the importance of team cohesion but lacks clarity on the role of organizational leadership in team development and problem diagnosis. Additionally, the model does not provide clear insights into how organizational culture influences the entire team development process.
The Wisdom of Teams Model (Katzenbach & Smith, 1993)	Implemented a diagnostic approach aimed at assessing the team's performance in successfully accomplishing challenging tasks.	As a diagnostic model, it is crucial to explore the impact of cross-cultural dimensions on team effectiveness. This investigation serves as a guide for recommending appropriate behavioural norms, which can help mitigate the negative consequences of cross-cultural conflicts within the organizational culture.
T7 Model (Lombardo & Eichinger, 1995)	To achieve the objectives, a typical approach involves the utilization of both internal and external elements, employing various strategies and tactics.	The model failed to discuss the impact of cross-cultural dimensions on the five internal factors. Additionally, in a project context, the two external factors cannot be considered completely external to the team since leadership plays a crucial role in defining goals and establishing the relevant policies, standards, and procedures necessary for accomplishing the task.
LaFasto and Larson Model (LaFasto & Larson, 2001)	Emphasize the importance of team membership by ensuring that every team member exhibits qualities such as openness, supportiveness, activeness, and a positive disposition towards the gaol of the team.	The impact of cross-cultural influences on team members' behaviour and the potential trade-offs of personal interests for the sake of team cohesion were not addressed.
Hackman Model (Hackman, 2002)	The effectiveness of a team is assessed by its productive output, the quality of its social interaction, and the overall group experience.	It is necessary to provide a more comprehensive definition of how cross-cultural influences impact the formation of a cohesive team, and how organizational culture and leadership contribute to creating an enabling structure for it.

consistency, and involvement. Culture is defined from the perspective of learned beliefs and values, which reinforces the behaviour of a group. Hence, culture thrives in the presence of underlying assumptions (Schein, 2010). The mission explains the goals and objectives necessitating the need for the project. Adaptability is focused on the need for team members to adapt to the needed change to enhance project delivery and improve the value the project brings to the customer. Empirical evidence suggest that behavioural adaptability significantly impacts on productivity (Ellis et al., 2023). Projects are established to sustain the core business value of the organisation. The "consistency" domain of OC defines these core business values in every project and expects every team member to adapt. "Involvement" is based on enhancing team performance through organisational learning, capacity building, and empowerment.

2.2.2. Cross-culture (C–C)

The dimensions of C–C include power distance, uncertainty avoidance, individualism versus collectivism, masculinity versus femininity, long-term versus short-term orientation, and indulgence versus restraint (Hofstede, 2011). However, masculinity versus femininity and indulgence versus restraint are not included in the measured variables for C–C because of possible ethical violations. Like OC, C–C involves shared beliefs. Specifically, C–C is defined (Northouse, 2019, p. 434) as "the learned beliefs, values, rules, norms, symbols, and traditions common to a group of people." As adopted in this study, power distance (PD) measures the presence of inequality in the leadership hierarchy, which can impede the growth and development of subordinates. Uncertainty avoidance requires the clarification of roles, tasks, and the project roadmap. Individualism versus collectivism defines the extent of collaboration and dependence on one another for task completion. A highly adaptive team favours long-term orientation, a criterion needed to sustain team loyalty, and adaptiveness to reduce employee turnover rate.

2.2.3. Path-goal (P-G) leadership

Leadership creates the enabling structure and environment for organizations to thrive. Hence, leadership behaviour drives the leadership process and followership structure that is obtainable in every project setting. P-G leadership behaviour is adopted in this study because it is multidimensional and suits the need for a multivariant approach to leadership in projects management (Umuteme & Adegbite, 2022). P-G leadership sphere of influence in projects includes directive, achievement-oriented, participative, and supportive. As explained in the literature (Northouse, 2019; Umuteme & Adegbite, 2022), and adopted in this study, the measured variables are defined as follows. (i) Directive leadership implies that the key performance indicators for project success are clearly explained to the team, such that the team is guided on the key deliverables for the project. In the oil and gas industry, directive leadership is evident through the adopted standards and specifications, and the need to adhere strictly to policies. (ii) Achievement-oriented leadership defines a workplace leadership behaviour where challenging goals are consistently set by the leadership throughout the duration of the project. This approach is highly driven by the intention to enhance the business bottom-line of sustainable profitability and growth. Therefore, it is expected that a highly deterministic achievement-oriented leadership behaviour can provide the needed project environment for both participative and supportive leadership styles. (iii) Participative leadership encourages shared vision (Barnett & Weidenfeller, 2016). Hence, team members are encouraged to contribute to decision making without coercion. In a large power distance cross-culture environment, it is expected that participative leadership will be underemphasised. (iv) Supportive leadership style enables the leadership to provide a learning, competence building and adaptive project environment for project success. In such project environment, the leadership emphasizes gender equality to harness the benefits of diversity and inclusiveness in a cross-cultural workplace. Thus, project leadership supports the literature's contention that effective leadership depends on the appropriateness of skills, timing, and situation (Kumar, 2009). Furthermore, details of why P-G leadership is most suitable for project delivery have been provided and discussed exhaustively in our previous study (see., Umuteme & Adegbite, 2022). The study framework compared transformational, transactional, authentic and P-G leadership

styles against the project domains discussed in the dominant literature (PMI, 2017). Specifically, the focus of the study was on the project leadership demands of clarity of goals, scope and objectives, the structure of the project team, competence development, demonstrating work ownership, enhancing team's work output and reducing cross-culture interference on team effectiveness. The results suggest that P-G leadership theory can enhance project delivery from the perspective of team motivation.

2.2.4. Team effectiveness (TE)

Three variables define the effectiveness of a team in the literature (Hackman, 2002; Wageman et al., 2005), and they include: i) the productive output (PO) of the team, ii) socializing process (SP), and iii) group experience (GP). The PO represents the team's measured performance (MP) based on the agreed key performance indicators (KPIs). It is evident from previous studies that through socializing, employees derive social belongingness and identity to enhance job satisfaction and motivation (Tsai, 2011). The SP must be task-oriented through team-driven social cohesion (Salas et al., 2015), so that team members can share knowledge to advance project delivery. The third dimension of TE adopted in this study is group experience, which is possible when there is a high level of collaborative learning within the team. Team effectiveness is the independent variable for both Model 1 and Model 2. The two conceptual/research models investigated in this study are presented in Fig. 1 below.

2.3. Hypotheses development

This section presents previous empirical studies and their relatedness to the four concepts considered in this research. The empirical reviews provided the guiding knowledge for the development of hypotheses H1, H2 and H3, presented earlier. Each of these hypotheses is discussed as follows.

2.3.1. Hypothesis H1: linking cross-culture to team effectiveness

Research evidence supports cross-cultural diversity in the workplace (Forsyth, 2010; Fox et al., 2000; Salas et al., 2015). This implies that cross-cultural dimensions can drive performance and team effectiveness to improve job satisfaction and employee motivation. In corroborating this assertion, researchers agree that cross-cultural dimensions influence team effectiveness (Bitsani, 2013; Dorfman et al., 2012; Hofstede, 2011). Consequently, it is important to determine the level of causal and correlational relationship between cross-cultural dimensions prevalent in projects and the team's effectiveness in the Nigerian oil and gas industry. In hypothesis H1, the significance of this direct relationship without the mediating effect of leadership is investigated.

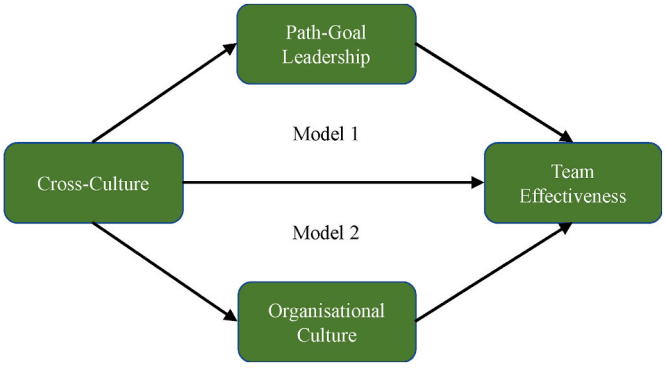

Fig. 1. Conceptual/Research Models
Note: Model 1 (M1) and Model 2 (M2) are defined as follows. M1 and M2 describe an initial direct causal relationship between cross-culture and team effectiveness. While M1 investigates the mediating role of Path-Goal leadership, otherwise stated as P-G leadership henceforth, M2 examines the mediating role of organisational culture. Therefore, three hypotheses are as follows:
H1A direct positive causal relationship exists between cross-culture and team effectiveness.
H2Path-Goal leadership introduces an indirect positive mediating effect on the positive causal relationship between cross-culture and team effectiveness.
H3Organisational culture introduces an indirect positive mediating effect on the positive causal relationship between cross-culture and team effectiveness.

2.3.2. Hypothesis H2: mediating effect of P-G leadership on H1

It is suggested in the literature that leadership always influences organizations to enhance team performance by monitoring team performance and taking action (Northouse, 2019). Hence, from hypothesis H1, the leadership mediation role will influence the direct relationship between CC and TE through the facilitation of decision-making. It equally implies that cross-culture can influence the adopted leadership style. This is corroborated by Dorfman et al. (2012) that cross-cultural bottlenecks can be mitigated if the leadership enhances integration and collaboration within the team.

2.3.3. Hypothesis H3: mediating effect of organisational culture on H1

The organisational culture defines the learned beliefs and norms that drive the integration and adaptive collaboration within the workforce. Culture is not static (Hall, 1989), and it is impossible to transfer cultural norms from one project to another, even in the same organisation. Cultural assumptions such as artifacts and symbols can influence the work climate in an organisation (Schein, 2010) and are expected to create the enabling environment for teamwork to thrive. Here, the mediating role of organisational culture on the direct relationship between cross-culture and team effectiveness is prominent. As stated earlier, four dimensions of OC measured in this study are from the Denison model (Denison et al., 2014), including mission, adaptability, consistency, and involvement.

3. Methodology

The purpose of this study is to examine the mediating roles of Path-Goal leadership on the relationship between cross-cultural dimensions and team effectiveness in project teams in the Nigerian oil and gas industry and a further investigation of organisation culture on the same relationship. Hence, two models are being investigated, and the intent is to enhance the understanding of how leadership approach and organisational culture influence team effectiveness. A quantitative research approach is adopted from positivist and relativist philosophical standpoints to achieve this objective. Both causal and correlational relationships are being investigated. The research methodological schematics is provided in Fig. 2.

3.1. Sample characteristics

The study population varies as project team members are not fixed

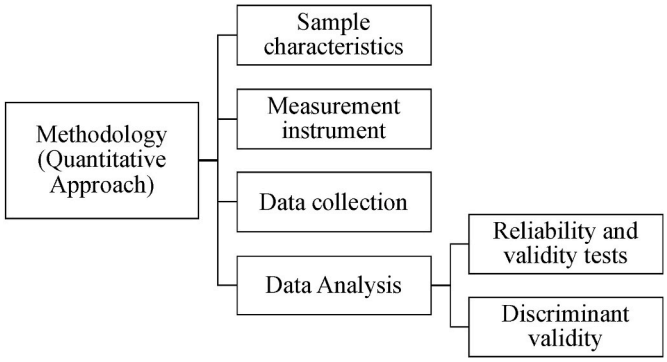

Fig. 2. Methodology.

throughout the project's duration. However, the population of projects in the oil and gas industry can be less than or equal to 100 team members (Alladi & Iyyunni, 2015). A structural equation modelling (SEM) statistical data analysis approach is adopted in this study, and the study sample size definition has been tailored to the rules of SEM. Each model investigated in this study is made up of 11 measured variables. Hence, applying a ten-times rule suggested in the literature (Barclay et al., 1995); thus, a 110 sample size is required for this study. However, 210 participants were recruited for this study with a 100% return on the survey instrument. The adoption of 210 as the sample size, as determined from G*Power software (Faul et al., 2007), is based on the need to minimize Type-I error using an alpha level of 0.05 and Type-II error with an appropriate research power of 80% for exploratory studies as suggested in the literature (Cohen, 1988). The sampling procedure was cross-sectional with a judgemental sampling approach (Sekaran & Bougie, 2016), where only team members with the needed information were selected for the survey.

3.2. Measurement instrument

The operationalization of the data collection tool is guided by the definition of the study's concepts and the hypotheses formulated for this particular investigation. A 5-scale point Likert structured survey questionnaire data collection tool was developed based on the dimensions of each latent variable with options ranges from: (1) Never (2) rarely (3) Sometimes (4) Always. The survey instrument was distributed physically to project team members in the selected project teams in the eastern part of Nigeria. The study sample was drawn from three different project teams across four international oil and gas organizations operating in Nigeria, however the identity of the projects has been kept confidential for ethical reasons. The questions are operationalized from the definitions of the measured variables of each construct. For instance, respondents were asked whether members socialize, had one-on-one interactions during meetings and engagements to measure attitudinal disposition to team effectiveness (see Table 2).

Table 2
Operationalized measured variables.

S/N	Dimensions	Questions
Cross Culture Theory (Hofstede, 2011)		
1	Power Distance	There is inequality caused by the presence of leadership hierarchy.
2	Uncertainty Avoidance	The project leader periodically defines team roles and structure.
3	Individualism versus Collectivism	Relationship of team members with the project leadership prevails over task.
4	Long Term versus Short Term Orientation	The presence of a strong capacity for adapting to change is encouraged.
Project Team Effectiveness Theory (Hackman, 2002; Wageman et al., 2005)		
5	Productive Output	The team consistently delivers project results that adhere to the defined standards of quality, encompassing factors such as time, cost, and scope.
6	Socializing Process	Socializing within the team strengthens members' ability to collaborate interdependently while requiring minimal supervision.
7	Group Experience	The presence of team meetings and interactions positively impacts the learning and well-being of individual team members.
Path-Goal Leadership Theory (Northouse, 2019)		
8	Directive	Project leadership provides subordinates with an explanation of the key performance indicators.
9	Supportive	Project leadership supports subordinates in overcoming obstacles that hinder their task performance.
10	Participative	Project leadership seeks input from subordinates regarding decisions related to project quality, encompassing factors such as time, scope, and cost.
11	Achievement oriented	Project leadership consistently establishes ambitious goals throughout the entire duration of the project.
Organizational Culture Model (Denison et al., 2014)		
12	Mission	The organization's vision is effectively communicated, and team members have a clear understanding of the defined goals and objectives.
13	Adaptability	Team members consistently exhibit a positive response to changes in the project by embracing organizational learning.
14	Involvement	Team members are actively engaged and aligned in project activities through empowerment and ongoing development of their capabilities and competencies.
15	Consistency	The organization has established values, systems, and processes that foster agreement, coordination, and integration among team members.

3.3. Data collection

Data collection approval was received from Unicaf University Research Ethics Committee (UREC) on the August 9, 2022. According to Sekaran and Bougie (2016), the selection of participants for data collection relies on the chosen sampling strategy, as it plays a necessary role in determining the overall data collection process. Throughout the data collection process, the researcher prioritizes safeguarding the rights of participants, ensuring confidentiality, anonymity, and avoiding any form of coercion when obtaining information becomes paramount at this stage. It was necessary to respect the participants' right to choose whether or not to participate and withdraw from the study before the results are disclosed to the public. Only individuals capable of giving informed consent for themselves are included, while those with mental disabilities incapable of providing consent are excluded from the study. According to Saunders et al. (2019) quantitative research data can be collected through experimental manipulation of variables, structured observation, secondary data analysis, or surveys. In this study, the fourth approach is preferred to gather data due to the unique nature of the research construct. The aim is to obtain a large number of responses from project team members in the Nigerian oil and gas industry. To achieve this, a cross-sectional survey was administered, using closed-ended questions that measure the operationalized dimensions of the research construct. A pilot study was undertaken, involving 50 participants, to evaluate the clarity, relevance, and reliability of the measurement items using a survey tool. The results indicated that the instrument was suitable for its intended purpose and was implemented according to the original design, which had been approved by the Unicaf Research Ethics Committee (UREC). A total of 230 questionnaires were distributed, and an impressive 210 (91.3%) were received. This high response rate can be attributed to the effective role played by project or site managers, who acted as gatekeepers. They personally administered the 210 questionnaires to project personnel across three distinct project sites, ensuring that participants were not coerced and had the right to discontinue their participation at any stage of the study. To overcome common method bias which refers to a potential bias that arises when data in a research study is collected using the same method or source, the data was collected from three different project sites in three different international oil companies (IOCs) as suggested in the literature (Podsakoff et al., 2003). Common method bias is a concern in research as it can undermine the validity and reliability of the findings, potentially leading to incorrect conclusions or interpretations.

3.4. Data analysis

Structural equation modelling (SEM) was adopted for data analysis in this study to aid the understanding of the interrelation among the study variables under project environment settings. SEM has gained

extensive popularity in educational and psychological research. The covariance-based modelling (CB-SEM) approach is versatile in handling intricate theoretical models and effectively addressing measurement error, and positioned it as the preferred model among researchers. However, the model does impose some challenging assumptions and limitations, such as the requirement of normality and relatively large sample sizes. In contrast, partial least squares SEM (PLS-SEM) offers a nonparametric alternative that does not rely on normal distributional assumptions and can be estimated with small sample sizes. A partial least square (PLS) SEM modelling approach was adopted because of the unique characteristics of this study as exploratory research. However, covariance-based SEM is not ideal for models with both formative and reflective factors, as in this study (Sarstedt et al., 2016). As stated above, CB-SEM is utilized when the underlying population follows a factor-based structure and exhibits a normal distribution to generate maximum likelihood factor estimates (Rigdon, 2016). However, the outcome of the simulation shows that the distribution did not follow the normal distribution curve (Fig. 3), hence CB-SEM is not right for this study. Again, CB-SEM is favoured when prior knowledge about the population's characteristics is necessary in order to employ CB-SEM. Conversely, in the present study, the nature of the population is unknown due to variations in project teams size, task characteristics, leadership traits, and performance measurement (El-Reedy, 2016). Therefore, implementing CB-SEM in this context can result in erroneous modelling assumptions, unrealistic regression and correlation estimates, and ineffective path analysis. Again, since this study aims not to generalize the results but to provide an indication of an existing relationship that can provide further insight into project performance audit outcomes, a PLS approach to SEM is favoured.

The simulations were completed using SmartPLS (Ringle et al., 2015). The raw data was initially entered into SPSS and screened for outliers. Each construct was developed in SmartPLS software with the measured variables as indicators. A bootstrapping simulation of 1000 subsamples was executed to provide the path coefficients and the statistical significance level. Other information retrieved from the simulation results include the average variance extracted (AVE), heterotrait-monotrait ratio (HTMT), and the coefficient of determination (R-Squared) value to project information needed for performing both validity and reliability checks.

3.4.1. Reliability and convergent validity tests

The study performed reliability and validity checks as suggested in the literature (Ringle & Sarstedt, 2016; Hair et al., 2019; Henseler et al., 2015; Sarstedt et al., 2020). The Fornell-Larcker criterion for determining the convergent validity was adopted in this study, where the construct is valid when the square of the inter-correlation values between constructs is more than their respective AVEs provided composite reliability is greater than 0.6 (Fornell & Larcker, 1981). Convergent validity refers to the degree to which the construct effectively converges to account for the variability observed in its items. The AVEs for the constructs in Table 3 are stated as follows: P-G leadership (0.40), Organisational culture (0.55) and Team effectiveness (0.5). Since one of the AVEs are less than 0.5, it is important to check the values of the square of the inter-correlations between the construct, and if the values are less than their individual AVE and the composite reliabilities are greater than 0.6, to ascertain the validity of the reflective models. The squares of the inter-correlations (Table 5) are P-G leadership → Organisational culture is 0.23, P-G leadership → Team effectiveness is 0.20, and Organisational culture → Team effectiveness is 0.24. Additionally, the composite reliabilities for all reflective constructs in Table 4 are all greater than 0.6. The outcome of the simulation suggests that the squares of the inter-correlations values are less than their individual AVEs and the composite reliabilities are greater than 0.6, stated above. Thus, the reflective constructs (P-G leadership, Organisational Culture, Team Effectiveness) passed the convergent validity (Fornell & Larcker, 1981), suggesting that the four studied constructs are different and distinctively studied different phenomenon in the project environment.

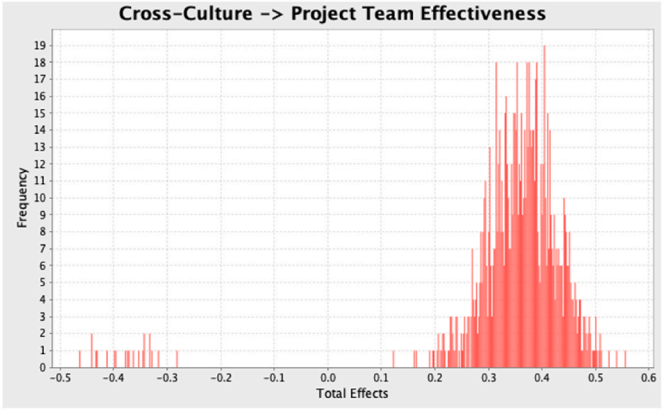

Fig. 3. Total effect frequency distribution.

The standardized formative indicator weights for all measured variables in cross-culture are +1, thus fulfilling the requirement for validity set in the literature (Hair et al., 2019). Furthermore, Variance Inflation Factor (VIF) was also used to check the validity of the formative constructs. According to the literature (Hair et al., 2019), the VIF metric must be <3 to pass validity check. The VIF criterion was also fulfilled in this study since the indicator values for power distance (1.135), uncertainty avoidance (1.013), individualism/collectivism (1.149) and short/long-term orientation (1.039) are <3.

3.4.2. Discriminant validity

Henseler et al. (2015) propose the heterotrait-monotrait ratio (HTMT) as a more recommended metric. The HTMT is used for assessing discriminant validity and is calculated as the ratio of correlations. It represents the average item correlations across constructs relative to the geometric mean of the average correlations for items measuring the same construct (Hair et al., 2019). According to Henseler et al. (2015), discriminant validity issues are unlikely when HTMT values are below 0.9. and can exceed the maximum HTMT threshold of 0.9 if the constructs are conceptually similar. In this study where the performance of project leadership approach and project team effectiveness depends on organizational culture, the reflective constructs are conceptually similar, hence HTMT can be >0.9. The HTMT values for all constructs in Table 6, suggest that the models are valid for the study.

4. Results

SmartPLS is the SEM analysis software (Ringle et al., 2015) adopted for the data analysis, with details provided below. The numbers in brackets are the p-values and indicate that the outer loadings and path coefficients are significant when $p \leq 0.05$. For this study, in situations where two polar concepts are measured as a single entity, loadings greater than 0.5 suggests the outcome favours the first concept and vice versa. In cases where there is the need to ascertain the degree of certainty, outer loadings greater than 0.5 suggest a high degree of certainty that the measured variable is preferred, and vice versa. For all reflective formulations, the loadings for each dimension are treated as a unique

Table 3
Average variance extracted (AVE).

Reflective Measure Models	AVE	t-Statistics	*p* Value	Criteria AVE ≥ 0.5
P-G Leadership: Mediator 1	0.40	13.27	0.00	No
Organizational Culture: Mediator 2	0.55	16.39	0.00	Yes
Project Team Effectiveness	0.50	14.47	0.00	Yes

Table 4
Composite reliability test.

Reflective Measure Models	Composite Reliability (C–R)	t-Statistics	*p* Value	Criteria C–R>0.6
P-G Leadership: Mediator 1	0.69	18.86	0.00	Yes
Organizational Culture: Mediator 2	0.82	41.29	0.00	Yes
Project Team Effectiveness	0.70	19.20	0.00	Yes

Table 5
Square of Pearson r inter-correlations.

Inter-Correlations	Pearson r	*p* Value	$p \leq 0.05$	Square of r
Organizational Culture → P-G Leadership	0.483	0.000	Yes	0.23
Project Team Effectiveness → P-G Leadership	0.451	0.000	Yes	0.20
Project Team Effectiveness → Organizational Culture	0.490	0.000	Yes	0.24

Table 6
Heterotrait-monotrait ratio (HTMT).

Inter-Correlations	HTMT	Criteria	Meet Criteria
Organizational Culture → P-G Leadership	0.86	<0.9; >0.9 if models are conceptually similar	Yes
Project Team Effectiveness → P-G Leadership	0.97		Yes
Project Team Effectiveness → Organizational Culture	0.81		Yes

entity (Kline, 2012). Thus, the measured dimensions of P-G leadership, organisational culture, and team effectiveness are unique since they reflect the latent variables. The dimensions of cross-culture are formative and have a combinatory regression effect on cross-culture.

4.1. Coefficient of determination (R-squared)

The R-squared (R^2) value, also known as the predictive power of the research sample data (Rigdon, 2012), represents the proportion of the variance in an output variable that can be explained by the input variable in a causal relationship predictive model (Cohen, 1988). The range of R^2 is from 0 to 1, with higher values indicating greater explanatory power. According to the literature, R^2 values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively (Hair et al., 2011, 2019), providing a general guide for assessing the explanatory power of the measurement. The R^2 value in this study, which measures team effectiveness as the outcome, is 0.314, falling between the categories of moderate and weak. Despite being relatively low, it carries substantial implications for management decisions when considered in the context of project delays, cost overruns, and the impact on stakeholder trust. While an R^2 value of 0.314 may not be considered strong in isolation, it still provides valuable insights into the factors influencing team effectiveness. It suggests that approximately 31.4% of the variance in team effectiveness can be explained by the variables included in the model. This information can guide management decisions by identifying the key drivers that contribute to team effectiveness. Moreover, the significance of this R^2 value becomes more pronounced when we consider the broader organizational implications. Project delays and cost overruns are common challenges that organizations face, impacting timelines, budgets, and overall project success. By recognizing the link between team effectiveness and these outcomes, management can prioritize strategies to improve team collaboration, communication, and coordination. Addressing these factors can not only enhance team performance but can mitigate project delays and cost overruns, thereby promoting stakeholder trust and confidence. The interpretation of the significance of path coefficients and R-squared values relies on the combined evaluation of p-values and t-statistic values. In every instance, the t-statistic served as the decisive factor for accepting or rejecting the hypotheses, with a two-tailed t-statistic threshold of $t_{0.025} \geq 1.690$.

4.2. Total effects

In 1988, Cohen established a framework for interpreting effect sizes (Cohen, 1988). Effect size refers to the magnitude of the relationship or difference between variables in a statistical analysis. Cohen's definitions help researchers determine the practical significance or impact of their findings. According to Cohen's guidelines, an effect size of $f^2 = 0.02$ is considered small, indicating a relatively minor effect. A medium effect size corresponds to $f^2 = 0.15$, suggesting a moderate impact. Finally, a large effect size is defined as $f^2 = 0.35$, indicating a substantial or significant effect. These benchmarks serve as reference points to assess the strength of relationships or differences observed in research studies. In terms of prediction, the effect sizes indicate that cross-culture has a substantial impact on shaping the effectiveness of the team. Also, P-G leadership has a moderately substantial effect on team effectiveness. The outcome in Table 7 suggests that cross-culture influences both organizational-culture and the leadership approach in projects.

The implication of cross-cultural influences on organizational culture and leadership approaches in projects is significant for project performance. It highlights the importance of understanding and adapting to diverse cultural norms, values, and communication styles within project teams. By recognizing and respecting cultural differences, project managers can promote a more inclusive and collaborative environment, leading to better team cohesion, communication, and ultimately, improved project outcomes. Moreover, incorporating cross-cultural awareness and sensitivity into project planning and execution can help mitigate potential conflicts, enhance stakeholder engagement, and promote effective decision-making, thereby increasing the overall success rate of projects.

4.3. Hypotheses testing

4.3.1. Direct causal relationship - hypothesis H1

This hypothesis tested the direct relationship between cross-cultural dimensions and team effectiveness. Fig. 4 represents the SEM results for the link between cross-culture and team effectiveness. All the outer loadings of cross-culture dimensions and team effectiveness have p-values greater than 0.05. The SEM outcome in Fig. 4 suggests that there is no direct significant causal positive relationship between cross-culture and team effectiveness. Therefore, hypothesis H1 was rejected.

4.3.2. Mediated relationship - hypothesis H2 and H3

This hypothesis tested the effect of P-G leadership approach mediation on the direct relationship between cross-cultural dimensions and

Table 7
Total effect.

Path	Total Effect	t-Statistics	*p* Value	$P \leq 0.05$
Cross-Culture → P-G Leadership	0.36	3.06	0.00	Yes
Cross-Culture → Organizational Culture	0.42	3.00	0.00	Yes
Cross-Culture → Project Team Effectiveness	0.35	2.88	0.00	Yes
P-G Leadership → Project Team Effectiveness	0.25	3.34	0.00	Yes
Organizational Culture → Project Team Effectiveness	0.31	4.27	0.00	Yes

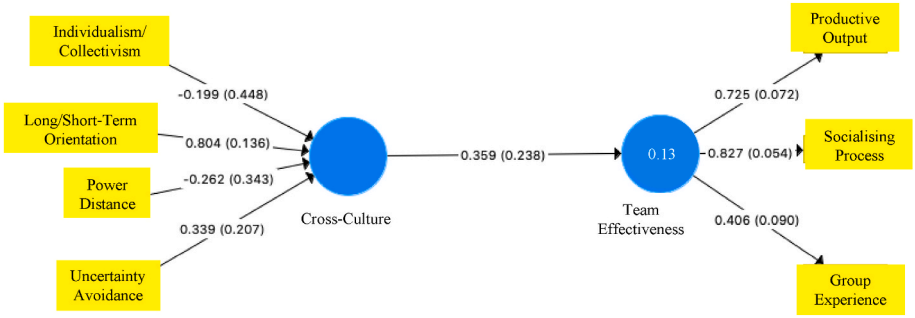

Fig. 4. The causal relationship between cross-culture and team effectiveness.

team effectiveness. In Fig. 5 below, the outer loadings of only two measured dimensions of cross-culture, viz: long/short-term orientation (0.792) and uncertainty avoidance (0.438), have significant p-values<0.05. As explained earlier, since the loadings for long/short-term orientation are greater than 0.5, the results suggest a preference for long-term orientation. Also, the lower loadings of 0.438 for uncertainty avoidance indicate low uncertainty avoidance. This outcome is important in explaining how both P-G leadership and organisational culture can influence the cross-culture in projects. Whereas other path coefficients linking the latent variables are significant at $p \leq 0.05$, the path coefficient (0.132, $p = 0.096$) for the link between cross-culture and team effectiveness is not significant. The outcome also suggests that the adopted leadership behaviour is in the order: of achievement-oriented – directive, participative and supportive. Thus, projects are executed with a high presence of achievement-oriented and directive leadership, a medium presence of participative leadership, and low supportive leadership.

Also, all the dimensional loadings of organisational culture are significant at $p \leq 0.05$, with values greater than 0.7. This suggests the stronger mediation influence of organisational culture on team effectiveness compared to the adopted leadership styles. The results also suggest that an 18% variance in organisational culture is mostly influenced by cross-cultural dimensions of high long-term orientation and low uncertainty avoidance. Similarly, 13% variance in leadership styles within the project team is primarily influenced by cross-cultural dimensions, specifically high long-term orientation and low uncertainty avoidance. In other words, these cultural factors significantly impact the way leaders behave and make decisions within the organization. Long-term orientation refers to a cultural dimension that emphasizes planning for the future, persistence, and perseverance. Leaders with a high long-term orientation are more likely to focus on long-term goals, strategic planning, and sustainable growth. This cultural value shapes their leadership style and decision-making processes. On the other hand, low uncertainty avoidance reflects a cultural dimension where individuals are more open to ambiguity, risk, and change. Leaders with low uncertainty avoidance tend to be more adaptable, flexible, and willing to take risks. They are comfortable with ambiguity and can navigate uncertain situations effectively. The combined mediation effect of these cross-cultural dimensions contributes to a 31% variance in team effectiveness. This implies that the cultural values and leadership styles influenced by high long-term orientation and low uncertainty avoidance have a significant impact on the overall effectiveness of teams within the organization. External loadings of the measured variables of team effectiveness ranked in the order of socializing process (0.816), productive output (0.742), and group experience (0.400). Hence, suggesting low group experience among team members. According to prior research, it has been suggested that the apprehension of highly competent team members regarding the potential loss of their competitive advantage may contribute to their unwillingness to share their know-how within the team (Nauman et al., 2022). The correlations of the latent variables presented in Table 8, are also significant at $p \leq 0.05$. However, which P-G leadership and organisational culture mediation

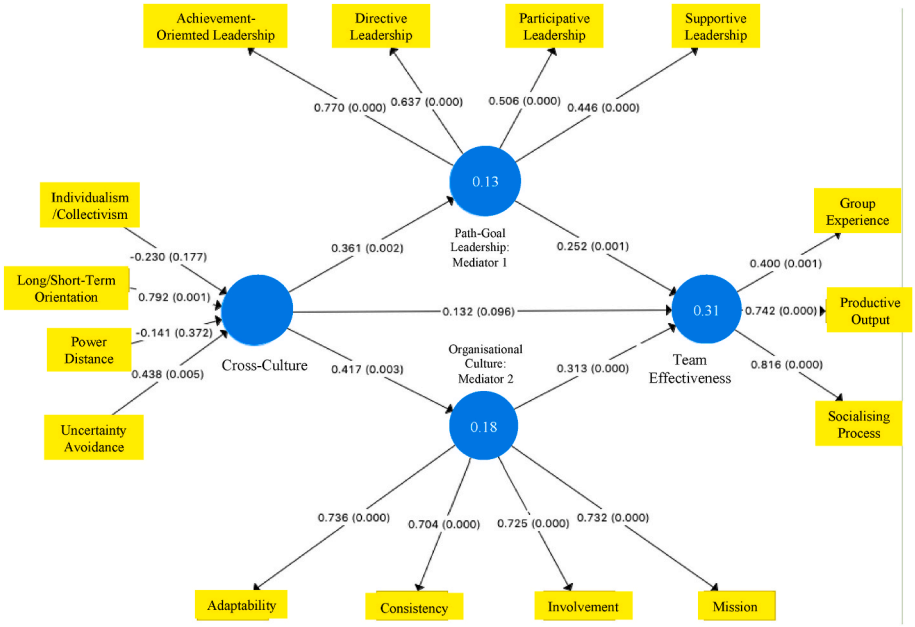

Fig. 5. Combined mediation effect of P-G leadership and organizational culture of the causal relationship between cross-culture and team effectiveness.

Table 8
Latent variable correlations.

Latent Variable Correlation	Pearson r	T Statistics	P Value	P ≤ 0.05
P-G Leadership → Cross-Culture	0.36	3.06	0.00	Yes
Organizational Culture → Cross-Culture	0.42	3.00	0.00	Yes
Organizational Culture → P-G Leadership	0.48	7.93	0.00	Yes
Project Team Effectiveness → Cross-Culture	0.35	2.88	0.00	Yes
Project Team Effectiveness → P-G Leadership	0.45	7.05	0.00	Yes
Project Team Effectiveness → Organizational Culture	0.49	8.77	0.00	Yes

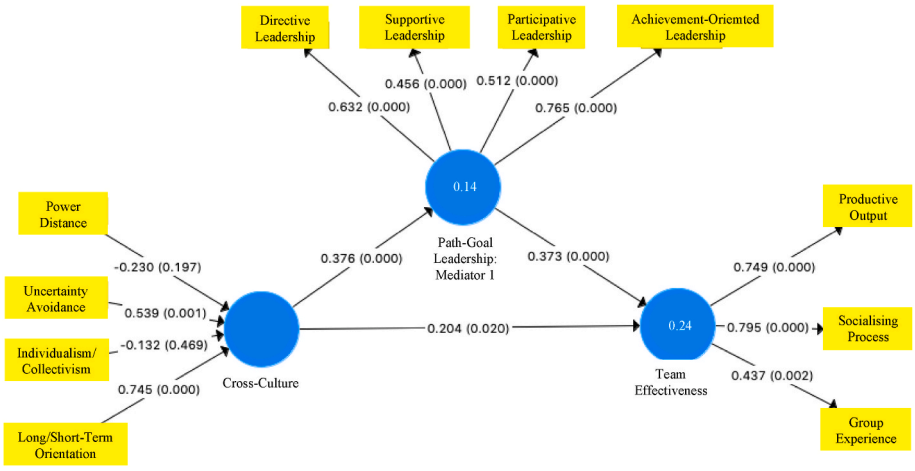

Fig. 6. Mediation effect of P-G leadership on the causal relationship between cross-culture and team effectiveness.

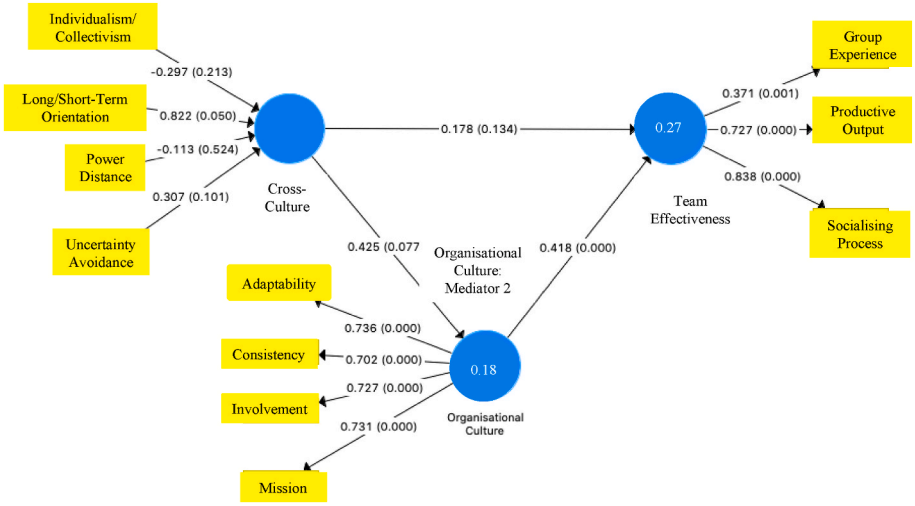

Fig. 7. Mediation effect of organizational culture of the causal relationship between cross-culture and team effectiveness.

effect are responsible for the non-significant causal relationship between cross-culture and team effectiveness is investigated further by comparing the individual mediation effects in Figs. 6 and 7.

Table 9
Summary of Relationship between variables in the model.

Hypothesis	Hypothesis Definition		Reject/ Accept
	Prior Position	Posterior Position	
H1	Positive and significant	Positive but non-significant	Reject H1
H2	Positive and significant	Positive and significant	Accept H2
H3	Positive and significant	Positive and significant	Accept H3

Fig. 6 presents the mediation model for P-G leadership, which suggests that a positive significant causal relationship exists between cross-culture and team effectiveness under the mediation effect of P-G leadership. Similarly, Fig. 7 suggests the non-existence of a significant relationship under the mediation effect of organisational culture. Furthermore, the summary of the hypotheses showing the relationships between the variable is presented in Table 9.

5. Discussion

The control of cross-cultural norms by organisational culture is responsible for the non-significant relationship between cross-culture and team effectiveness in Fig. 7. It is important to note that the link between cross-culture and organisational culture was not significant when organisational culture was the only mediating variable but was

significant under the mediating influence of P-G leadership (Fig. 6). This suggests that the adopted leadership style in projects drives the link between cross-culture and organisation culture. Hence, the team adopts through long-term orientation cross-culture under the control of adaptive organizational culture driven by achievement-orientated leadership. Again, while long-term orientation and low uncertainty avoidance loadings were significant in Fig. 6 under the mediation of P-G leadership, only long-term orientation was significant in Fig. 7 under the mediation of organisational culture. This observation suggests that the full presence of the dimensions of organisational culture in projects affects the determination of other cross-cultural except for the need for the workforce to adapt their behaviour to that dictated by the organisational cultural norms. Implying that long-term orientation can lead to employees adopting cultural artifacts and symbols that enhances positive emotional organizational citizenship behaviours. In such a work environment it is possible to improve team effectiveness by controlling counter-productive emotions (Miao et al., 2020). Controlling counter-productive emotions in the workplace can indeed contribute to improving team effectiveness. When team members experience negative emotions such as anger, frustration, or stress, it can hinder communication, collaboration, and overall productivity. To address this issue, organizations can implement various strategies to promote emotional well-being and create a positive work environment. Consequently, the workforce socializes within the team to ease stress and often finds it difficult to benefit from shared learning among the workforce, as suggested by the low loading of group experience. Thus, in accordance to both cross-culture and organizational culture theories, the presence of multiple cultural perspectives in an organization is supported by the outcome of this study. Implying that project leaders and managers must continue to recognize and embrace diversity, as it can contribute to a richer organizational culture and enhance cross-cultural understanding. This understanding can lead to more effective decision-making, improved communication, and a more inclusive and harmonious work environment.

The strong control of organisational culture on team effectiveness from Fig. 7, can create a project environment where the workforce is believed to enjoy utilitarian exchange relationship with the leadership. This is corroborated in the literature (Alvesson, 2002), where the culture is employed as a tool to discourage employees from emphasizing personal work environment preference and rewards. By emphasizing the organizational culture, projects can achieve several advantages. Firstly, a strong and well-defined culture can foster a sense of unity and shared purpose among team members. When employees are aligned with the organization's values and goals, they are more likely to work collaboratively and harmoniously towards project success. Additionally, a culture that discourages excessive emphasis on personal preferences and rewards can help mitigate potential conflicts and rivalries among team members. Instead of focusing solely on individual gains, employees are encouraged to prioritize the collective achievement of project goals. This creates an environment that promotes cooperation and teamwork, allowing for smoother project execution. Moreover, by de-emphasizing personal preferences and rewards, the project team can focus more on the objective criteria and standards that contribute to successful project outcomes. This reduces the potential for biased decision-making based on individual interests, leading to more effective and unbiased project management.

The connection between workplace factors and mood swings is well-documented, as indicated in the literature (Yukl, 2013). Individuals who struggle to adapt to the work environment often experience mood swings. Furthermore, in the context of cross-cultural projects, uncertainty avoidance plays a crucial role and is a strong predictor. Wu et al. (2019) have found that higher levels of uncertainty avoidance are associated with the presence of abusive leadership. This suggests that in project environments where uncertainty is high and cultural differences are prevalent, there is a higher likelihood of encountering abusive leadership behaviours. It is important for organizations to recognize these factors and work towards creating a positive and supportive work environment to mitigate mood swings and prevent abusive leadership from negatively impacting employee well-being and project outcomes.

While the team has adopted a long-term orientation cross-culture as a way of aligning with the demands of projects in this industry in this study, the low preference for participative and supportive leadership can be counter-productive. Research conducted by Berry et al. (2002) has highlighted that employing coercive and authoritarian strategies in people management can result in employees withholding valuable and productive information. When employees are subjected to oppressive management practices, they may feel compelled to protect themselves and their interests by hoarding information rather than sharing it openly. This behaviour is likely driven by a lack of trust and fear of negative repercussions. Consequently, organizations that adopt a coercive and authoritarian approach may suffer from reduced knowledge sharing, hindering overall productivity and innovation. Consequently, this study raises the implication of possible burnout and mood swings among workers in projects in the oil and gas industry who struggle with adjusting to the norms imposed by the controlling achievement-oriented and directive leadership organisational culture.

The outcome of this study supports the position promoted by the GRPI model (Rubin et al., 1977), that The team's roles are determined by the shared objectives, which can be modified by the team to improve their overall efficiency. The higher loading in long-orientation cross--culture suggest adaptation to of team members to the modification of the team's objective which is mainly driven by achievement-oriented leadership approach. The consequent higher loading in productive output demonstrates that adaption to change improves team's output. As expected from the wisdom of teams model (Katzenbach & Smith, 1993), the effectiveness of a team greatly relies on the goals it aims to achieve. These goals play a pivotal role in shaping the team's identity, determining individual roles, establishing team procedures, and fostering the necessary interpersonal relationships for cohesive teamwork. The outcome of the current study equally supports team bonding through socialization, however the group experience is low suggesting the presence of high level of competency differentiation within the team. Also, the importance of external control on the project team through directive leadership, involvement culture and adaptation can be inferred from the T7 model (Lombardo & Eichinger, 1995). The emphasis on interdependent work process as defined by the socializing dimension of the Hackman's team effectiveness model is also corroborated in our study, where socializing process had the highest outer loading of 0.8. This outcome equally emphasized team membership and collaboration as suggested in the LaFasto and Larson team effectiveness model (LaFasto & Larson, 2001).

The path-goal leadership theory highlights the importance of tailoring the leadership style to match the attributes of both the employees and the objective at hand. By eliminating obstacles that hinder productivity, a path-goal leader inspires the workforce by employing any combination of the four dimensions. This study provides support for the Path-Goal theory of leadership by demonstrating that multiple leadership behaviours can coexist within an organization. The theoretical model proposed in this research highlights that different leaders may adopt various approaches simultaneously, rather than adhering to a single leadership style. This finding aligns with the Path-Goal theory, which asserts that leaders should adjust their behaviours based on the needs and characteristics of their team members. Furthermore, the study emphasizes the influence of cross-cultural factors on the dimensions of the Path-Goal leadership theory. The effect size of cross-culture indicates that cultural norms within an organization can significantly impact the leadership behaviours adopted by individuals. To promote a more inclusive and collaborative environment, it becomes crucial to understand how each team member adapts to the prevailing cultural norms and the associated leadership behaviours. The implication is that project success cannot be solely attributed to a single approach to leadership. Instead, leaders should recognize and embrace the diversity of leadership

behaviours within their organization. Thus, project leaders adopting the P-G leadership theory can create a harmonious and productive work environment where team members feel supported and motivated. This approach acknowledges the unique needs and cultural contexts of individuals and fosters an atmosphere of adaptability and collaboration, ultimately enhancing the potential for project success.

5.1. Implications of the study

The empirical outcomes suggest the importance of leadership styles, organizational culture, and competence development in achieving project success in the Nigerian oil and gas industry. The following implications should be considered in projects to enhance their project management practices and create an environment conducive to successful project outcomes.

a) The presence of high achievement and directive leadership styles suggests a focus on setting challenging goals, providing clear directions, and emphasizing performance. This can lead to increased motivation, productivity, and overall project success.
b) Also, the finding that workers adapt to the project working environment by adopting a long-term orientation cross-culture indicates their ability to adjust and align their behaviours with the project's objectives and values. This adaptability can foster collaboration, effective communication, and cultural integration, thereby positively impacting project success.
c) Again, understanding the dominant control variables of organizational culture can help project managers align project objectives, processes, and decision-making with the prevailing cultural norms. This alignment promotes smoother coordination, better communication, and increased synergy among project team members.
d) Furthermore, recognizing the influence of organizational culture on project environments allows project managers to anticipate potential resistance to change. They can then develop strategies to manage cultural transitions effectively, leading to smoother implementation of project initiatives and increased chances of success.
e) Finally, relying solely on employees with specialized skills may hinder the transfer of knowledge and expertise to new entrants. This can lead to a lack of continuity, knowledge gaps, and potential bottlenecks in project execution. Neglecting competence development training for new entrants can result in a lack of a skilled workforce in the long run. Investing in training and development programs not only enhances the competence of employees but also promotes a culture of continuous learning and innovation, which is crucial for sustained project success.

6. Managerial insights and recommendations

The following managerial insights emphasize the importance of balancing leadership styles, proactively managing occupational health, and utilizing industry-wide project audits to enhance leadership policies. By implementing these recommendations, managers in the oil and gas industry in Nigeria can foster a culture of ownership, mitigate deceptive work behaviour, and promote the well-being and effectiveness of their teams.

6.1. Managerial insight 1: balancing achievement-oriented and directive leadership with shared leadership

The consistent drive for achievement-oriented and directive leadership can sometimes limit the opportunities for shared leadership within teams. This can potentially diminish the feeling of ownership among team members, as they may perceive themselves as mere followers rather than active contributors. To address this, it is recommended that a balance between achievement-oriented leadership and shared leadership be maintained throughout the duration of the project. While focusing on the bottom-line and achieving goals, managers should encourage participative and supportive leadership practices. This involves involving team members in decision-making processes, seeking their input, and valuing their ideas and expertise. This approach fosters a sense of ownership and empowers team members to contribute actively to the project's success. To reinforce this sense of ownership, it is important for team members to have direct access to top leadership through face-to-face or online decision-making discussions. Regular communication channels should be established, ensuring that team members feel heard, and their contributions are valued. This approach not only enhances ownership but also promotes a collaborative and engaged work environment.

6.2. Managerial insight 2: managing adaptive work behaviour and mitigating deceptive work behaviour

The continuous demand for adaptive work behaviour can sometimes lead to employees engaging in deceptive work behaviour, which undermines both the health and safety of employees and the overall effectiveness of the project. To address this issue, a proactive approach is recommended, focusing on periodic and active occupational health assessments of team members. Regular assessments can provide insights into the indicators of workplace stress and help identify potential issues early on. By monitoring employees' well-being, managers can address stressors promptly, implement appropriate support mechanisms, and promote a healthy work environment. The occupational health assessment should include both quantitative and qualitative measures to capture a comprehensive view of employees' well-being. This can involve surveys, interviews, and observation to understand the factors contributing to stress and potential deceptive work behaviour. By proactively managing occupational health, managers can reduce the likelihood of deceptive work behaviour and promote a positive and safe work environment for all team members.

6.3. Managerial insight 3: enhancing leadership policies through industry-wide specific project audits

Access to funding for large-scale research is crucial to develop an industry-wide project audit tool based on the measured variables identified in this study. This tool can provide valuable insights into the project environment and serve as a basis for an enhanced people-oriented leadership policy specifically tailored for the oil and gas industry in Nigeria. The project audit tool should encompass a wide range of variables identified in the study, including leadership styles, team dynamics, adaptive work behaviour, and indicators of workplace stress. It should be designed to gather data from various projects within the industry, ensuring a comprehensive understanding of the overall project environment. By analysing the data collected through the audit tool, industry leaders can gain valuable insights into the strengths and weaknesses of current leadership practices and identify areas for improvement. This data-driven approach can inform the development and implementation of policies that prioritize people-oriented leadership and foster a positive and productive work environment.

7. Conclusion

The study investigates the relationship among cross-culture, organisational culture, path-goal leadership, and team effectiveness. The intent was to ascertain the variables influencing project success to minimize delays. Emphasis was on defining people-oriented leadership from the perspective of enhancing team effectiveness by clearly identifying which organisational culture and leadership provide the most mediating role so that the negative effects of cross-cultural differences within the team are minimal. Three hypotheses were tested: H1 investigated the direct causal effect of cross-culture on team effectiveness; H2 investigated the mediating effect of P-G leadership on H1; and H3

investigated the mediating effect of organisational culture on H1. This study enhances the literature on the complex interrelationship among culture, leadership, and team effectiveness, which creates the enabling environment for projects to thrive in the Nigerian oil and gas industry. Thus, the following are the theoretical novelties proposed in this study:

i) *Integrated leadership styles and cross-cultural adaptation in projects:* The theoretical novelty proposed here is that in the Nigerian oil and gas industry, the presence of high achievement and directive leadership styles in projects leads to a long-term orientation cross-culture among workers. This suggests that when these specific leadership styles are prevalent, employees in this industry tend to adapt their behaviours and attitudes to align with a long-term perspective that transcends cultural boundaries. This concept highlights the interplay between leadership styles and cross-cultural adaptation in project environments, offering insights into how leadership influences organizational culture and employee behaviour.

ii) *Organizational culture as dominant control variables:* This theoretical novelty suggests that in the Nigerian oil and gas industry, the dimensions of organizational culture play a crucial role in defining project environments. It posits that factors such as values, norms, beliefs, and practices embedded within the organizational culture significantly shape the overall project environment. By emphasizing the influence of organizational culture as dominant control variables, this concept highlights the importance of understanding and managing cultural aspects to create a conducive project environment within the industry.

iii) *Specialized skills vs competence development:* This theoretical novelty proposes that the project environment depicted in the study encourages the employment of employees with specialized skills only, without considering competence development training for new entrants. It suggests that in the Nigerian oil and gas industry, there is a prevailing emphasis on recruiting individuals with specific expertise and technical skills, rather than investing in comprehensive competence development programs for new employees. This concept raises questions about the potential consequences of this approach and encourages a critical examination of the balance between specialized skills and the need for continuous competence development in the industry.

8. Limitations and further work

The influence of gender on the measured variables in the project environment was not considered in this study due to a relatively low participation rate (15%) and concerns regarding ethical implications related to gender. Additionally, due to limited funding, a mixed method approach was not employed, which would have allowed for qualitative analysis and a deeper understanding of the study outcomes through interviews with top management or focus groups. For future studies, it is important to investigate the moderation effect of organizational culture on the direct relationship between cross-culture and team effectiveness. This exploration can shed light on how organizational culture influences cross-cultural differences within teams and determine whether organizational culture plays a mediating or moderating role in shaping project environments. Furthermore, adopting a mixed method approach in future research is crucial to enhance the understanding and characterization of the study's related constructs.

CRediT authorship contribution statement

Oghenethoja M. Umuteme: Conceptualization, Literature Review, Methodology, Study Design, Validation, Software, Formal analysis, Writing – original draft. **Waliu M. Adegbite:** Literature Review, Methodology, Study Design, Writing – review & editing.

Declaration of competing interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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