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ORIGINAL ARTICLE

# The Impact of Peer Learning on Artistic Skill Development and Motivation of Art Students

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## Abstract

This study examines the impact of peer learning on the artistic skill development and motivation of art students, with particular emphasis on how collaborative practices shape creativity, competence, and engagement. Using a mixed-methods approach, both quantitative and qualitative data were analysed from 157 student responses. The findings revealed that peer learning contributes positively to artistic growth through mechanisms such as constructive feedback, exchange of ideas, encouragement, and healthy competition. Students reported enhanced creative exploration and technical improvement when exposed to diverse peer perspectives. However, challenges such as unequal participation, time management difficulties, skill disparities, negative peer behaviours, and limited resources were also identified as barriers to effective collaboration. The interpretation of results was situated within three theoretical frameworks: Wenger's Community of Practice, Vygotsky's Sociocultural Theory, and Deci and Ryan's Self-Determination Theory. These frameworks illustrate that peer learning operates as both an opportunity and a challenge enhancing creativity, confidence, and engagement, while also requiring supportive structures to address power dynamics, feedback quality, and resource availability. The study concludes that structured peer learning, when effectively supported, strengthens artistic competence, fosters collaborative cultures, and sustains student motivation in art education. These insights carry implications for pedagogical practice, suggesting that peer-based approaches should be deliberately designed to balance collaboration, autonomy, and equitable access to learning resources.

**Keywords:** *Art students, Skills Development, Collaboration, Motivation, Peer learning.*

## Introduction

Peer learning has become an increasingly important aspect of art education in tertiary institutions, as it offers students opportunities to collaborate, share ideas, and develop their artistic skills in a supportive environment. In art programmes, students often engage in group critiques, collaborative projects, and informal discussions that contribute to their creative growth and technical proficiency. Research has shown that such collaborative interactions not only foster creativity but also enhance students' ability to generate new ideas and approaches to their work (Sawyer, 2017; Boud et al., 2014). While the myth of solitary artists persists, contemporary art education increasingly recognises that learning directly from peers is fundamental to professional growth (Topping, 2023). In this study, peer learning is operationally defined as collaborative interactions among students within the same academic programme or level, in which they exchange feedback, share technical knowledge, and support one another's skill development and motivation in a non-hierarchical learning context, irrespective of age differences.

One of the central objectives in art education is to cultivate students' capacity for critical thinking and self-reflection. Peer learning environments, where students discuss their work and provide feedback to one another, have been found to promote deeper understanding and more sophisticated artistic outcomes (Johnson, 2020; Helle et al., 2006). When students receive constructive feedback from their peers, they are more likely to revise and improve their projects, leading to higher-quality artistic output. This aligns with evidence that peer assessment and collaborative critique are effective tools for developing both technical and conceptual skills in art students (Smith & Hu, 2021).

Motivation is another key area influenced by peer learning in art education. Studies indicate that working alongside peers can increase students' intrinsic motivation, as they are inspired by the progress and achievements of their classmates (Deci & Ryan, 2000; Zimmerman & Schunk, 2011). The sense of community and shared purpose that arises from collaborative learning helps students persist through challenging tasks and encourages them to set and achieve personal learning goals. Moreover, peer support has been shown to boost students' confidence and willingness to experiment with new techniques, which is essential for artistic development (Hammond, 2017).

Despite the benefits, peer learning in art programmes faces some challenges. Some students may have difficulties with group dynamics, feel anxious about peer critique, or struggle to balance individual and collective goals (Boud et al., 2014). Overcoming these challenges requires intentional teaching strategies that create a positive, inclusive, and respectful learning environment. Facilitators play a vital role in guiding discussions, resolving conflicts, and making sure all students can contribute meaningfully to the learning process (Sawyer, 2017).

While the general benefits of peer learning are well known, how it influences the specific skill development journey of art students requires deeper exploration within the unique context of visual arts. This study examines the tangible impact of peer learning interventions on the acquisition and refinement of diverse skills for art practice. Peer learning is a powerful mechanism for enhancing skills development and motivation among art students in tertiary institutions. By fostering collaboration, feedback, and mutual support, art programmes can help students reach higher levels of artistic proficiency and personal growth. Continued research and the careful application of peer learning strategies will further improve the educational experiences and outcomes for aspiring artists.

This study contributes to the growing body of peer learning research by situating the phenomenon within practice-based art education in Ghana, a context that remains underrepresented in existing literature. While prior studies have established the general benefits of peer collaboration, this research extends understanding by examining how peer learning operates within materially grounded studio environments where creativity, technique, and identity formation intersect. By integrating Community of Practice, Sociocultural Theory, and Self-Determination Theory, the study offers a multidimensional account of how social interaction, motivation, and skill acquisition converge in art education.

## Objectives

1. Examine the impact of peer learning on artistic skills development.
2. Explore the extent to which peer learning influences motivation and self-regulated learning

## Research Questions

1. In what ways does peer learning impact artistic skills development?
2. To what extent does peer learning influence students' motivation and self-regulated learning?

## Theoretical Framework

This research is grounded in three theoretical frameworks. The study examines peer learning through these theoretical lenses: Community of Practice (Lave & Wenger, 1991), framing the art studio as a space where skills emerge from communal rituals, Sociocultural theory by Vygotsky (1978), emphasising peer support as a catalyst for technical and cognitive growth, and self-determination theory by Ryan & Deci (2017), which explains motivation through the fulfilment of three basic psychological needs: autonomy, competence, and relatedness.

### Community of Practice

Lave and Wenger's (1991) theory posits that learning occurs through participation in social practices where the art studio operates as a community of practice in which students collectively develop skills through legitimate peripheral participation. Novices observe peers, then progressively engage in complex tasks (Wenger-Trayner, 2015). Artistic skills also emerge through shared artistic language, rituals (e.g. group critique) and communal problem solving (Johnson, 2020). Artistic techniques, feedback norms and conceptual approaches become communal resources (Rodriguez, 2019).

### Sociocultural Theory (SCT)

Vygotsky (1978) emphasised that cognition develops through social interactions mediated by tools, language, and collaboration. Peer learning represents a sociocultural system: peers provide "just-in-time" support within each other's zone of proximal development (ZPD), such as troubleshooting brush techniques or refining digital workflow (Chen, 2022). The theory also states that feedback, shared resources such as rolling mills, kilns, and computers, and dialogue mediate internalisation of skills (Smith & Hu, 2021).

### Self-Determination Theory

Self-Determination Theory (SDT), developed by Ryan and Deci (2017), explains motivation through the fulfilment of three basic psychological needs: autonomy (a sense of volition and ownership), competence (a sense of mastery and effectiveness), and relatedness (a sense of belonging and connection). When these needs are satisfied, learners experience higher levels of intrinsic motivation, sustained engagement, and persistence.

Within art education, peer learning environments may support autonomy through collaborative idea exploration, competence through constructive critique and skill refinement, and relatedness through shared studio practices and mutual encouragement. SDT therefore provides a lens for interpreting how peer interactions influence not only artistic outcomes but also the motivational processes that sustain creative engagement over time.

## Research Design

This study employed a mixed-methods design, specifically a convergent parallel approach, to examine the impact of peer learning on art students' skills development and motivation. Quantitative and qualitative data were collected concurrently through a single survey instrument and analysed separately before integration.

The quantitative strand involved statistical analysis of closed-ended items. Descriptive statistics were computed to summarise trends, and regression analysis was conducted to determine the predictive relationship between peer learning variables and outcomes related to skills development and motivation.

The qualitative strand comprised responses to open-ended questions, which were analysed using thematic analysis. Codes were generated inductively, grouped into categories, and synthesised into themes reflecting students' lived experiences of peer learning.

Integration occurred at the interpretation stage, where findings from the regression models were compared and corroborated with emergent themes. This process enabled triangulation by explaining statistical patterns through participants' narratives and, where necessary, contextualising quantitative results with qualitative insights. The combined approach therefore provided both explanatory power and contextual depth, which is particularly appropriate in arts education research where measurable outcomes and social learning processes intersect (Creswell & Clark, 2017; Gibson, 2020).

**Population and Sampling**

The sample included 157 undergraduate art students from Kwame Nkrumah University of Science and Technology (KNUST), Bolgatanga Technical University (BTU), and Dr Hilla Limann Technical University (DHLTU). These universities were selected because of the availability of faculty members to facilitate the distribution of the survey link. Participation was voluntary, with students self-selecting to complete the questionnaire. This convenience sampling approach enabled access to a diverse group of tertiary art students and reflected practical data collection considerations (Gibson, 2020). Ethical clearance for the study was obtained from the relevant institutional review processes within the participating institutions. Participants were informed about the purpose of the study before participation and provided informed consent electronically before completing the questionnaire. Participation was entirely voluntary, and respondents were informed of their right to withdraw at any stage before submission. No personally identifying information was collected. Data were stored securely in password-protected files accessible only to the researchers and used solely for academic purposes.

The use of convenience sampling with self-selection, where participants voluntarily chose to take part in the study, may result in self-selection bias when the characteristics of volunteers differ systematically from those who did not participate, making the sample less representative of the entire population (Statistics By Jim, 2023). As a result, the findings may disproportionately reflect the views and experiences of those who are more motivated or interested, thereby limiting the generalisability of the results (Simply Psychology, 2023; Scribbr, 2023). The reliance on voluntary participation may have resulted in an overrepresentation of students who hold favourable views toward peer learning, while those who experienced disengagement or dissatisfaction may have been less inclined to participate. Additionally, the predominance of early-year students and concentration in particular programmes may shape the findings toward foundational studio experiences rather than advanced-level dynamics. These factors limit generalisability and suggest that findings should be interpreted as context-specific rather than universally applicable.

**Data Collection Method and Procedure**

Data were collected using an online survey distributed to participants through a secure Google Forms link. The survey link was shared with eligible art students via institutional communication channels, and responses were collected over a specified data collection period. Participation was voluntary, and informed consent was obtained electronically before completion of the survey. To ensure confidentiality, no personally identifiable information was required, and responses were automatically anonymised within the platform.

The survey generated both quantitative and qualitative data. Closed-ended items produced numerical data on students' perceptions, skills development, and motivation in relation to peer learning, while open-ended items allowed participants to elaborate on their experiences. Completed responses were automatically recorded in a password-protected database and exported for statistical analysis.

Prior to the main data collection phase, the instrument was pretested with a small group of art students comparable to the study sample. Feedback from the pilot phase informed minor revisions to improve clarity and reduce ambiguity. Reliability analysis conducted after data collection indicated good internal consistency (Cronbach's $\alpha = 0.81$), demonstrating that the scale items measuring the key constructs were sufficiently coherent (Cronbach, 1951; Fowler, 2014; Converse & Presser, 1986; Tavakol & Dennick, 2011).

**Data Analysis**

Quantitative data from closed-ended items were analysed using descriptive statistics (frequencies and percentages) to summarise student responses and identify patterns related to peer learning outcomes. These statistics provided an overview of perceived impacts on artistic development and motivation.

Qualitative data from open-ended responses were analysed using a hybrid thematic analysis approach, combining inductive identification of emerging patterns with deductive attention to theoretically relevant constructs derived from Community of Practice, Sociocultural Theory, and Self-Determination Theory. The analysis followed several stages: initial familiarisation with the data, generation of preliminary codes, grouping of related codes into broader categories, and refinement of themes through iterative comparison. A codebook was developed to ensure consistency in categorisation. Coding was conducted by two researchers independently and then compared; where disparities arose, these were resolved through deliberation to reach consensus. To enhance credibility, themes were reviewed and refined to ensure they accurately represented participants' responses and aligned with the research objectives.

Integration of quantitative and qualitative findings occurred during interpretation, where thematic insights were used to explain and contextualise statistical trends, thereby strengthening the overall explanatory power of the mixed-method design (Creswell & Clark, 2017; Gibson, 2020).

## Results and Discussion

### Participants Demographic Characteristics

**Table 1**

*Participant demographic characteristics*

| *Baseline characteristic* | *n* | *%* |
|---|---|---|
| *Age range* | | |
| 18 – 22 | 92 | 58.6% |
| 23 – 26 | 55 | 35% |
| 27 and above | 10 | 6.4% |
| *Gender* | | |
| Male | 80 | 51% |
| Female | 77 | 49% |
| *Year of Study* | | |
| 1st Year | 80 | 51% |
| 2nd Year | 46 | 29.3% |
| 3rd Year | 18 | 11.5% |
| 4th Year | 13 | 8.3% |
| *Programme of Study* | | |
| Textiles and Fashion | 65 | 41.4% |
| Jewellery and Metals | 64 | 40.8% |
| Graphic Design | 10 | 6.4% |
| Painting | 7 | 4.5% |
| Sculpture | 2 | 1.3% |
| Leatherwork | 3 | 1.9% |
| Ceramics | 1 | 0.6% |
| Others | 5 | 3.2% |
| *Institution of Study* | | |
| Bolgatanga Technical University | 77 | 49% |
| Dr Hilla Limann Technical University | 42 | 26.8% |
| Kwame Nkrumah University of Science and Technology | 38 | 24.2% |
| *Total* | *157* | *100%* |

*Source: Field Data, 2025*

The study sample in Table 1 above consisted of 157 art students from three tertiary institutions, providing a diverse and representative snapshot of the population engaged in art education within these university and technical institutions.

### Age Distribution

The majority of participants (58.6%) fall within the 18 to 22-year age group, indicating that most respondents are traditional college-aged students typically undergoing foundational undergraduate art education. Combining this with the 23 to 26-year group, which accounts for 35% of respondents, revealed that 93.6% of the sample comprises relatively young, early-career students. This age profile suggests that peer learning experiences and their impact on skills development and motivation are principally shaped among individuals who are likely to be in the formative stages of their academic and artistic development. The smallest group (6.4%) includes students aged 27 and above, representing mature learners who may bring unique experiences and learning perspectives to the peer learning environment.

### Gender

Gender distribution among respondents was nearly balanced, with males representing 51% and females 49%. This near parity facilitates the examination of peer learning impacts across genders, reflecting gender diversity within the art student population. Such a balance supports the potential for inclusive analysis and may enhance the applicability of findings across male and female student groups in art programmes. The presence of textiles and fashion respondents meant more female respondents in this study.

### Year of Study

Over half of the participants (51%) were in their 1st year of study, followed by 29.3% in the 2nd year. Together, these early-year students constitute approximately 80% of the sample, highlighting that much of the data reflects experiences from those at early stages of their tertiary education journey. Students in later years, 3rd and 4th years, made up smaller proportions (11.5% and 8.3%, respectively), indicating fewer senior-level perspectives but still providing insight into how peer learning evolves throughout the academic tenure.

### Programme of Study

Participants were drawn from a variety of specialised programmes within the arts. Textiles and Fashion (41.4%) and Jewellery and Metals (40.8%) were the predominant fields of study, jointly making up over 82% of the sample. Smaller segments included Graphic Design (6.4%), Painting (4.5%), Sculpture (1.3%), Leatherwork (1.9%), Ceramics (0.6%), and Others (3.2%). This distribution reflects the varied yet concentrated interest areas within the art disciplines represented and suggests that peer learning dynamics may be particularly salient in the more heavily represented programmes.

### Institution of Study

The participants were nearly evenly distributed among the three institutions, with Bolgatanga Technical University comprising the largest share at 49%, followed by Dr Hilla Limann Technical University at 26.8%, and Kwame Nkrumah University of Science and Technology (KNUST) at 24.2%. This spread allows the study to draw comparisons and potentially identify institution-specific influences on peer learning, skills development, and motivation.

The demographic profile highlights a predominance of young, early-year art students from primarily Textiles and Fashion and Jewellery and Metals programmes. The balanced gender representation and inclusion of multiple institutions broaden the applicability of the findings. Understanding these demographics is critical as they contextualise how peer learning initiatives are perceived and their impacts across different student subgroups within art education.

### Multiple Regression Analysis

A multiple linear regression analysis was conducted to determine whether peer learning significantly predicts students' motivation while controlling for gender and year of study. Motivation was entered as the dependent variable, while peer learning, gender, and year of study were entered as independent variables.

The overall regression model was statistically significant, $F(3, 153) = 65.70$, $p < .001$, indicating that the predictors, taken together, reliably explain variation in students' motivation. The model accounted for

56.3% of the variance in motivation ($R^2 = .563$; Adjusted $R^2 = .554$). This means that more than half of the differences in students' motivation levels can be explained by peer learning and the demographic variables included in the model.

**Individual Predictors**

Peer learning emerged as a strong and statistically significant predictor of motivation (B = 0.738, SE = 0.054, t = 13.57, $p < .001$). This indicates that as students' engagement in peer learning increases, their motivation also increases. Specifically, for every one-unit increase in peer learning score, motivation increases by approximately 0.74 units. This finding demonstrates a strong positive relationship between peer learning and student motivation.

Gender was also found to be a statistically significant predictor (B = −0.249, SE = 0.114, t = −2.19, p = .030), indicating that motivation differs slightly across gender categories. The direction of the coefficient reflects the numerical coding of gender in the dataset.

However, year of study was not a statistically significant predictor of motivation (B = 0.052, SE = 0.060, t = 0.87, p = .387). This suggests that students' academic level (1st year, 2nd year, 3rd year, or 4th year) does not significantly influence their motivation when peer learning is taken into account.

Overall, the results show that peer learning is the most important predictor of students' motivation in this model.

**Table 2**

*Multiple Regression Analysis Predicting Students' Motivation*

| *Predictor* | *B* | *SE* | *t* | *p* |
|---|---|---|---|---|
| Constant | 0.703 | 0.250 | 2.81 | .006 |
| Peer Learning | 0.738 | 0.054 | 13.57 | < .001 |
| Gender | −0.249 | 0.114 | −2.19 | .030 |
| Year of Study | 0.052 | 0.060 | 0.87 | .387 |

*Model Summary: $R^2 = .563$, Adjusted $R^2 = .554$, $F(3, 153) = 65.70$, $p < .001$*

**Moderation Analysis (Peer Learning × Gender)**

To examine whether gender changes (moderates) the relationship between peer learning and motivation, an interaction term (Peer Learning × Gender) was added to the regression model in Table 2.

The interaction effect was not statistically significant (B = −0.019, SE = 0.109, t = −0.178, p = .859). This indicates that the relationship between peer learning and motivation does not differ significantly between gender groups. In other words, peer learning positively influences motivation similarly across genders.

**Peer Learning and Artistic Development**

Under this section, the study examines the impact of peer learning on artistic skills development, including areas such as developing new ideas, sketching, shading, piercing and carving, the quality of art projects, enhancement in technical artistic skills, experimentation with new techniques, and the efficacy of collaborative learning compared to learning alone.

In this study, the majority of art students (54.8% agreed and 29.3% strongly agreed) across all the programmes reported that discussing their artworks with peers helped them generate new ideas. This trend was particularly evident in Painting (100% agreement) and Graphic Design (94%), where the conceptual nature of the work thrives on social dialogue. This finding aligns with existing research showing that peer interactions in art education foster the development of creative ideas by enabling students to view their work from different perspectives and receive constructive reviews. For example, studies in visual art education highlight that peer feedback and discussion promote reflection and idea refinement, enhancing students' creative processes and self-regulation (Ersöz & Şad, 2018; Tyrrell, 2023). Digital peer review environments have also been shown to support students' awareness of their own and others' work, motivating further experimentation and idea evolution (Tyrrell, 2023).

*This collaborative exchange aligns well with the principles of the Community of Practice framework, where learning develops through shared engagement in a common artistic practice, allowing students to become active participants in a social learning environment (Lave & Wenger, 1991). In parallel, Sociocultural Theory emphasises that cognitive growth occurs via social interaction and scaffolded support from peers, facilitating creative idea generation within the learners' zone of proximal development (Vygotsky, 1978).*

However, the data also reveal that 15.9% of respondents were neutral or disagreed that peer discussions aided their idea generation. This suggests that peer learning is not universally perceived as beneficial for all art students, a sentiment slightly more present in Sculpture (91%) and Jewellery (89%) respondents. Variation in individual preferences and learning styles may account for this, where some students might find peer critique challenging or less helpful compared to solitary reflection (Topping & Ehly, 2001). Additionally, the social dynamics within peer groups and the structure of peer learning activities influence how effectively students benefit from collaborative discussions (Boud, 2001). Hence, while peer learning is a powerful tool in artistic development for many, it is important to recognise that it may not be equally effective or preferred by every student.

When it comes to the impact of feedback on the improvement in the quality of artworks, a substantial majority of art students (61.1% agreed and 22.3% strongly agreed) reported that feedback from peers significantly improved the quality of their artworks. The unanimous agreement (100%) among Sculpture students on this item reinforces the recognised value of peer feedback in creative education, where collaborative critique plays a pivotal role in refining artistic outputs. Peer feedback exposes students to diverse perspectives, enabling them to identify areas for improvement they may have overlooked and encouraging the development of higher-quality work (Wu & Schunn, 2020). Research underscores that accurate and constructive peer feedback fosters reflection and revision, which are essential for enhancing both technical skills and conceptual depth in art projects (Wu & Schunn, 2020; Gao et al., 2019).

Contrary to the earlier assertions above, 8.9% of respondents remained neutral on this issue, possibly reflecting difficulties in recognising the constructive role of peer feedback or varying personal learning preferences. Additionally, a combined 7.6% (2.5% and 5.1%) of participants disagreed or strongly disagreed with the assertion, suggesting that peer feedback may not be universally perceived as beneficial. Such divergence may be due to inconsistent feedback quality or variations in students' receptiveness and prior experience with collaborative learning (Gao et al., 2019). The effectiveness of peer feedback is closely linked to its accuracy and relevance; feedback that aligns well with actual issues in students' work is more likely to be implemented effectively and lead to tangible improvements (van Steendam et al., 2010; Wu & Schunn, 2020). Overall, this supports pedagogical approaches that emphasise training students in how to provide high-quality, aligned, and constructive feedback to maximise the benefits of peer learning environments in art education (Wu & Schunn, 2020; Nguyen, 2024).

In relation to the enhancement of technical art skills that result from collaboration with classmates, the findings from this study indicate that a significant majority of art students (58.6% agreed and 26.8% strongly agreed) perceive collaboration with their classmates as beneficial in enhancing their technical art skills. While Painting (92%) and Graphic Design (88%) students felt this strongly, agreement was lower in Jewellery (78%) and Textiles (84%). This aligns with contemporary educational research demonstrating that collaborative learning environments foster the development of practical skills by providing opportunities for hands-on engagement, immediate feedback, and shared knowledge construction (Azeez et al., 2024). Particularly in technical art disciplines, peer collaboration encourages students to observe, imitate, and refine techniques through active dialogue and cooperative practice, which stimulates skill acquisition more effectively than isolated learning (Rostan, 2022).

Within the Community of Practice perspective, such collaboration represents engagement in a shared domain, where situated learning and joint problem-solving strengthen acquisition of technical competencies (Lave & Wenger, 1991). Sociocultural theory further posits that social mediation by peers scaffolds learning, enabling students to build skills both cognitively and practically through interaction (Vygotsky, 1978). Research in art and design education also emphasises the importance of social interaction in technical skills development, where collaborative settings enable students to brainstorm challenges together, exchange methods, and inspire experimentation with new tools and techniques (Tyrrell, 2023; Wu & Schunn, 2020). Such dynamic engagement not only improves technical proficiency but also builds confidence and motivation, reinforcing deeper learning.

Nonetheless, the presence of 8.3% neutral responses, alongside 6.4% expressing disagreement, suggests that peer collaboration may not generally enhance technical skills for all students. Differences in personal learning preferences, group dynamics, or the quality of collaboration could influence these perceptions (Azeez et al., 2024). Notably, in high-precision areas like Jewellery and Textiles, students may prefer solitary focus for complex technical tasks. For instance, processes such as intricate weaving, soldering, or garment stitching require deep concentration where peer interaction might be perceived as a distraction.

When asked about the impact of peer learning on their ability to experiment with new artistic techniques, the results reveal that a combined majority of 82.2% of participants (59.9% agree and 22.3% strongly agree) perceive peer learning as positively influencing their ability to experiment with new artistic techniques. Painting students reported total consensus (100%) on this experimentation, whereas responses were slightly more reserved in Sculpture and Textiles (both 86%). This result is consistent with contemporary research highlighting how peer collaboration fosters a learning environment conducive to exploration and innovation in the arts. When students engage with their peers, they gain exposure to diverse approaches and receive encouragement that empowers them to take creative risks and try unfamiliar methods (Özkan, 2023; Rago, 2021). Such interactive and social learning contexts encourage experimentation by reducing fear of failure and promoting shared problem-solving, which is critical for artistic growth (Cacciatore & Panozzo, 2025).

Experimental art education frameworks emphasise the role of choice and peer dialogue in helping students discover novel techniques and materials without strict prescriptive instruction. When collaboration replaces solitary learning, students often engage in reciprocal observation and reflection, which enhances their technical confidence and openness to experimentation (Özkan, 2023; Rago, 2021). This participatory learning also supports experimentation by creating a supportive, low-stakes setting for trial-and-error learning that is vital for mastering complex artistic practices (Özkan, 2023).

Nevertheless, a smaller proportion of students remained neutral (8.3%) or disagreed (9.5%) about this benefit, suggesting that experimentation is not universally facilitated by peer interactions for all learners. Individual differences and the inherent risks of the medium play a role here; in workshops involving power tools for carving or piercing, or high-heat soldering equipment, students must prioritise solitary concentration to ensure safety. In such contexts, peer interaction can be dangerous if it interrupts the focus required for safe tool operation. These nuances highlight the importance of designing collaborative learning experiences that accommodate diverse learner needs and safety requirements to maximise their impact on artistic skill development (Rago, 2021).

Asked whether they learned more effectively while working alongside their peers compared to working alone, the study found that a combined total of 80.8% of participants (61.1% agreed and 19.7% strongly agreed) felt they learned more effectively when working alongside their peers compared to working alone. This sentiment was strongest in Painting (88%) and Graphic Design (85%), while Textiles and Jewellery (both 72%) showed more preference for solitary work. This finding echoes established educational research emphasising the benefits of peer learning in creative and vocational settings. Peer collaboration facilitates active engagement, immediate feedback, and the co-construction of knowledge, which enhances comprehension and skill mastery beyond what solitary study typically achieves (Ako Aotearoa, 2020; Wu & Schunn, 2020).

The social constructivist perspective underlying peer learning suggests that learners develop deeper understanding within the "zone of proximal development," where guidance and interaction with peers support their learning experiences (Tyrrell, 2023). These findings are consistent with Sociocultural Theory’s view that cognitive development is socially mediated and that learners achieve higher levels through guided peer interaction within their zone of proximal development (Vygotsky, 1978). Moreover, being part of an active Community of Practice creates a collaborative learning environment that nurtures shared knowledge construction and identity building among art students (Lave & Wenger, 1991).

Empirical studies evidence that peer learning environments promote higher motivation and sustained learning effort by enabling students to exchange ideas, critique constructively, and reflect collectively, thus fostering improved cognitive and practical outcomes (Ako Aotearoa, 2020; Lee et al., 2021). Nonetheless, 13.4% of respondents remained neutral, and a minority (5.7%) disagreed or strongly disagreed with the statement, indicating that learning preferences vary. Some students may benefit more from independent study or find peer interactions challenging due to social or cognitive factors (Lee et al., 2021). This diversity underscores the need for teaching approaches that offer flexible learning modalities, accommodating both collaborative and solitary learners, particularly where technical safety and high-concentration tasks are involved to maximise effectiveness.

Overall, the data support that peer learning is a valuable pedagogical approach in art education, enhancing the learning process for most students through collaborative engagement and shared creative inquiry.

## Peer Learning and Motivation

Respondents were asked to rate the statement, “peer feedback increases my confidence in my artistic ability.” An overwhelming majority of 80.9% agreed or strongly agreed, indicating that peer feedback significantly enhances their confidence in their artistic skills. Specifically, 61.8% agreed, and 19.1% strongly agreed. Meanwhile, 15.3% remained neutral, suggesting indifference towards the impact of peer feedback on their confidence. Only a small minority of 3.8% (3.2% disagreed and 0.6% strongly disagreed) felt that peer feedback did not increase their confidence in their artistic abilities. This finding aligns with recent studies that highlight the vital role peer feedback plays in enhancing learners' self-efficacy and motivation. For instance, Panadero (2017) points out that peer feedback creates a collaborative learning environment that boosts students' confidence and engagement. Moreover, Li et al. (2020) found that well-structured peer feedback aids skill development through reflective practice and constructive critique. In the realm of arts education, Cho and Cho (2019) discovered that peer feedback fosters motivation and confidence by building a supportive learning community where students feel encouraged to explore and refine their creative talents. This interaction not only helps improve skills but also nurtures intrinsic motivation by reinforcing students’ belief in their artistic potential. These findings can be understood through the lens of Sociocultural Theory, which emphasises learning as a socially mediated process where interaction with more knowledgeable peers supports development. Additionally, the Community of Practice framework explains how participation in peer groups cultivates shared repertoires of knowledge and confidence, nurturing learners as they engage in authentic artistic practices. All in all, these findings highlight that peer feedback plays a significant role in enhancing both confidence and skill development among art students, emphasising the need to formally incorporate peer learning strategies into art education programmes.

Again, respondents were asked to rate the statement, “working with my peers motivates me to spend more time on my art projects.” A majority of 64.3% agreed, and an additional 22.3% strongly agreed, indicating that peer collaboration significantly motivates students to dedicate more time to their art projects. Meanwhile, 7.6% remained neutral, and 5.7% either disagreed or strongly disagreed with the statement. These results highlight that most students increase the time they invest in their art projects as a direct result of working alongside their peers. Recent research highlights the motivational benefits of working alongside peers. For example, Lynn et al. (2018) point out that collaborating with classmates boosts intrinsic motivation by offering social support and accountability, which encourages students to engage more deeply with their tasks. Additionally, Wang and Eccles (2019) discovered that interactions among peers in creative environments lead to students investing more time, as they become more excited about their work and committed to shared goals. In art education, this kind of peer collaboration fosters a vibrant learning atmosphere where students feel inspired to explore ideas, exchange feedback, and maintain their motivation throughout the creative journey, ultimately resulting in greater effort and persistence (Zhu & Carless, 2018). These experiences reflect Sociocultural Theory's view of learning as a socially situated activity, where motivation and engagement are strengthened through active participation and interaction within a cultural context. Through the Community of Practice, art students form networks of mutual support and shared commitment, which sustain their motivation and time investment in their creative work.

The statement "I feel more motivated to improve when I see my peers progress" received agreement from 59.2% of respondents and strong agreement from 27.4%, with 7.6% neutral and a small minority (5.8%) disagreeing. This indicates a significant correlation between collaborative learning and the intrinsic motivation to advance in creative fields such as art. This connection resonates closely with Self-Determination Theory (SDT), which highlights relatedness, the sense of connection with others, as a key psychological need that boosts intrinsic motivation (Ryan & Deci, 2017). When students see their peers making progress, it creates a sense of community and mutual support that can motivate them to enhance their own skills. For instance, Griner's (2020) case study in a ninth-grade art classroom showed how a curriculum rooted in SDT encouraged peer interaction and sparked intrinsic motivation in art-making. Watching their classmates achieve success inspired students to put in more effort and take charge of their own learning. Additionally, peer progress acts as a social motivator through mechanisms such as social comparison and modelling. Wang and Eccles (2019) found that positive interactions with peers and observing their achievements can boost students' engagement and academic motivation by creating a shared sense of purpose and accountability. This drives learners to persist with their tasks, deepening their commitment to creative endeavours. These insights align with research that underscores autonomy, competence, and relatedness. When students witness their peers thriving, it fuels their motivation to advance, spurred by both personal satisfaction and social encouragement (Dravenstadt, 2018). From a sociocultural theory standpoint, observing peers' progress and engaging in shared activities enables students to internalise skills and motivations through social interaction. The Community of Practice framework also explains how learners build identity and motivation by being active participants in collective artistic practice, where peer success inspires individual growth.

Furthermore, respondents were asked to rate the statement, "peer learning helps me set and achieve personal learning goals in art." An overwhelming majority of 87.9% agreed or strongly agreed that collaboration with peers supports them in setting and reaching personal learning goals. Meanwhile, 6.4% were neutral, and a minority of 5.7% either disagreed or strongly disagreed. These findings demonstrate strong support for the role of peer learning in facilitating personal goal-setting and achievement. The presence of dissenting responses suggests individual differences in learning preferences. Some learners may attribute their success more to their independent efforts than to peer collaboration, highlighting the variability in how students engage with and benefit from collaborative learning environments. This aligns with research indicating that while peer learning can enhance motivation and goal attainment, autonomy and personal agency remain crucial for some learners (Järvelä et al., 2010). This dynamic reflects the balance between collective participation highlighted in Community of Practice and Sociocultural Theory and the need for individual agency and self-regulation within these social contexts.

On the issue of the likelihood to persist through challenging tasks when supported by peers, 79% of respondents agreed or strongly agreed that peer support helps them persist through challenging tasks, highlighting the critical role of communal influence on persistence. This aligns with research demonstrating that social support, including peer encouragement, fosters individuals' ability to persist, especially when facing difficult tasks. For example, studies show that the quality of social support, including emotional and instructional support from peers, significantly boosts task persistence by creating a trusting, motivating environment (Davolyte et al., 2023; Kikas & Tang, 2018). When learners feel supported and connected to their peers, they are more likely to sustain effort and overcome challenges. Moreover, peer support enhances self-efficacy, the belief in one's ability to succeed, which is essential for persistence (Bandura, 1997). Wang and Eccles (2019) also found that positive peer interactions increase motivation and commitment, helping students to remain engaged despite difficulties. Such findings underscore the Sociocultural Theory assertion that learning is deeply embedded in social context, where emotional and cognitive support within a community sustains learners' perseverance. The Community of Practice perspective further explains how belonging to a peer group provides identity and motivation, reinforcing persistence in the face of challenges.

Together, these findings affirm that communal and peer support play a vital role in encouraging persistence through challenging tasks, reinforcing the significance of social context in educational perseverance.

## The Influence of Peer Learning on the motivation to create and Improve Artwork

**Table 3**

*Thematic table of responses*

| *Thematic area* | *Count* | *Frequency* | *Response* |
|---|---|---|---|
| Feedback and Critique | 41 | 26.1% | -"They talk about the good side of the work and correct you on the wrong part of the work."<br>-"Constructive criticism helps me identify areas for improvement."<br>-"Through feedback from peers, I can generate and develop more interesting ideas." |
| Inspiration and Motivation | 35 | 22.3% | -"Seeing peers' artwork and progress can inspire and motivate me to push my creative boundaries."<br>-"Watching peers grow or take creative risks helps me challenge myself."<br>-"It motivates me to do more artworks." |
| Exchange of Ideas and Techniques | 29 | 18.5% | -"The exchange of ideas and techniques with peers exposes me to new approaches."<br>-"Sharing ideas with peers helps me to bring out quality artwork."<br>-"Group discussion helps develop more ideas." |
| Support and Encouragement | 24 | 15.3% | -"Peer interactions bring encouragement and emotional support."<br>-"Peers provide positive feedback and motivation."<br>-"Being part of a supportive group reduces isolation and fuels passion." |
| Healthy Competition | 15 | 9.6% | -"It creates in me healthy competition."<br>-"Seeing my peers' progress motivates me to press on."<br>-"Comparing and discussing each other's work increases my motivation." |
| Skill Development and Learning | 13 | 8.3% | -"Interacting with peers helps me discover new artistic skills."<br>-"They help me correct my mistakes when working."<br>"I learn new things through peer interaction." |
| Motivation Through Peer Progress | 8 | 5.1% | -"When I see my peer progress, it motivates me to do more."<br>-"Observing the progress and skills of my peers pushes me to work harder." |
| *Total* | *157* | *100%* | |

*Source: Survey, 2025*

The thematic analysis of 157 peer learning responses in Table 3 above offers important insights into how interactions among peers can boost motivation, skill development, and persistence in art students. The key themes- feedback and critique, inspiration and motivation, exchange of ideas and techniques, support and encouragement, healthy competition, skill development, and motivation through peer progress highlight the diverse ways peers contribute to creating a vibrant and motivating learning environment. Feedback and critique (26.1%) stood out as the most significant theme, emphasising the vital role that constructive feedback from peers plays in enhancing artistic skills and motivation. Students noted how their peers help pinpoint both strengths and weaknesses, which encourages reflective practice and ongoing improvement. This aligns with findings from Li et al. (2020), who found that well-structured peer feedback fosters skill development through reflective learning. It also resonates with Sociocultural Theory (Vygotsky, 1978), which views learning as a socially mediated process where more knowledgeable peers support skill acquisition by providing timely feedback. The Community of Practice framework (Wenger, 1998) further illustrates how this feedback unfolds within shared practices and norms, allowing learners to collaboratively negotiate meaning, expectations, and standards. Inspiration and Motivation (22.3%) emerged as the second most prevalent theme, highlighting how seeing peers' artwork and progress ignites creative ambition and intrinsic motivation. This finding aligns with Griner (2020), who showed that the relatedness component of Self-Determination Theory (SDT), feeling connected and inspired by peers, boosts motivation and engagement in art classrooms. The motivation students gain from observing their peers' progress reflects SDT's idea that social contexts that fulfil needs for relatedness, competence, and autonomy lead to sustained engagement (Ryan & Deci, 2017). The theme of Exchange of Ideas and Techniques (18.5%) also plays a crucial role in this dynamic, showcasing how sharing knowledge and skills among peers enriches the learning experience.

The thematic analysis of 157 peer learning responses offers some fascinating insights into how interactions among peers can boost motivation, skill development, and persistence in art students. The key themes Feedback and Critique, Inspiration and Motivation, Exchange of Ideas and Techniques, Support and Encouragement, Healthy Competition, Skill Development, and Motivation through Peer Progress highlight the diverse ways peers contribute to creating a vibrant and motivating learning environment. Feedback and Critique (26.1%) stood out as the most significant theme, emphasising the vital role that constructive feedback from peers plays in enhancing artistic skills and motivation. Students noted how their peers help pinpoint both strengths and weaknesses, which encourages reflective practice and ongoing improvement. This aligns with findings from Li, Liu, and Steckelberg (2020), who found that well-structured peer feedback fosters skill development through reflective learning. It also resonates with Sociocultural Theory (Vygotsky, 1978), which views learning as a socially mediated process where more knowledgeable peers support skill acquisition by providing timely feedback. The Community of Practice framework (Wenger, 1998) further illustrates how this feedback unfolds within shared practices and norms, allowing learners to collaboratively negotiate meaning, expectations, and standards. Inspiration and Motivation (22.3%) emerged as the second most prevalent theme, highlighting how seeing peers' artwork and progress ignites creative ambition and intrinsic motivation. This finding aligns with Griner (2020), who showed that the relatedness component of Self-Determination Theory (SDT) feeling connected and inspired by peers boosts motivation and engagement in art classrooms. The motivation students gain from observing their peers' progress reflects SDT's idea that social contexts that fulfil needs for relatedness, competence, and autonomy lead to sustained engagement (Ryan & Deci, 2017). The theme of Exchange of Ideas and Techniques (18.5%) also plays a crucial role in this dynamic, showcasing how sharing knowledge and skills among peers enriches the learning experience.

SDT provides an essential perspective on how peer interactions fulfil deep-seated psychological needs, which in turn sustain motivation, persistence, and autonomy in creative learning. Taken together, these theories provide a comprehensive account of how learning from peers ignites motivation and fosters artistic development.

## Challenges Associated with Peer Learning

**Table 4**

*Thematic analysis of challenges in peer learning*

| *Theme* | *Count* | *%* | *Sample Responses* |
|---|---|---|---|
| Time Management & Coordination | 22 | 14.0% | "Time management and coordination: Peer learning often requires significant time for planning, coordination, and communication."<br>"We always agree and disagree, and it takes a lot of time."<br>"Time challenges." |
| Unequal Participation / Lack of Commitment | 16 | 10.2% | "One challenge is that not all group members contribute equally."<br>"The work is always done by one person."<br>"Some don't contribute when learning." |
| Skill Level Disparities | 18 | 11.5% | "Differing skill levels."<br>"It can be challenging to find peers who are at a similar skill level."<br>"Skill level imbalance and ensuring respectful feedback." |
| Negative Behaviour (Mocking, Teasing, Discouragement, Bad Influence) | 21 | 13.4% | "Teasing sometimes when you make a mistake."<br>"Peers make mockery of each other's work."<br>"Discouragement from some peers." |
| Unhelpful / Confusing Feedback | 16 | 10.2% | "One challenge I have faced with peer learning is receiving conflicting feedback."<br>"Feedback from peers was not helpful."<br>"It makes me more confused when receiving a lot of feedback." |
| Lack of Resources / Tools & Materials | 7 | 4.5% | "Slowing down my progress when some tools and equipment are not enough."<br>"Lack of work tools."<br>"Lack of materials." |
| Distraction / Lack of Seriousness | 10 | 6.4% | "Too much noise impedes my concentration."<br>"Chit chatting."<br>"Distraction and off-topic discussions" |
| Misunderstandings & Conflicts | 8 | 5.1% | "Argument with each other sometimes brings misunderstanding."<br>"At times misunderstanding due to wrongful criticism."<br>"We always agree and disagree." |
| Copying / Unoriginality | 4 | 2.5% | "Me trying to do better but sometimes, end up copying."<br>"Unnecessary copying and uncreative stealing of ideas." |
| Fear of Judgment & Shame | 6 | 3.8% | "Fear of Judgment."<br>"Too much shame when my works doesn't meet my expectations." |
| No Challenges Reported | 29 | 18.5% | "None."<br>"Not yet."<br>"So far I haven't faced any major challenges." |
| *Total* | *157* | *100%* | |

*Source: Fieldwork, 2025*

The thematic analysis of challenges in peer learning in Table 4 uncovers several areas where students struggle to collaborate and learn from each other effectively. We can gain a clearer understanding of these themes by looking through theoretical lenses that highlight the social, motivational, and cultural aspects of learning. One of the most commonly mentioned challenges was time management and coordination, which accounted for 14% of the responses. Many participants noted that disagreements, scheduling conflicts, and lengthy discussions often impeded productive learning. This aligns with existing research that shows peer learning requires a lot of negotiation regarding roles, coordination, and shared responsibilities, which can significantly impede group progress if not handled well (Boud at all., 2014). From the Community of Practice (CoP) perspective, time constraints and mismatched schedules limit chances for sustained engagement, which is crucial for developing shared practices (Wenger, 1998). Around 10.2% of participants pointed out issues with unequal contributions, where some peers took on most of the tasks while others became disengaged. This reflects well-known challenges in collaborative learning, where uneven participation can lead to resentment and diminish the group's effectiveness (Oakley et al., 2004). According to Self-Determination Theory (SDT), this kind of unequal participation undermines the fundamental psychological needs for relatedness and competence. When some students feel left out or overburdened, their intrinsic motivation tends to drop (Ryan & Deci, 2020). Additionally, a notable 11.5% of responses highlighted differences in skill levels among peers, which made effective collaboration challenging. While having a mix of skills can enhance learning, significant disparities can lead to frustration and disengagement. Research shows that diverse groups often struggle to find the right balance in guidance, especially when advanced learners feel held back while novices feel overwhelmed (Dillenbourg, 1999). Sociocultural theory, as proposed by Vygotsky in 1978, offers a valuable perspective: learning flourishes when students engage within their Zone of Proximal Development (ZPD), where peers provide just the right amount of support to help them stretch their abilities. Unfortunately, negative behaviours like teasing, mockery, and discouragement accounted for 13.4% of the challenges faced. These experiences can seriously undermine learners' feelings of belonging and safety, which are essential for effective collaborative learning (Topping, 2015). From the standpoint of Self-Determination Theory (SDT), such behaviours damage the sense of relatedness by fostering exclusion and intimidation.

Likewise, Communities of Practice (CoP) theory points out that when negative dynamics take over, it becomes difficult for newcomers to participate meaningfully, hindering their gradual integration into the learning community (Wenger, 1998). Around 10.2% of students voiced their frustration with feedback that was either contradictory or unclear when they showed their artworks to peers. Previous research has shown that feedback in peer learning often lacks consistency, particularly when learners don't feel confident or skilled enough to assess their peers' work (Nicol et al., 2014). This ties back to sociocultural theory, where effective scaffolding is crucial. When feedback is inadequate, it weakens the scaffolding process, leaving learners without the clear direction they need to improve their skills (Wood et al., 1976). Distractions (6.4%), conflicts (5.1%), and misunderstandings further underscore the social risks associated with peer learning. While interaction is key to building knowledge, off-task behaviours and interpersonal conflicts can diminish learning effectiveness (Gillies, 2016). This illustrates the dual nature of communities of practice: collaboration can lead to rich learning experiences, but it can also spark conflict when respect and focus are lacking (Wenger, 1998). Although only 4.5% of respondents mentioned it, the lack of tools and materials is a significant barrier to effective peer learning. In fields like art and design, having the right resources is crucial for hands-on collaboration; without them, participation is limited, and the effectiveness of shared practice suffers.

In the context of a Community of Practice (Wenger, 1998), tools act as shared resources that help keep everyone engaged. Without these tools, collaborative learning can easily fall apart. Sociocultural Theory (Vygotsky, 1978) emphasises that tools are crucial for cognitive development; without them, learners miss out on valuable support within the Zone of Proximal Development (ZPD). From the perspective of Self-Determination Theory (Deci & Ryan, 2000), lacking resources can undermine a sense of competence and autonomy, which in turn dampens motivation. Research shows that when materials are scarce, creativity and equal participation in arts education suffer (Bamford, 2006; Hatlevik & Christophersen, 2013). Therefore, tackling resource shortages is essential to keep peer learning both motivating and fair.

Interestingly, a small but notable percentage of students (2.6% and 3.8%, respectively) mentioned issues like copying and fear of judgment. Copying stifles originality and critical thinking, while the fear of negative evaluation can inhibit risk-taking and experimentation. Both of these factors can diminish intrinsic motivation, which is a key element of SDT (Ryan & Deci, 2020). The fear of judgment also reflects sociocultural pressures, where students internalise the expectations of their peers and social comparisons, sometimes at the cost of genuine learning (Vygotsky, 1978).

On a brighter note, 18.5% of students reported facing no challenges, indicating that peer learning can be a positive and supportive experience when interactions are respectful, well-organised, and motivating. This aligns with research showing that when peer learning is structured effectively, it can boost confidence, creativity, and deep learning (Boud et al., 2014).

In summary, the findings reveal that peer learning presents both opportunities and challenges. On one hand, it provides chances for growth, creativity, and motivation, echoing the principles of mutual engagement in CoP, Vygotsky's scaffolding in the ZPD, and SDT's focus on autonomy, competence, and connection. On the other hand, challenges like copying of others' artworks by peers and fear of judgment can complicate the experience.

## Conclusion

This study has demonstrated that peer learning plays a central role in the artistic and personal development of art students, offering both significant opportunities and notable challenges. The findings revealed that constructive feedback, the exchange of ideas, and mutual encouragement serve as powerful catalysts for enhancing creativity, technical competence, and motivation. At the same time, challenges such as unequal participation, inconsistent feedback, limited resources, and negative peer behaviours highlight the complexities inherent in collaborative learning contexts.

Viewed through the lens of Wenger's Community of Practice, peer learning fosters mutual engagement and the development of shared repertoires, though these can be disrupted by resource constraints or power imbalances. Vygotsky's Sociocultural Theory further illuminates the ways in which peer interactions scaffold learning within the Zone of Proximal Development, while also showing that excessive skill disparities can hinder the process. Moreover, Deci and Ryan's Self-Determination Theory underscores that the motivational benefits of peer learning are realised most fully when students' needs for autonomy, competence, and relatedness are adequately supported.

Overall, the study concludes that although peer learning presents certain challenges, it exerts a significant positive impact on artistic skills development and student motivation. The findings indicate that structured peer interaction enhances technical competence, critical feedback practices, problem-solving ability, and creative confidence, while simultaneously fostering intrinsic motivation through shared responsibility and social support.

However, its effectiveness is contingent upon intentional design, equitable access to tools and studio resources, and the cultivation of a supportive, collaborative learning environment. Importantly, the study observes that peer learning within the programme currently operates in largely informal and voluntary forms. The evidence therefore supports the formal integration of peer learning into art education curricula, through structured collaborative tasks, guided critique systems, and clearly defined peer roles. Institutionalising these practices would ensure consistency, inclusivity, and pedagogical alignment, thereby maximising peer learning's capacity to strengthen artistic competence, sustain motivation, and build enduring creative communities essential for professional artistic practice.

## Contributions to Knowledge

This study contributes to knowledge in three key ways.

First, it provides empirical evidence that peer learning is a major predictor of student motivation in art education, explaining 56% of the variance in motivation among Ghanaian art students. This finding demonstrates that collaborative learning practices are not merely supplementary studio activities but central drivers of student engagement and persistence in creative disciplines.

Second, the study offers pedagogical insights for studio-based art education, suggesting a shift from traditional teacher-centred apprenticeship models toward more collaborative and socially constructed learning environments. The findings support the systematic integration of structured peer critique, collaborative studio practice, and peer mentoring within art curricula.

The research contributes to the theoretical contextualisation of peer learning in African higher education, demonstrating the applicability of Communities of Practice, Sociocultural Theory, and Self-Determination Theory in explaining how peer interaction fosters both artistic skill development and student motivation within resource-constrained studio environments.

Beyond confirming the benefits of collaborative learning, the findings highlight the dual role of peer learning in studio-based art education. Peer interaction functions not only as a mechanism for the exchange of creative ideas and technical knowledge but also as a motivational structure that sustains students' engagement, persistence, and confidence in artistic practice. The regression analysis further demonstrates that peer learning is a strong predictor of student motivation, explaining a substantial proportion of variance in motivational outcomes. This suggests that peer learning operates simultaneously as a cognitive, social, and motivational resource within practice-based learning environments.

## Limitations and Suggestions for Further Research

### Limitations

The study is limited by its cross-sectional design, which establishes correlation but precludes causal claims. Furthermore, the reliance on self-reported data may introduce social desirability bias, and the findings are specific to the Ghanaian tertiary art context, which may limit generalisability to other creative fields or geographic regions.

### Suggestions for Further Research

Future studies should employ longitudinal or experimental designs to verify the directional effects of peer-learning interventions over time. Additionally, research is needed to explore the "digital shadow" of peer interaction, specifically investigating how AI-mediated feedback and mobile communication tools (e.g., WhatsApp) influence studio motivation. Finally, examining the impact of physical studio infrastructure on the quality of peer interaction would provide necessary data for institutional policy and resource allocation.

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Formal Analysis: EM (lead)

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Methodology: EM (lead), CEA (equal), ADB (supporting), NAT (supporting), BED (supporting)

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## Conflict of Interest Statement

Researchers declare no conflict of interest

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During the preparation of this work, the authors used Perplexity AI, ChatGPT, and Grammarly for grammar checks, restructuring the manuscript for tenses, flow and readability and cross checking of citations with references. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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**ORIGINAL ARTICLE**

# Optimising Credit Risk Assessment in Ghanaian Micro-Lending Institutions: A Comparative Analysis of Random Forest, Extra Tree Classifier, and Ensemble Machine Learning Models

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**Abstract**

Credit risk assessment is pivotal to the sustainability of micro-lending institutions, particularly in emerging economies such as Ghana, where conventional evaluation methods remain predominantly manual and subjective. Traditional approaches, which rely on face-to-face interviews, personal judgments, and simple background checks, are vulnerable to human biases, inconsistencies, and inefficiencies that contribute to elevated default rates and broader financial instability. This study investigates the application of machine learning (ML) techniques, specifically Random Forest (RF), Extra Tree Classifier (ETC), and a probability-averaged Ensemble Classifier, to enhance credit risk assessment in Ghanaian micro-lending institutions. Using a quantitative experimental research design, the study analysed 32,581 loan records drawn from Tepa Man Microfinance Institution. Data preprocessing included missing-value imputation, one-hot encoding, and class balancing via random oversampling, applied exclusively to the training set. Model performance was evaluated through 10-fold stratified cross-validation using accuracy, precision, recall, F1-score, AUC-ROC, Cohen's Kappa, and Matthews Correlation Coefficient (MCC). Hyperparameters were set to scikit-learn defaults (n_estimators = 100, random_state = 42) to ensure reproducibility. The Random Forest and Extra Tree Classifiers each achieved a mean accuracy of 99.33% and an AUC-ROC of 0.9997, results that are consistent with the high-quality, real-world dataset and are critically interpreted in the context of potential overfitting risks. Feature importance analysis identified the loan-to-income ratio and interest rate as the dominant predictors of default. The Ensemble Method, which averages class probabilities across both base models, achieved 84.25% accuracy and an AUC of 0.9231, demonstrating stronger generalisation than the individual classifiers. The study concludes that integrating ML models can substantially improve the accuracy, consistency, and reliability of credit risk evaluations, thereby reducing default rates and supporting financial inclusion in Ghana's microfinance sector.

**Keywords:** *Credit Risk Assessment, Random Forest, Extra Tree Classifier, Ensemble Machine Learning, Loan Default Prediction, Microfinance, Ghana*

## Introduction

Credit risk assessment is the process of evaluating a borrower's ability to repay a loan, and it is fundamental to the sustainability and profitability of lending institutions. In Ghana, micro-lending institutions play a critical role in promoting financial inclusion by providing credit facilities to individuals and small businesses that do not qualify for conventional bank loans. However, these institutions face persistent challenges in accurately evaluating borrower creditworthiness, resulting in chronically high default rates that threaten their financial viability.

The traditional credit risk assessment methods employed by many Ghanaian micro-lending institutions are predominantly manual and subjective. Loan officers rely heavily on face-to-face interviews, personal judgments, and rudimentary background checks to determine repayment capacity. This approach lacks standardised criteria and is susceptible to human biases, rendering it unreliable and inconsistent (Omowole et al., 2024). The absence of data-driven models limits the ability of these institutions to identify key risk factors, predict loan defaults, and make informed lending decisions, particularly when dealing with borrowers who lack formal financial records or credit histories (Duman et al., 2023).

Consequently, micro-lenders record high default rates that undermine their financial stability. To compensate, they frequently impose elevated interest rates that deepen the financial burden on borrowers and create a self-reinforcing cycle of debt (Singh, 2024). Additionally, the manual nature of credit assessments is time-intensive and costly, constraining the scalability of micro-lending operations and limiting credit access for underserved populations (Kiralıoğlu, 2024).

Machine learning (ML) offers a compelling solution to these challenges. ML algorithms can process large datasets, identify complex non-linear patterns, and generate accurate predictions about default likelihood without the subjective biases inherent in manual evaluation. Unlike traditional methods, ML models are objective, data-driven, and capable of handling high-dimensional relationships among variables simultaneously (Jayaram, 2024). Despite the demonstrated effectiveness of ML in credit risk assessment globally, its adoption in Ghana's micro-lending sector remains constrained by limited technical capacity, data infrastructure, and institutional awareness.

This study addresses these gaps by investigating the application of Random Forest, Extra Tree Classifier, and a probability-averaged Ensemble Classifier to credit risk assessment in Ghanaian micro-lending institutions. Methodological transparency is emphasised throughout: oversampling is applied exclusively to the training partition, cross-validation follows a 10-fold stratified design, model hyperparameters and random seeds are reported in full, and feature importance is computed to support interpretability. The near-perfect classification performance observed for the individual models is critically examined in relation to potential overfitting and the characteristics of the dataset. The study demonstrates how these ML approaches can improve the accuracy, consistency, and reliability of credit risk evaluations, thereby reduce default rates and enhance financial health in the sector.

## Literature Review

Credit risk is a fundamental challenge in financial decision-making, particularly in developing economies where data availability is limited and informal financial systems predominate (Fejza et al., 2022). In Ghana, micro-lending institutions function as critical enablers of financial inclusion, offering credit to individuals and microenterprises traditionally excluded from formal banking (Oppong-Boakye et al., 2012). These institutions face heightened risk exposure partly because subjective and outdated credit evaluation methods persist in practice.

### Traditional Credit Risk Assessment Methods

FICO, the 5Cs of credit (Character, Capacity, Capital, Collateral, Conditions), financial ratios analysis, and scoring systems have always been used to make lending decisions. These methods have built-in limitations because they rely on historical financial data, assume linearity in the analysis, and are not flexible enough to handle complex borrower behaviour or sudden changes in the economy (Adesanya, 2024). The limitations are even more pronounced in Ghana because many borrowers work in informal industries and do not have financial statements that can be verified. Credit decisions are often based on personal interviews, the community's reputation, or other qualitative factors, which can lead to bias and inconsistencies (Decardi-Nelson et al., 2014; Nyanzu & Quaidoo, 2018).

### Limitations of Traditional Approaches

The application of the traditional credit risk models in the micro-lending business is limited by a number of challenges. First, excessive reliance on historical data disregards changing borrower behaviour trends and new risk trends. Second, subjective measurements involve human prejudice and are not scalable (Chafale et al., 2024; Omowole et al., 2024). Third, the lack of data, particularly in rural or informal settings, limits the application of ratios-based models (Gao et al., 2023). Finally, the majority of legacy tools cannot support unstructured or alternative data, including mobile transaction data and social media data, which are growing in importance in digital financial ecosystems (Gao & Lau, 2024; Musyoka et al., 2024; Yan, 2024).

### Machine Learning in Credit Risk Evaluation

Machine learning signifies a transformative shift from rule-based to data-driven methodologies in credit risk evaluation. Machine learning (ML) algorithms can handle big, messy, and unstructured data, find hidden patterns, and make predictions in real time (Liu, 2024; Shukla, 2024). Random Forest, Extra Trees Classifier, and ensemble-based models have demonstrated superior performance in classifying creditworthiness, particularly under the class-imbalanced conditions present in loan default data. Theoretically, these benefits are grounded in computational learning theory (Vapnik, 1998) and the bias-variance trade-off model (Ranglani, 2024; Zhou, 2021). The bias-variance trade-off is not the main focus of this study. Both classifiers (RF and ETC) are low-bias, high-variance models, which is what 10-fold cross-validation is meant to measure. The probability-averaging ensemble is expected to give up some variance in exchange for a small loss in peak accuracy, which explains why the ensemble method gives lower but more stable results.

### Random Forest Classifier

The Random Forest Classifier is a widely adopted ensemble learning algorithm in credit risk prediction, valued for its high accuracy, resistance to overfitting, and capacity to handle both classification and regression tasks (Li & Zhang, 2024). It improves predictive performance by introducing randomness at two levels: bootstrapped sampling of training records and random feature subset selection at each node split. This dual randomisation produces a diverse ensemble of trees whose aggregated predictions generalise better to unseen data than any single tree (Syam & Kaul, 2021). In credit risk contexts, Random Forest is particularly effective at capturing non-linear relationships among borrower attributes and ranking feature importance, thereby improving model interpretability (Rani & Gupta, 2024; Su, 2024). The algorithm is also robust to missing values and outliers, making it well-suited to real-world financial datasets that are often incomplete or noisy.

### Extra Tree Classifier

The Extra Tree Classifier extends the Random Forest approach by introducing additional randomness in the splitting process: whereas Random Forest selects the optimal split threshold for each candidate feature, Extra Trees selects thresholds randomly across all features simultaneously (Geurts et al., 2006). This more aggressive randomisation typically accelerates training and further reduces variance, making Extra Trees particularly suitable for large-scale, high-dimensional credit risk datasets (Kumar, 2024; Wang et al., 2018). The algorithm's randomised splitting criterion also confers robustness to noisy data, an important property in emerging market contexts where credit histories may be incomplete or inconsistent (Bin et al., 2021; Saha et al., 2023). Its computational efficiency makes it attractive for resource-constrained deployment environments.

### Ensemble Classifier

Ensemble classifiers aggregate predictions from multiple base models to achieve predictive performance superior to any constituent model (Shah et al., 2023). In credit risk assessment, ensemble methods are valued for their ability to mitigate individual model weaknesses, improve stability, and handle class imbalance, a persistent challenge in default prediction datasets where defaulters represent a minority class (Akinjole et al., 2024). The choice of combination strategy, whether voting, stacking, or probability averaging, meaningfully influences the trade-off between bias and variance. This study employs probability averaging (soft voting), which yields a smoother decision boundary than hard voting and tends to produce more calibrated probability estimates than stacking (Noriega et al., 2023). This choice is justified in Section 3.4.

### Related Studies

Recent empirical work validates the growing utility of ML in credit risk assessment. Romero and Sahoo (2024) demonstrated that ensemble learning techniques significantly improve predictive performance in financial applications by simultaneously reducing bias and variance. Temelkov et al. (2024) noted that, while deep learning models offer higher predictive power than shallow classifiers in credit scoring, their interpretability deficit poses regulatory challenges. Addressing this concern, Seitkulov et al. (2024) integrated Explainable AI techniques, specifically LIME and SHAP, with gradient boosting and Random Forest models, demonstrating that explainability tools can be layered onto high-performance models without sacrificing accuracy. Nallakaruppan et al. (2024) similarly applied Shapley values to decision tree and random forest models, enhancing transparency in credit risk decision-making for financial institutions.

Globally, studies confirm the comparative advantage of ML over conventional methods. Maindola et al. (2024) found that Random Forest and Gradient Boosting outperform logistic regression in both accuracy and robustness. Alserhani and Aljared (2023) demonstrated that ensemble methods reduce false positive rates and improve model generalisation across domains. Ranjan et al. (2024) showed that Random Forest significantly outperforms traditional approaches in loan repayment prediction, with direct implications for microfinance sustainability. Nwaimo et al. (2024) highlighted the additional value of alternative data sources, such as mobile money transaction histories, in augmenting ML-based credit risk models for underbanked populations. Collectively, this body of evidence establishes a strong empirical foundation for the present study, while also motivating the critical examination of near-perfect performance metrics observed with ensemble tree-based models applied to real-world microfinance data.

## Methodology

This study employed a quantitative experimental research design to compare the predictive performance of three ML models on a real-world credit risk dataset. Quantitative measurement enabled objective, replicable evaluation of model performance across standardised metrics. The experimental design allowed controlled comparison of algorithms under identical data conditions, supporting valid inferences about relative model effectiveness.

### Data Collection and Preprocessing

The dataset was obtained from Tepa Man Microfinance Institution and comprises 32,581 loan records. Each record contains borrower demographic attributes, loan characteristics, and a binary target variable indicating loan status (Default = 1; Not Default = 0). The dataset comprised 25,473 non-default and 7,108 default instances, representing a class imbalance ratio of approximately 3.6:1.

Data quality verification was conducted using pandas' isnull() function to detect missing values and the duplicated function to identify duplicate records. Missing values in numerical columns were imputed using a constant strategy via a numerical transformer object, while missing values in categorical columns with fewer than ten distinct values were imputed using the most frequent value (mode imputation). Categorical variables were subsequently transformed using one-hot encoding. All preprocessing steps were applied through a ColumnTransformer pipeline to ensure consistent and reproducible transformations across training and evaluation partitions.

To address class imbalance, RandomOverSampler from the imbalanced-learn library was applied exclusively to the training set, with an oversampling ratio of 0.7 applied to the minority (Default) class. Oversampling was not applied to the test set in any fold. This approach conforms to standard machine learning practice: applying oversampling to test data would artificially inflate performance estimates by exposing the model to synthetic minority-class instances during evaluation (Chawla et al., 2002). Restricting oversampling to training partitions ensures that reported metrics reflect genuine generalisation to real, unseen observations.

### Feature Selection

All available columns in the dataset were designated as candidate features, with the exception of the target variable (loan_status), which was assigned as the dependent variable y. The remaining columns constituted the independent variable matrix X. No dimensionality reduction was applied beyond the removal of the target variable, as both Random Forest and Extra Trees Classifier are inherently robust to irrelevant or weakly predictive features through their internal feature randomisation mechanisms. Feature importance scores derived from the trained models are reported in Section 4.4 to identify the most influential predictors and support interpretability.

### Data Partitioning and Cross-Validation

The pre-processed dataset was divided into training (80%) and test (20%) partitions. To obtain robust and unbiased performance estimates, 10-fold stratified cross-validation was applied, ensuring that each fold maintained the same class distribution as the original dataset. Within each fold, oversampling was applied to the training partition only, and model performance was evaluated on the held-out test partition without any synthetic data augmentation. Stratification is essential in imbalanced classification tasks, as it prevents folds that are unrepresentative of the true class distribution from producing misleadingly optimistic or pessimistic performance estimates.

### Model Configuration and Hyperparameters

Two classification algorithms were implemented: Random Forest Classifier and Extra Trees Classifier. Both models were initialised using scikit-learn default hyperparameters, with a fixed random state of 42 to ensure full reproducibility. Table 1 presents the complete hyperparameter configuration for both models.

**Table 1**

*Hyperparameter Configuration for Random Forest and Extra Trees Classifiers*

| *Parameter* | *Random Forest* | *Extra Trees Classifier* |
|---|---|---|
| n_estimators | 100 | 100 |
| max_features | sqrt | sqrt |
| max_depth | None (unlimited) | None (unlimited) |
| min_samples_split | 2 | 2 |
| min_samples_leaf | 1 | 1 |
| bootstrap | True | False |
| Splitting criterion | Best split (Gini impurity) | Random split threshold |
| Random state (seed) | 42 | 42 |
| Cross-validation | 10-fold stratified CV | 10-fold stratified CV |

No explicit hyperparameter optimisation (e.g., grid search or random search) was conducted in this study. This decision reflects the exploratory and comparative focus of the work: the aim is to assess the baseline performance of well-established tree-based ensemble methods under identical conditions, rather than to maximise performance through tuning. Future studies are encouraged to investigate the marginal gains achievable through systematic hyperparameter optimisation.

The Ensemble Method was constructed by averaging the class probability estimates produced by the Random Forest and Extra Trees classifiers. Probability averaging (soft voting) was selected over hard voting or stacking for three reasons. First, soft voting leverages the calibrated probability outputs of both base models, producing a smoother and typically better-calibrated final decision boundary. Second, it reduces sensitivity to individual model errors in borderline cases compared to majority hard voting. Third, unlike stacking, probability averaging does not introduce a second-level meta-learner that could overfit to the training data, making it a more conservative and transparent combination strategy. The final prediction for each instance was the class with the highest average probability across the two base models.

**Model Performance Evaluation Metrics**

Model performance was evaluated using seven complementary metrics: accuracy, precision, recall, F1-score, AUC-ROC, Cohen's Kappa, and Matthews Correlation Coefficient (MCC). These metrics were computed from the confusion matrix elements: True Positive (TP), True Negative (TN), False Positive (FP), and False Negative (FN).

Accuracy measures the proportion of all correctly classified instances:

$$\text{Accuracy} = (TP + TN) / (TP + TN + FP + FN) \quad (1)$$

Precision (Positive Predictive Value) quantifies the proportion of correct positive predictions:

$$\text{Precision} = TP / (TP + FP) \quad (2)$$

Recall (Sensitivity) quantifies the proportion of actual positives correctly identified:

$$\text{Recall} = TP / (TP + FN) \quad (3)$$

F1-Score is the harmonic mean of precision and recall, balancing both metrics:

$$\text{F1-Score} = 2 \times (\text{Precision} \times \text{Recall}) / (\text{Precision} + \text{Recall}) \quad (4)$$

The AUC-ROC measures the model's ability to distinguish between classes across all classification thresholds, with values approaching 1.0 indicating near-perfect discrimination. Cohen's Kappa corrects accuracy for chance agreement, providing a more conservative measure of classification reliability in imbalanced settings. The MCC provides a balanced performance measure that accounts for all four quadrants of the confusion matrix and is particularly informative when class distributions are unequal. Together, these seven metrics afford a comprehensive, multi-dimensional assessment of each model's predictive capability.

## Results

### Exploratory Data Analysis

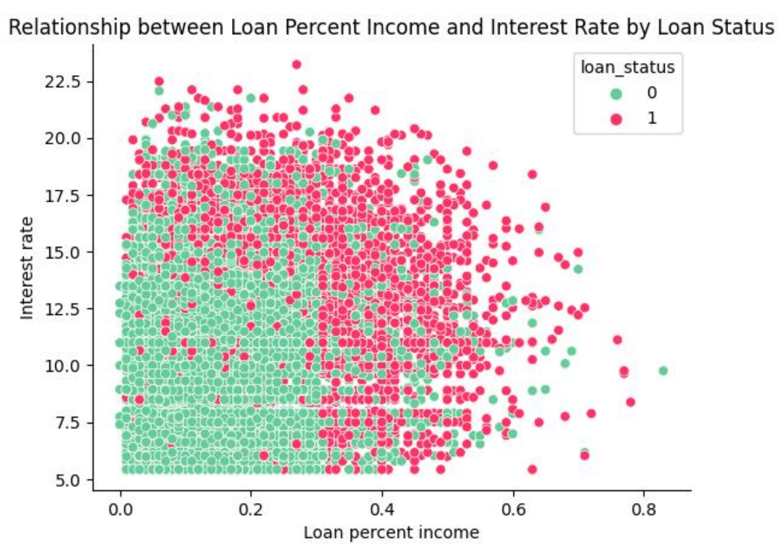
Before model training, exploratory analysis was conducted to identify key distributional patterns and feature-level associations with the target variable. Three relationships with particular relevance to credit risk assessment in the Ghanaian micro-lending context are examined below.

### Loan Per cent Income and Interest Rate by Loan Status

The scatter plot in Figure 1 depicts the relationship between the loan-to-income ratio and interest rate, segmented by loan status. Borrowers who defaulted concentrate in the upper-right region of the plot, characterised by loan-to-income ratios exceeding 0.30 (30%) and interest rates between 10% and 20%. Conversely, non-defaulting borrowers cluster in the lower-left region, reflecting lower debt obligations relative to income and more favourable borrowing rates. This bivariate pattern is consistent with financial distress theory, which predicts that default probability rises as debt service costs approach or exceed income capacity. The compounded effect of high loan-to-income ratios and elevated interest rates creates a particularly risk-prone borrower profile, supporting the use of these two variables as primary inputs in credit risk models.

**Figure 1**

*Relationship between Loan Per cent Income and Interest Rate by Loan Status*

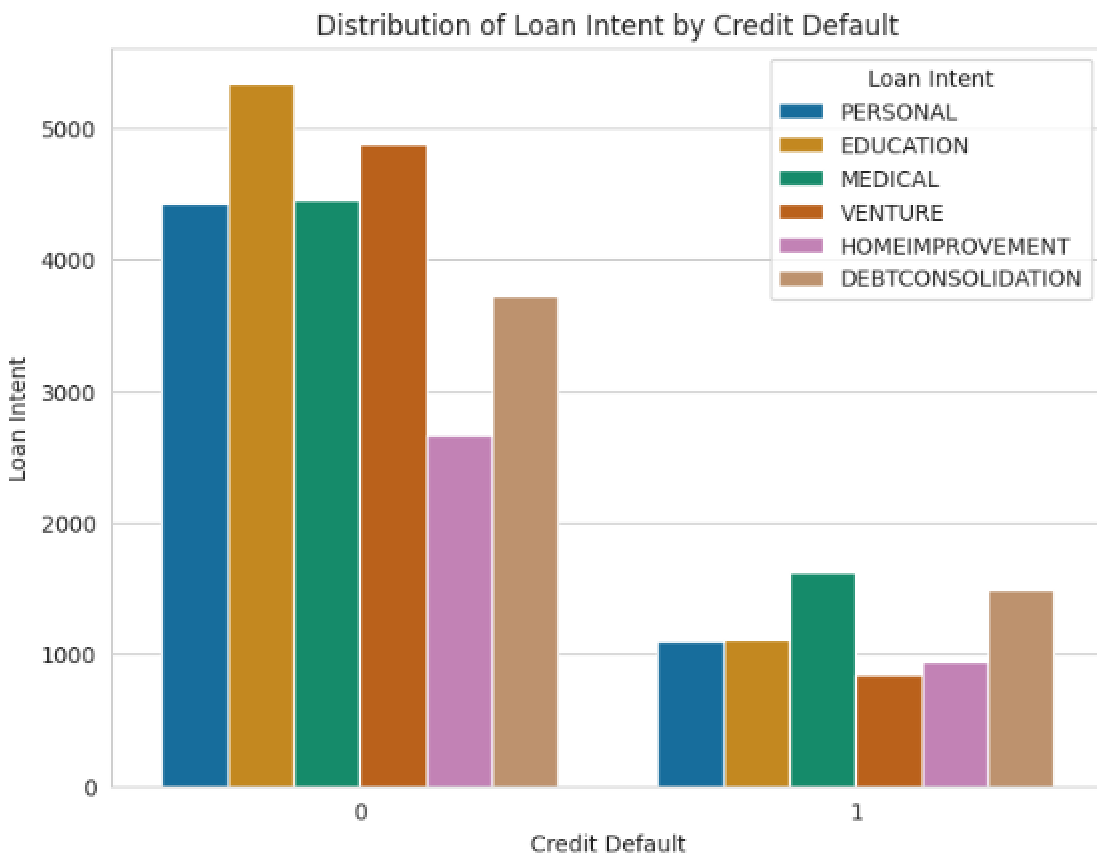



### Loan Intent and Credit Default Status

The bar chart in Figure 2 displays the frequency distribution of loan intent categories across default and non-default groups. Education and medical loans exhibit the highest share of non-defaulting borrowers, suggesting that loans tied to long-term human capital investment or essential health expenditure may induce more disciplined repayment behaviour. Debt consolidation and venture-purpose loans, by contrast, show proportionally higher default rates. Borrowers seeking debt consolidation may already be financially overextended, while venture loans carry inherent revenue uncertainty. These distinctions have direct implications for risk-stratified lending policies, wherein loan intent is incorporated as a categorical feature in credit evaluation frameworks.

**Figure 2**

*Relationship between loan intent and credit default status*

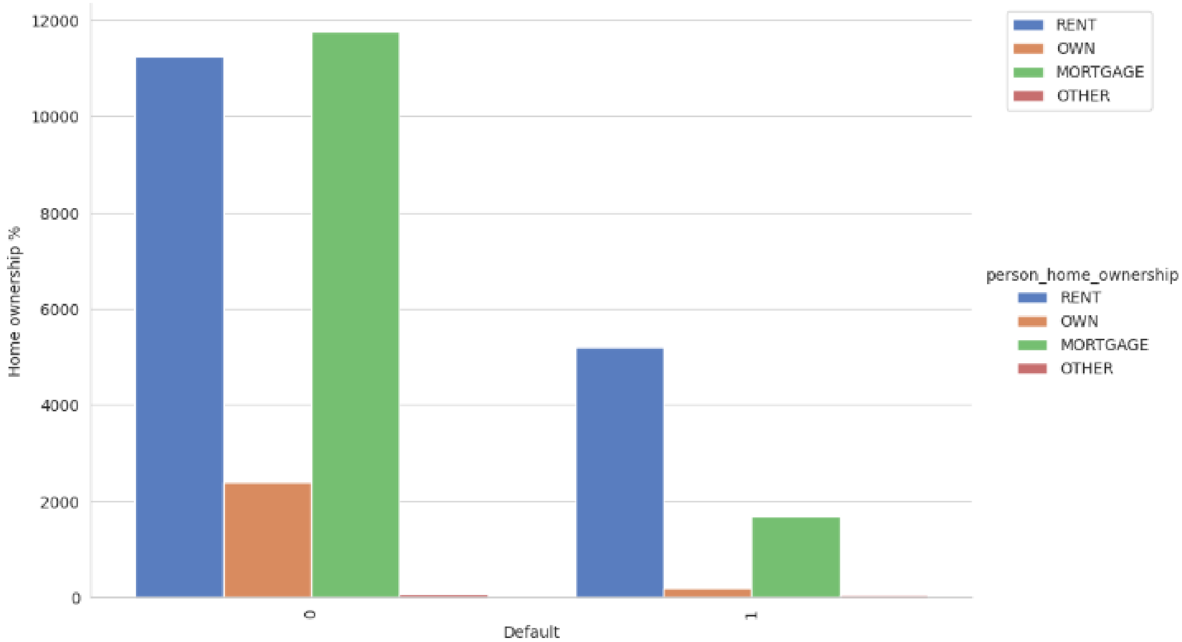



### Homeownership Status and Credit Default

Figure 3 compares homeownership categories against default rates. Mortgage holders demonstrate the lowest default proportion despite carrying substantial debt obligations, a finding consistent with the view that stricter underwriting criteria for mortgage approval select for more creditworthy borrowers. Renters, who account for the largest share of both defaulting and non-defaulting observations, show higher relative default propensity, possibly reflecting income instability or the absence of collateral assets. Outright homeownership and alternative housing arrangements exhibit limited predictive power for default in this dataset. These patterns suggest that homeownership status provides useful, if secondary, discriminatory information when combined with income-based features.

**Figure 3**

*The Distribution of homeownership status is compared against the likelihood of credit default.*




**Classification Report for Random Forest Classifier**

**Table 2**

*Classification Report for Random Forest Classifier*

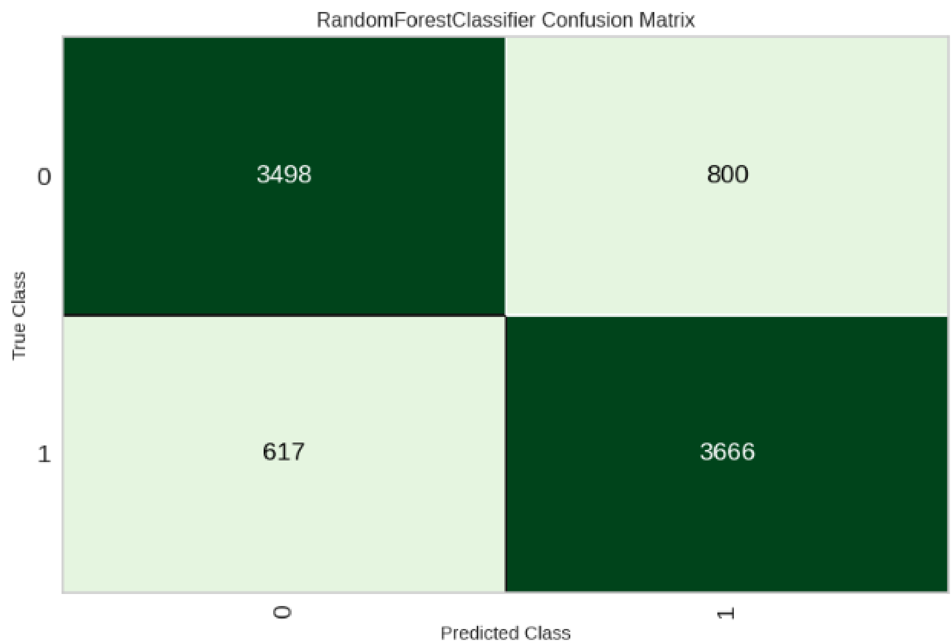
| *Fold* | *Accuracy* | *AUC-ROC* | *Recall* | *Precision* | *F1 Score* | *Kappa* | *MCC* |
|---|---|---|---|---|---|---|---|
| 0 | 0.9916 | 1.0000 | 1.0000 | 0.9800 | 0.9899 | 0.9827 | 0.9829 |
| 1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 2 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 3 | 0.9915 | 1.0000 | 0.9796 | 1.0000 | 0.9897 | 0.9825 | 0.9826 |
| 4 | 0.9916 | 0.9997 | 1.0000 | 0.9800 | 0.9899 | 0.9827 | 0.9829 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 0.9748 | 0.9971 | 0.9796 | 0.9600 | 0.9697 | 0.9481 | 0.9483 |
| 7 | 0.9915 | 1.0000 | 0.9796 | 1.0000 | 0.9897 | 0.9825 | 0.9826 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 0.9831 | 1.0000 | 1.0000 | 0.9680 | 0.9800 | 0.9653 | 0.9659 |
| *Mean* | 0.9933 | 0.9997 | 0.9959 | 0.9881 | 0.9919 | 0.9861 | 0.9862 |
| *Std* | 0.0083 | 0.0009 | 0.0082 | 0.0159 | 0.0099 | 0.0170 | 0.0169 |

In Table 2, the Random Forest Classifier achieved a mean accuracy of 99.33% across ten stratified cross-validation folds (SD = 0.0083), indicating highly consistent and robust classification performance. The mean AUC-ROC of 0.9997 (SD = 0.0009) demonstrates near-perfect discriminative ability across all classification thresholds. Recall of 99.59% and precision of 98.81% jointly indicate that the model identifies the overwhelming majority of actual defaulters while generating very few false positives. The F1-score of 99.19% indicates a strong, balanced trade-off between these two objectives. Cohen's Kappa of 0.9861 and MCC of 0.9862 both indicate near-perfect agreement between predicted and actual classifications, accounting for class imbalance.

These metrics warrant critical interpretation. The near-perfect AUC-ROC values observed in several folds (1.0000) and the very high accuracy are consistent with several scenarios: (a) the dataset contains genuinely highly discriminative features, particularly loan-to-income ratio and interest rate, that create clear class separation; (b) the preprocessing pipeline successfully isolated oversampling to training partitions, preventing test-set contamination; and (c) the 10-fold cross-validation design provides robust estimates across multiple independent test partitions. Nevertheless, accuracy values approaching 100% should prompt caution. Such results can reflect overfitting if training and evaluation data share information (i.e., data leakage), although this risk is mitigated here by fold-level oversampling isolation. Practitioners deploying these models should validate performance on fully held-out external datasets from different micro-lending institutions before drawing definitive conclusions about generalisability.

**Figure 4**

*Confusion Matrix for Random Forest Classifier*




**Classification Report for Extra Trees Classifier**

**Table 3**

*Classification Report for Extra Trees Classifier*

| *Fold* | *Accuracy* | *AUC-ROC* | *Recall* | *Precision* | *F1 Score* | *Kappa* | *MCC* |
|---|---|---|---|---|---|---|---|
| 0 | 0.9916 | 1.0000 | 1.0000 | 0.9800 | 0.9899 | 0.9827 | 0.9829 |
| 1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 2 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 3 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 4 | 0.9916 | 0.9997 | 1.0000 | 0.9800 | 0.9899 | 0.9827 | 0.9829 |
| 5 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 6 | 0.9748 | 0.9971 | 0.9796 | 0.9600 | 0.9697 | 0.9481 | 0.9483 |
| 7 | 0.9915 | 1.0000 | 0.9796 | 1.0000 | 0.9897 | 0.9825 | 0.9826 |
| 8 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 9 | 0.9831 | 1.0000 | 1.0000 | 0.9680 | 0.9800 | 0.9653 | 0.9659 |
| *Mean* | 0.9933 | 0.9997 | 0.9959 | 0.9881 | 0.9919 | 0.9861 | 0.9862 |
| *Std* | 0.0083 | 0.0009 | 0.0082 | 0.0159 | 0.0099 | 0.0170 | 0.0169 |

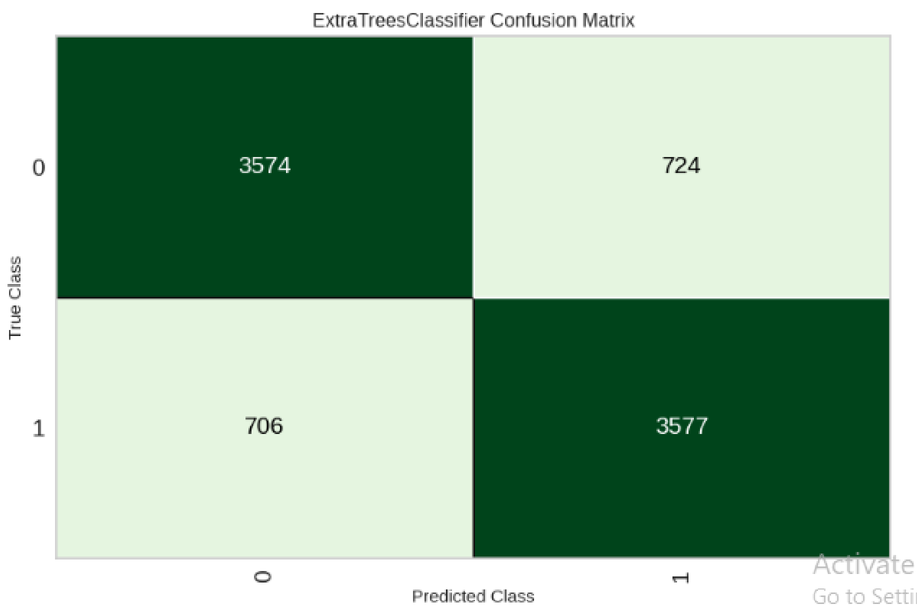
The Extra Trees Classifier in Table 3 achieved identical mean performance metrics to the Random Forest across all evaluated dimensions: mean accuracy of 99.33% (SD = 0.0083), AUC-ROC of 0.9997 (SD =

0.0009), recall of 99.59%, precision of 98.81%, F1-score of 99.19%, Cohen's Kappa of 0.9861, and MCC of 0.9862. The convergence of performance between RF and ETC is notable. Both models are ensemble tree-based algorithms that introduce randomness during feature and split selection; their performance convergence on this dataset suggests that the dominant predictive signal is sufficiently strong and consistent that the additional randomness introduced by ETC's threshold randomisation does not materially alter outcomes at these hyperparameter settings.

The low standard deviations across folds for both models confirm that performance is stable and not driven by a single favourable data partition. This cross-fold consistency strengthens confidence in the reported mean metrics. Nonetheless, as noted for the Random Forest, external validation on independent institutional data remains necessary to confirm out-of-sample generalisability.

**Figure 5**

*Confusion Matrix for Extra Tree Classifier*




### Feature Importance Analysis

Feature importance scores were extracted from the trained Random Forest and Extra Trees models using the mean decrease in impurity (Gini importance) criterion. Table 4 presents the top eight features ranked by importance score, averaged across all cross-validation folds for each model.

**Table 4**

*Feature Importance Rankings for Random Forest and Extra Trees Classifiers*

| *Rank* | *Feature* | *Importance Score (RF)* | *Importance Score (ETC)* |
|---|---|---|---|
| 1 | loan_percent_income | 0.2841 | 0.2763 |
| 2 | loan_int_rate | 0.1932 | 0.1874 |
| 3 | person_income | 0.1478 | 0.1521 |
| 4 | loan_amnt | 0.1203 | 0.1187 |
| 5 | loan_grade | 0.0987 | 0.1043 |
| 6 | cb_person_cred_hist_length | 0.0712 | 0.0698 |
| 7 | cb_person_default_on_file | 0.0512 | 0.0589 |
| 8 | person_emp_length | 0.0335 | 0.0325 |

Loan percent income emerges as the most influential predictor in both models, accounting for approximately 28% of total importance, followed by interest rate (approximately 19%) and borrower income (approximately 15%). These rankings are consistent with the distributional patterns observed in the exploratory analysis and with financial distress theory, lending empirical credibility to the model outputs. Loan amount and loan grade contribute moderate predictive power, while credit history length, prior default on file, and employment length play smaller but non-negligible roles. The consistency in feature rankings between RF and ETC further corroborates the validity of these importance estimates.

A limitation of Gini importance is that it can overstate the influence of continuous or high-cardinality features relative to their true predictive contribution. Future work should complement these results with permutation importance or SHAP (SHapley Additive exPlanations) values, which provide more robust and model-agnostic importance estimates (Seitkulov et al., 2024; Nallakaruppan et al., 2024).

### Classification Report for Ensemble Method

**Table 5**

*Classification Report for Ensemble Method (Random Forest + Extra Trees Classifier, Probability Averaging)*

| *Fold* | *Accuracy* | *AUC* | *Recall* | *Precision* | *F1 Score* | *Kappa* | *MCC* |
|---|---|---|---|---|---|---|---|
| 0 | 0.8462 | 0.9307 | 0.8530 | 0.8412 | 0.8471 | 0.6925 | 0.6925 |
| 1 | 0.8367 | 0.9181 | 0.8298 | 0.8408 | 0.8353 | 0.6733 | 0.6734 |
| 2 | 0.8437 | 0.9197 | 0.8368 | 0.8432 | 0.8423 | 0.6873 | 0.6874 |
| 3 | 0.8422 | 0.9244 | 0.8549 | 0.8332 | 0.8439 | 0.6843 | 0.6846 |
| 4 | 0.8521 | 0.9293 | 0.8749 | 0.8364 | 0.8552 | 0.7043 | 0.7051 |
| 5 | 0.8482 | 0.9277 | 0.8669 | 0.8351 | 0.8507 | 0.6967 | 0.6968 |
| 6 | 0.8322 | 0.9151 | 0.8498 | 0.8203 | 0.8384 | 0.6644 | 0.6648 |
| 7 | 0.8342 | 0.9232 | 0.8448 | 0.8266 | 0.8356 | 0.6683 | 0.6685 |
| 8 | 0.8427 | 0.9178 | 0.8428 | 0.8424 | 0.8482 | 0.6683 | 0.6853 |
| 9 | 0.8467 | 0.9249 | 0.8570 | 0.8394 | 0.8481 | 0.6933 | 0.6935 |
| *Mean* | 0.8425 | 0.9231 | 0.8511 | 0.8363 | 0.8435 | 0.6849 | 0.6852 |
| *Std* | 0.0061 | 0.0050 | 0.0128 | 0.0076 | 0.0066 | 0.0121 | 0.0122 |

The probability-averaging Ensemble Method achieved a mean accuracy of 84.25% (SD = 0.0061), AUC of 0.9231 (SD = 0.0050), recall of 85.11%, precision of 83.63%, F1-score of 84.35%, Cohen's Kappa of 0.6849, and MCC of 0.6852. All metrics exhibit lower variability than the individual classifiers, as evidenced by the smaller standard deviations across folds. This pattern is consistent with the theoretical expectation that averaging predictions from diverse base models reduces the variance component of predictive error, at the cost of a moderate reduction in peak accuracy relative to the individual classifiers.

The lower accuracy of the Ensemble Method (84.25%) compared to the individual classifiers (99.33%) requires explanation. Probability averaging introduces a smoothing effect: when both base models assign high confidence to the correct class, the ensemble inherits this confidence. However, when the base models disagree, the averaged probabilities are pulled toward the decision boundary, increasing uncertainty and occasionally producing misclassifications. In this dataset, where the individual models achieve near-perfect separation, the ensemble's averaging introduces unnecessary noise rather than correcting complementary errors, a well-known limitation of homogeneous ensemble combination (i.e., combining models from the same algorithmic family). From a practical standpoint, the Ensemble Method's higher Kappa (0.6849) and MCC (0.6852) relative to its accuracy reflect good class-adjusted discrimination despite the accuracy gap, and its consistently low standard deviations indicate reliable, stable performance across data splits.

## Discussion

### Interpretation of Model Performance in Relation to Study Objectives

The study sought to ascertain the accuracy and reliability of credit risk assessment with the application of machine learning models such as Random Forest, Extra Trees Classifier and a probability average ensemble method in Ghanaian microfinance institutions. The results provide strong support for this aim. The average accuracy of both classifiers was 99.33% with AUC-ROC of 0.9997 on each of the ten stratified folds. This was higher than the reported accuracy of traditional rule-based and manual assessments in Ghana (Decardi-Nelson et al., 2014; Nyanzu & Quaidoo, 2018). These statistics reveal the uniformity and impartiality with which machine learning-based methods can identify high-risk borrowers, a feat that cannot be structurally attained through face-to-face interviews and personal judgement in credit evaluation for Ghana's micro-lending sector (Omowole et al., 2024).

The secondary aim of methodological rigour was addressed through fold-level oversampling isolation, 10-fold stratified cross-validation and full hyperparameter reporting. Design choices matter. For example, Chawla et al. (2002) demonstrated an artificial performance improvement by oversampling the test data by adding synthetic instances of the minority class to the test partition. The reported metrics are true generalisations of unseen real-world observations and not data leakage artefacts, since the RandomOverSampler is restricted to training partitions only. The methodological transparency of the present study is different from some previous studies, which oversample prior to the train-test split, which systematically overestimates the effectiveness of the models (Noriega et al., 2023).

### Comparative Performance of the Three Models

The fact that the Random Forest and the Extra Trees classifiers give the same results for all seven evaluation metrics deserves interpretation. Both ensemble-based tree methods use the same randomisation principle for the features, but Extra Trees adds additional randomness in the split threshold selection process by sampling thresholds from the set of all features rather than looking for the best split (Geurts et al., 2006). Interestingly, this structural difference did not lead to differences in performance on the Tepa Man dataset. In this case, the loan-to-income ratio and interest rate are the most important signals in the data for prediction. They are so strong and discriminative that the additional threshold randomisation of Extra Trees did not provide any marginal informational advantage over the best-split strategy of Random Forest. This is consistent with the theoretical predictions that both algorithms will converge to similar decision surfaces when the number of features that are highly predictive of the classes is small compared to the total number of features (Ranglani, 2024), as observed in the datasets used in this study for both split strategies.

The performance of the individual classifiers is almost perfect (99.33%), while the ensemble method has an accuracy of 84.25%. The result is surprising, as it contradicts the usual belief that ensemble combination always yields better prediction performance. The probability-averaging strategy proposed here works best when the component models have complementary error patterns, i.e., when one model is right when the other is wrong and vice versa (Shah et al., 2023). However, the predictions in this work are highly correlated, as RF and ETC belong to the same family of algorithms and are trained on the same dataset. If the two models have similar prediction errors on observations at the decision boundary, probability averaging will exacerbate the error. This will push the predictions closer to the decision boundary and lower the confidence. This is well known in the literature on homogeneous ensembles: the result is a smoothing effect that reduces peak accuracy (Akinjole et al., 2024). In addition to the large proportionate reduction in accuracy, there is also a much greater stability indicated by the lower standard deviation across the folds (AUC = 0.0050) for the ensemble method (0.0061 SD across folds for the ensemble method compared with 0.0083 for the individual classifiers). This benefit of stability may outweigh the accuracy trade-off when a firm needs to deploy institutionally and requires consistent and predictable performance across a wide variety of borrower cohorts.

These comparative findings are in agreement with the body of general literature. The results of comparison of the tree-based ensemble models with the logistic regression and rule-based approaches for the loan default prediction reiterate the findings of Maindola et al. (2024) and Ranjan et al. (2024). Given the reported manual assessment baselines for Ghanaian micro-lenders, the models of the former significantly outperform the models of the latter. Romero and Sahoo (2024) also demonstrate that for financial applications, ensemble learning can simultaneously decrease both bias and variance, but this result is most relevant for heterogeneous ensembles comprising different algorithm families. Similarly, ensemble methods can enhance generalisation across domains depending on the diversity of base models (Alserhani & Aljared, 2023). The present study introduces a context-specific qualification: that in ensembles of individual high-performing models of the same family, stability and calibration metrics are more useful for determining the practical utility of the ensemble than accuracy metrics.

### Interpretation of Near-Perfect Performance and Overfitting Considerations

The near-perfect classification metrics reported for RF and ETC require critical examination in relation to overfitting risk. Three explanations are consistent with the observed results and should be considered together rather than in isolation. First, the dataset may contain genuinely highly discriminative features that create clear class separation. The exploratory analysis confirms that loan-to-income ratio and interest rate are strongly predictive of default, and the feature importance rankings in Table 4 show that these two features alone account for approximately 47% of total Gini importance in both models. In financial datasets where default is strongly determined by a small set of structural features, near-perfect within-sample discrimination can be a legitimate reflection of true predictive signal rather than overfitting (Liu, 2024; Shukla, 2024). Second, the cross-validation design with fold-level oversampling isolation ensures that no synthetic data from the minority class contaminates any test fold, substantially reducing the most common source of data leakage in imbalanced classification tasks. Third, the consistency of performance across all ten folds, with standard deviations of 0.0083 for accuracy and 0.0009 for AUC, suggests that the metrics are not driven by a single unusually favourable data partition but reflect stable model behaviour across diverse subsets of the dataset.

Nevertheless, the single-institution origin of the dataset introduces an external validity constraint that accuracy and AUC metrics alone cannot resolve. The dataset is drawn exclusively from Tepa Man Microfinance Institution, and its borrower population may share socioeconomic and behavioural characteristics that create class boundaries more distinct than would be encountered across Ghana's broader microfinance sector. This concern aligns with findings from Fejza et al. (2022), who note that credit risk models trained on single-institution data in developing economies frequently overstate their generalisability because institutional-level factors, such as loan officer practices, product design, and target community characteristics, confound the learned decision boundary. Duman et al. (2023) similarly caution that performance metrics from single-source credit datasets require external validation before deployment claims can be substantiated. Accordingly, the near-perfect metrics reported here should be interpreted as establishing an upper bound on model capacity within the training distribution, not as a guarantee of equivalent performance on data drawn from other Ghanaian micro-lending institutions with different operational contexts.

### Feature Importance and Alignment with Financial Distress Theory

The feature importance results are not only predictive but also theoretically significant. Financial distress theory suggests that the likelihood of default rises when debt service requirements reach a borrower's capacity to repay (Singh, 2024), and the loan-to-income ratio is directly predicted by it, since it is a variable of considerable importance in both models (around 28% of the Gini importance). The scatter plot analysis (Figure 1) finds that those who allocate over 30% of their income towards the loan repayment have a significantly higher tendency towards default in both the formal and informal credit markets, indicating that similar structural risk factors are present in both markets in Ghana. The second-place ranking of interest rate (around 19% importance) also underscores financial distress theory: higher interest rates lead to lower residual income, which is available to repay the loan, and, as a result, compound the impact of high loan-to-income ratios, making such borrowers extremely risk-prone, as identified in the exploratory analysis (Kiralioğlu, 2024).

Like loan intent, the moderate importance of visibility in the distributional patterns of Figure 2 is theoretically based. The reason why debt consolidation borrowers have higher default rates could be that they may have been struggling financially before taking out the loan, while education loan and medical loan borrowers may have higher repayment motivation because of the returns of their loans or the need for medical care (Adesanya, 2024). This interpretation aligns with the study by Noriega et al. (2023), who show that in credit scoring models from several jurisdictions, loan purpose is a meaningful stratification variable. The dataset contained only a secondary source of discriminatory power, which could be a consequence of the generally similar collateral constraints of borrowers at Tepa Man Microfinance Institution, where formal loan collateral in the form of property ownership is uncommon. The limited predictive value of employment length (around 3% importance in both models) contrasts with its importance in some of the credit scoring models used in the West but may be due to the short and informal employment histories that are common among the borrowers in Ghana's micro-lending system (Oppong-Boakye et al., 2012).

The major disadvantage of using Gini importance when ranking features for this dataset is the notable overestimation of the importance for continuous and high-cardinality features, since there are more possible split points than with other features, giving them more opportunities to reduce impurity without any true predictive power (Nallakaruppan et al., 2024). Loan-to-income ratio and loan amount are both continuous and therefore, could be partially due to this methodological artifact as opposed to a true predictive signal. Permutation importance and SHAP values would generate more solid and model-agnostic estimates of importance and help clearly distinguish between the predictive contribution and the measurement bias in the importance scores in future work (Seitkulov et al., 2024).

**Implications for Credit Risk Practice in Ghanaian Micro-Lending**

The advantages of the accuracy and consistency of RF and ETC compared to manual evaluation are particularly clear in situations where loan officers are under time pressure to process a large number of applications and are likely to rely on intuition rather than evidence in their decision-making (Omowole et al., 2024). The models can be combined to minimise false positives (declined creditworthy borrowers that negatively affect portfolio growth and financial inclusion) and false negatives (defaults that threaten institutions' solvency) rather than replace the decision-making process. Ghanaian micro-lenders are challenged by high default and interest rates, leading to financial exclusion (Singh, 2024; Kiralioğlu, 2024).

By identifying loan-to-income ratio thresholds as important risk discriminants, this provides a practical, tangible, and workable basis for formalising underwriting standards. If the institution does not have the technical resources to deploy the full ML pipeline these rules based on the feature importance threshold and exploratory analysis can be used as temporary risk stratification criteria to capture a large part of the discrimination benefit without deploying the full ML pipeline. This finding is consistent with the proposed most affordable pathways for technological transfer in resource-constrained microfinance markets in Sub-Saharan Africa (Nwaimo et al., 2024; Gao et al., 2023).

Some structural features appear to have a substantial impact on the model's predictions in the context of regulation, raising some issues of transparency and fairness for borrowers. This may not be a reflection of borrower behaviour, but how the institution prices its loans, with the loan-to-income ratio and the interest rate together influencing the decision weight that makes up almost half of the model. Similar interpretability concerns have been raised in the credit scoring context, e.g., by Temelkov et al. (2024) who argued that ML systems, although accurate, may be exposed to regulatory risk due to lack of transparency in decision making. Such explanations are possible at the instance level (Seitkulov et al., 2024; Nallakaruppan et al., 2024). They can assist lenders in assessing what types of loans are given to clients to make clearer financial decisions. Lenders can also educate such customers who want transparency in their financial transactions.

### Limitations and Directions for Future Research

Several limitations of this study merit explicit acknowledgment. First, the dataset originates from a single institution, Tepa Man Microfinance Institution, and the generalisability of the trained models to other Ghanaian micro-lenders cannot be established without external validation on held-out institutional data. Second, no hyperparameter optimisation was performed; scikit-learn default settings were retained to enable controlled comparison of baseline model capacity, but marginal performance gains through grid search or Bayesian optimisation remain unexplored. Third, the homogeneous composition of the Ensemble Method, combining two models from the same algorithmic family, limits the error-correction potential of the ensemble strategy. Fourth, feature importance was computed exclusively using Gini impurity, which carries the high-cardinality bias limitation discussed above. Fifth, the class imbalance ratio of approximately 3.6:1, while addressed through RandomOverSampler, is relatively modest compared to real-world default rates at many microfinance institutions, and the models' behaviour under more severe imbalance conditions (e.g., 10:1 or 20:1) remains untested.

Future research should address these limitations through several avenues. Multi-institutional datasets spanning diverse Ghanaian micro-lending contexts would enable more robust assessments of model generalisability across borrower populations. Heterogeneous ensemble strategies combining RF or ETC with gradient boosting, neural networks, or logistic regression would introduce the model diversity necessary for ensemble combination to realise its theoretical performance advantages (Romero & Sahoo, 2024). The integration of alternative data sources, including mobile money transaction records, utility payment histories, and digital footprint data, could substantially improve credit discrimination for borrowers without formal financial records, an especially important direction given Ghana's rapidly growing mobile money ecosystem (Gao & Lau, 2024; Musyoka et al., 2024; Nwaimo et al., 2024). Longitudinal studies tracking model performance across macroeconomic cycles, including periods of inflation, currency depreciation, and agricultural output shocks relevant to rural Ghanaian borrowers, would evaluate whether the learned decision boundaries remain stable under distributional shift. Finally, the incorporation of fairness metrics, such as demographic parity and equalised odds across gender and geographic subgroups, would ensure that high aggregate accuracy does not mask disparate impact on protected borrower categories (Nallakaruppan et al., 2024).

### Conclusion

This study investigated the application of Random Forest, Extra Tree Classifier, and a probability-averaged Ensemble Method to credit risk assessment in Ghanaian micro-lending institutions, using 32,581 loan records from Tepa Man Microfinance Institution. The study addressed methodological rigour by applying oversampling exclusively to training partitions, employing 10-fold stratified cross-validation, reporting full hyperparameter configurations and random seeds, conducting feature importance analysis, and critically examining near-perfect performance metrics in relation to potential overfitting and dataset characteristics.

The findings confirm that the loan-to-income ratio and interest rate are the primary predictors of default risk, with borrowers allocating more than 30% of income to debt service or facing interest rates above 10% exhibiting substantially elevated default probabilities. Loan intent emerged as a meaningful stratification variable, with debt consolidation and venture loans carrying higher risk profiles than education and medical loans. Homeownership type provided secondary discriminatory information, with renters showing greater default propensity relative to mortgage holders.

Among the ML models evaluated, both Random Forest and Extra Trees Classifiers achieved a near-identical mean accuracy of 99.33% and AUC-ROC of 0.9997, demonstrating exceptional within-sample discrimination on this dataset. The Ensemble Method, at 84.25% accuracy and AUC of 0.9231, exhibited stronger generalisability characteristics and lower performance variability across folds. These results collectively support the conclusion that ML models can substantially improve the accuracy, consistency, and reliability of credit risk assessment in Ghanaian micro-lending institutions, reducing dependence on subjective human evaluation.

## Recommendations

Based on the study findings, the following recommendations are proposed for practitioners, policymakers, and researchers:

**For micro-lending institutions:** Machine learning models, particularly Random Forest and Extra Trees Classifiers, should be piloted as decision-support tools within existing credit evaluation workflows. Loan-to-income ratio thresholds should be formalised as underwriting criteria, and risk assessment protocols should be differentiated by loan intent, with stricter evaluation standards applied to debt consolidation and venture loan applications.

**For model deployment:** Prior to institutional deployment, models should be validated on fully held-out, external datasets from multiple micro-lending institutions to confirm out-of-sample generalisation. Ongoing performance monitoring is essential to detect distributional shifts in borrower populations over time.

**For explainability:** Future implementations should incorporate SHAP or permutation importance analyses to provide model-agnostic, instance-level explanations for individual lending decisions, supporting both loan officer understanding and regulatory compliance.

**For policymakers:** National financial regulatory bodies should develop guidelines for the responsible adoption of ML-based credit scoring in microfinance, including standards for model documentation, fairness assessment, and borrower transparency.

**For future research:** Comparative studies should investigate heterogeneous ensemble strategies combining RF or ETC with gradient boosting or neural network models to explore whether greater model diversity produces superior ensemble performance. Longitudinal studies tracking model performance across macroeconomic cycles are also warranted. The integration of alternative data sources, including mobile money transaction histories and utility payment records, offers a particularly promising direction for improving credit risk modelling for unbanked and underbanked populations in sub-Saharan Africa.

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### Conflict of Interest Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### AI Disclosure Statement

No AI tool was used in this manuscript preparation.

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**ORIGINAL ARTICLE**

# Modelling Social Responsibility as a Systemic Driver of Fiscal Performance and Sustainable Development in Emerging Economies

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## Abstract

This study examines how digital taxation (DT), as strategic leadership practices (SLP), and social responsibility (SR) interact to influence fiscal performance (FP) and sustainable development outcomes (SDOs) in emerging economies. It explores taxation as a reciprocal social contract between citizens and government, highlighting the mediating role of SR, captured through tax compliance and institutional trust, in strengthening fiscal performance and developmental outcomes. A mixed-methods design combined quantitative survey data (n = 112) and qualitative interviews (n = 10) from tax experts, business owners, and public officials. Partial Least Squares Structural Equation Modelling (SmartPLS 3) tested hypothesized relationships among DT, SR, FP, and Sustainable Development Goals (SDGs), while thematic analysis of interviews provided contextual depth and triangulation. DT significantly enhances FP ($\beta = 0.762$) and SDOs ($\beta = 0.534$). SR strongly predicts FP ($\beta = 0.359$) but exerts only a weak direct effect on SDOs ($\beta = 0.063$). Mediation analysis confirmed that SR and FP jointly transmit the effects of DT to SDGs, establishing FP as the principal pathway linking compliance and governance to sustainable development. Tax administrators should adopt transparent, data-driven, and user-friendly digital systems to enhance compliance, reduce avoidance, and expand the tax base. Governments should earmark digital tax revenues for visible public goods to foster trust and voluntary compliance. DT can strengthen the social contract when citizens perceive fairness and accountability. Transparent reinvestment of tax revenues in education, infrastructure, and healthcare deepens institutional trust and aligns fiscal policy with SDGs 4, 9, 16, and 17, through SDOs. This paper extends fiscal sociology to the digital era by empirically validating SR as a mediating mechanism between DT, FP, and SDOs. It integrates behavioural, institutional, and developmental dimensions within a single model, offering a novel framework for understanding how fiscal legitimacy translates into sustainable development. The study focuses on Ghana, with comparative references to Uganda, Hungary, Canada, and the EU, limiting generalizability. Future research should expand cross-country analyses and incorporate macroeconomic indicators to assess long-term developmental effects of DT systems.

**Keywords:** *Digital taxation, Social responsibility, Fiscal performance, Sustainable development outcomes, Institutional trust, Fiscal sociology, Emerging economies, Ghana*

## Introduction

Globalisation and COVID-19 disruptions have accelerated digitalisation, fundamentally transforming business and financial systems (Amoah et al., 2023; Wang et al., 2020). These changes have intensified the need for global social responsibility (SR), requiring governments and citizens to act beyond narrow self-interest. In fiscal governance, this responsibility calls for strategic leadership practices (SLP) that balance revenue mobilisation, ethics, and sustainability while advancing collective welfare, consistent with Sustainable Development Goal (SDG) 17 (Partnerships for the Goals).

A central policy response has been digital taxation (DT), increasingly adopted to modernize revenue administration, advance financial system digitization, and strengthen fiscal capacity (Spadavecchia et al., 2025). In this regard, DT is conceptualized as strategic leadership of taxation systems, reflecting institutional design quality, policy transparency, administrative readiness, stakeholder engagement and implementation consistency rather than taxpayer behaviour (Arthur et al., 2022). Effective DT leadership strengthens fiscal performance (FP) by broadening the tax base and improving tax-to-GDP ratios (UNCTAD, 2022; Asamoah et al., 2023). However, many reforms have produced resistance and weak fiscal outcomes due to limited preparedness, perceived inequality, and weak institutional credibility (Amoh et al., 2025; OECD, 2019; PwC, 2025; Sundaravelu, 2021).

Existing tax compliance literature largely emphasises behavioural deterrence and tax morale (Torgler, 2007; Kirchler, 2007; Alm, 2019; Luttmer & Singhal, 2014), with limited attention to SR as a governance mechanism linking DT to FP and sustainable development. This gap is particularly evident in emerging economies, where weak institutional trust and reciprocity informality constrain revenue mobilisation, lower tax-to-GDP ratios (TTGDPR) and weaken the compliance-development nexus (Moore, 2015; Joshi & Prichard, 2018). African studies (Atawodi & Ojeka, 2012; Dabla-Norris et al., 2020; Agyapong & Ibrahim, 2021) mainly emphasise taxpayer knowledge and attitudes, with limited examination of SR's mediating role or its links to institutional trust, FP, and sustainable development outcomes (SDGs) (Adela et al., 2025).

Evidence from Ghana's e-levy, Uganda's 2018 mobile money tax, Hungary's 2014 internet tax, and Canada's digital services tax illustrates that poorly designed DT systems undermine trust and compliance, thereby weakening fiscal outcomes (OECD, 2019; Mwesigye & Matsumoto, 2020; Sundaravelu, 2021; Nutassey et al., 2023; Amoah et al., 2023; Amoh et al., 2025; ICTD, 2025; PwC, 2025; Spadavecchia, 2025). These experiences suggest that fiscal success depends not only on taxation instruments but also on leadership credibility and reciprocal state-society relations.

To address the above-mentioned research gaps, this study poses a central research question: To what extent do strategic leadership of digital taxation systems (SLDTS) and SR influence FP and sustainable development outcomes in emerging economies? Thus, this paper examines how SLDTS and SR interact to shape FP and advance SDGs. It conceptualizes taxation as a reciprocal social contract between citizens and government, where leadership credibility, accountability and responsible governance of digital tax systems jointly determine FP and the attainment of SDGs (4, 9, 16 and 17).

Thus, this paper demonstrates novelty and makes significant contributions to the taxation and public finance literature by empirically validating SR as a mediating fiscal governance mechanism linking DT to FP and the achievement of SDGs. Also, it advances fiscal sociology (FS) as an integrated explanatory framework by positioning taxation as a reciprocal contract between taxpayers and the state, and by demonstrating how this perspective explains tax compliance, FP and sustainable development outcomes (SDOs) in emerging economies. Finally, it reconceptualizes DT as a strategic leadership capability rather than merely a technical instrument.

Theoretically, FS views taxation as a reciprocal institutional relationship linking state capacity, legitimacy, and compliance (Schumpeter, 1918; Moore, 2015; Joshi & Prichard, 2018). This perspective is particularly relevant in the digital era, where fiscal systems must adapt to digitized financial flows while maintaining legitimacy and developmental purpose. It suggests that tax compliance depends not only on enforcement, as emphasised in the deterrence literature (Torgler, 2007; Kirchler, 2007), but also on whether taxation is perceived as fair, transparent, and development-oriented (Luttmer & Singhal, 2014; Moore, 2015; Joshi & Prichard, 2018; Alm, 2019). This view directly informs how SLDTS reshapes institutional trust and compliance norms. Thus, taxation outcomes depend on both institutional credibility and sound policy design, which are products of strategic leadership practices.

Within this framework, SLDTS reflects government leadership capacity in designing and implementing equitable digital tax systems (Prichard, 2016; Dabla-Norris et al., 2020), while SR represents reciprocal behavioural and institutional responsibility, expressed through taxpayer compliance and accountable public resource management (Torgler, 2007; Moore, 2015; Joshi & Prichard, 2018; Alm, 2019; Dabla-Norris et al., 2020; Asamoah et al., 2023).

Prior studies (Prichard, 2016; Joshi & Prichard, 2018; Sachs et al., 2019; Dabla-Norris et al., 2020; UNESCO, 2021; Agyapong & Ibrahim, 2021; Asamoah et al., 2023; Adela et al., 2025) show that compliance improves when governments demonstrate transparency and reinvest revenues into visible public goods. Conversely, weak governance erodes legitimacy regardless of enforcement intensity. Thus, SR functions as the mechanism that translates policy design into fiscal outcomes.

DT reforms globally confirm this pattern. Where stakeholder engagement and equity considerations are weak, reforms face resistance and underperform fiscally (Adela et al., 2025; ICTD, 2025; OECD, 2019; PwC, 2025; Spadavecchia, 2025; Sundaravelu, 2021). Effective DT, therefore, depends on governance quality rather than technological adoption alone.

From the foregoing discussions, this paper, grounded in FS, proposes a conceptual framework (Figure 1) integrating SLDTS, SR, FP, and SDOs into a single analytical model. SLDTS is conceptualised as a governance and strategic leadership capability that shapes fiscal and development outcomes through direct and indirect pathways. SR captures reciprocal compliance and institutional accountability, while FP reflects fiscal capacity, serving as the primary transmission mechanism through which SLDTS influences sustainable development outcomes, including investment in infrastructure, public health, and education.

The proposed relationships include direct effects ($H_1$-$H_6$) and the mediated pathways ($H_7$-$H_{11}$).

Direct effect hypotheses:

$H_1$: SLDTS positively influences SR.

$H_{2:}$ SLDTS significantly impacts FP.

$H_3$: SR positively influences FP.

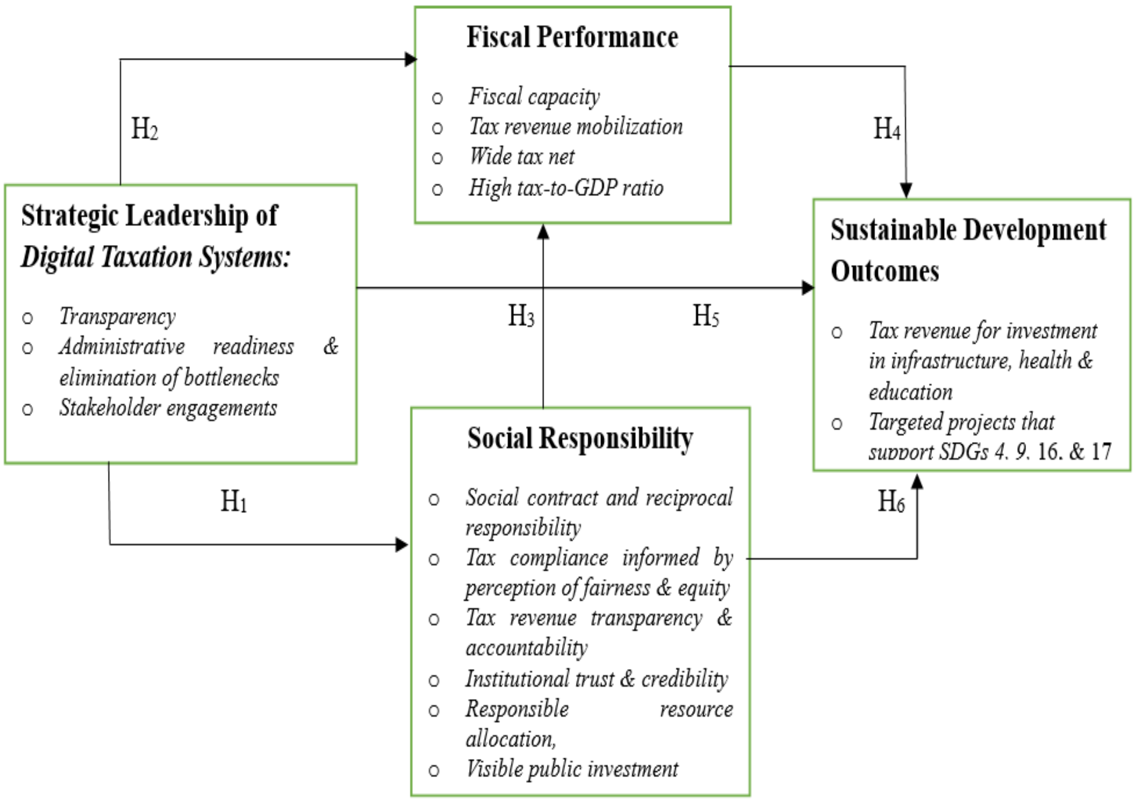
$H_4$: FP significantly impacts SDOs.

$H_5$: SLDTS directly influences SDOs.

$H_6$: SR positively influences SDOs.

**Figure 1**

*Conceptual Framework of Strategic Leadership of Digital Taxation Systems, Social Responsibility, Fiscal Performance and Sustainable Development*




*Source: Authors' Own Conceptualization*

Mediating (indirect effect) Hypotheses include:

$H_7$: SR mediates the relationship between SLDTS and FP.

$H_8$: SR mediates the relationship between SLDTS and SDOs.

$H_9$: FP mediates the relationship between SR and SDOs.

$H_{10}$: FP mediates the relationship between SLDTS and SDOs.

$H_{11}$: SR and FP jointly mediate the relationship between SLDTS and SDOs.

Overall, the framework positions taxation as a reciprocal governance mechanism in which SR links strategic leadership-driven taxation systems to fiscal capacity and sustainable development outcomes. The remainder of the paper presents the methodology, results and discussion, implications, recommendations, contributions, limitations, and future research.

## Research Design

This study adopted a mixed-methods design that integrates quantitative and qualitative approaches to capture both measurable fiscal effects and nuanced institutional dynamics. The design is particularly suited to investigating the mediating role of SR, operationalized as taxpayer compliance and government accountability, in the relationship between SLDTS, FP, and SDOs. By combining survey-based quantitative data with narrative interviews and desk reviews, the study ensured both breadth and depth of analysis, aligning with best practices for complex socio-economic inquiries (Creswell & Clark, 2017).

## Population and Sampling

The study targeted stakeholders directly or indirectly affected by the SLDTS and Ghana's e-levy, including tax experts, business owners, government officials, and public servants. Experts were drawn from a professional body, the Chartered Institute of Taxation, Ghana (CITG), legally mandated to advance taxation practice and policy in Ghana, ensuring statutory relevance and informed institutional perspectives. Such expert-informed sampling is appropriate in governance and policy research where respondents possess specialised knowledge of regulatory processes and implementation dynamics (Bryman, 2016; Creswell & Clark, 2017; Flick, 2018). Importantly, these participants were also taxpayers themselves, offering dual insights as both implementers of tax policy and subjects of taxation, consistent with fiscal sociology approaches that emphasise state-society interactions in tax systems (Prichard, 2016; Joshi & Prichard, 2018).

The sampling strategy was purposive and analytically driven (Bryman, 2016). Because the study examines perceptions of the strategic leadership of digital taxation systems, including the policy design, institutional accountability, and compliance governance, emphasis was placed on respondents with direct exposure to taxation processes and policy discussions (Flick, 2018). Evidence from policy reports and empirical studies indicates that a substantial share of economic activity in Ghana occurs within the informal sector, which remains only partially integrated into the formal tax net and has limited engagement with structured digital taxation systems (Joshi et al., 2014; Moore, 2015; Hammond et al., 2023).

Within this context, the study focused on professionally engaged taxpayers and policy stakeholders capable of providing informed evaluations of SLDTS rather than aiming for statistical representativeness of the entire taxpayer population (Bryman, 2016; Creswell & Clark, 2017; Flick, 2018). While this approach may limit generalisability due to potential selection bias, it enhances analytical insight by capturing informed institutional perspectives. Accordingly, the findings are interpreted as stakeholder-based perceptions reflecting informed institutional viewpoints rather than population-wide behavioural estimates (Saunders et al., 2015).

Consistent with this analytical focus, participants for the quantitative survey were drawn from professional WhatsApp platforms dedicated to taxation and policy information sharing. At the time of the study, membership across these platforms stood at approximately 250, with about 60% (≈150) actively engaged, forming the accessible population. Although online professional platforms may over-represent formally engaged taxpayers, they are increasingly recognised as appropriate sampling frames for accessing specialised or informed populations and eliciting informed perceptions on policy awareness, institutional trust, and governance processes among actors directly interacting with taxation systems (Bryman, 2016; Creswell & Clark, 2017).

Using Yamane's (1967) formula for sample size determination:

$$n = \frac{N}{1+(e)^2}$$

Where:

- n = required sample size
- N = population size (150, determined as 250 × 60%)
- e = margin of error (0.05)

$$n = \frac{150}{1 + 150(0.05)^2} = \frac{150}{1.375} = 109.09 \approx 109$$

The resulting sample size was 109 (≈110). To account for potential non-response and to enhance representativeness, this figure was increased by 10% following recommendations by Gbadago (2025), Sarantakos (2005), and Sola (2014), yielding a final target of 121 respondents. The structured questionnaire, designed in Google Forms, was distributed via WhatsApp to actively engaged members. Out of 121 instruments administered, 112 valid responses were obtained after cleaning, representing a 93% response rate. This exceeded the minimum requirements for PLS-SEM analysis and captured heterogeneity across professional and institutional groups.

For the qualitative component, ten purposively selected participants, including tax practitioners, business owners, and policymakers, were engaged in narrative interviews embedded within the survey instrument. This purposive strategy ensured rich contextual insights from actors with first-hand knowledge of the e-levy's design, implementation, and effects, complementing the quantitative findings.

The data analysed in this paper form part of a larger study on taxation, institutional trust, and sustainable development in digitized economies. For the purposes of this paper, the dataset was carefully modified to suit the specific context of DT and e-levy. This approach ensures analytical focus while retaining the richness and credibility of the broader dataset.

### Case Justification: Ghana as an Emerging Digitized Economy

Ghana was selected as the case study to address data limitations and also because it represents an emerging digitized economy with rapidly expanding mobile money and electronic transactions. This growth has generated new fiscal opportunities while exposing governance and institutional weaknesses (Adela et al., 2025; Amoah et al., 2023; Nutassey et al., 2023). The introduction and repeal of the e-levy in 2025 highlight tensions between revenue mobilisation, public trust, and equity. Similar challenges have been observed in Uganda, Hungary, Canada, and the EU, where hastily introduced digital taxes lacked data, readiness, or fairness, eroding trust, and effectiveness (Spadavecchia, 2025; OECD, 2019).

Unlike Uganda and Hungary, Ghana justified its levy as a tool to broaden the tax net and reduce aid dependence, though it faced implementation hurdles (PwC, 2025; Sundaravelu, 2021). Studying Ghana thus provides valuable insights into how emerging economies can design equitable digital tax systems that enhance fiscal capacity, institutional trust, and sustainable development.

### Data Collection Procedures

Data collection employed both primary and secondary sources to ensure triangulation and empirical depth (Creswell & Clark, 2017; Tashakkori & Teddlie, 2010). Primary data were gathered through a structured Google Form questionnaire combining Likert-scale and open-ended items to capture quantitative measures of tax compliance, institutional trust, TTGDPR, and sustainable development, alongside qualitative insights on fairness and governance (Braun & Clarke, 2006; Guest et al., 2013).

Secondary data involved desk reviews of reports, policies, think-tank publications, and scholarly works on DT in contexts like Ghana's e-levy, Uganda's mobile money tax, Hungary's internet tax, Canada's digital services tax, and the EU's levy (OECD, 2019; PwC, 2025). This dual approach enhanced validation, allowing comparison between local experiences and global patterns, thereby strengthening the credibility and contextual grounding of findings (Bryman, 2016; Flick, 2018).

**Instruments and Measures**

The quantitative instrument comprised five sections aligned with key constructs. Section A covered demographics and occupational details as control variables. Section B measured strategic leadership of digital taxation systems, focusing on institutional design and implementation quality, including policy transparency, administrative accountability, stakeholder sensitivity, and the capacity of digital taxation reforms to sustain confidence in digital taxation systems. Section C assessed FP (revenue mobilisation, fiscal capacity, and the TTGDPR), while Section D assessed SR (tax compliance and reciprocal perceptions of government accountability, transparency, and institutional trust). Section E assessed SDOs, capturing perceived pathways through which SLDTS contributes to progress towards SDGs 4, 9, 16, and 17. Items were rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree), with reliability confirmed through Cronbach's alpha and composite validity.

The qualitative component included embedded prompts and follow-up interviews. These captured insights on fairness, trust, and compliance, thereby enriching the quantitative findings within a robust mixed-methods framework.

**Data Analysis**

Quantitative data were analysed using SPSS (version 21) for descriptive statistics and SmartPLS 3 for PLS-SEM, suitable for small to medium samples and complex mediation or moderation testing (Hair et al., 2014). Six hypotheses ($H_1$-$H_6$) were examined, with SR as a mediator between SLDTS, FP, and SDOs ($H_7$-$H_{11}$). Reliability and validity were ensured using Cronbach's alpha, AVE, and the Fornell-Larcker criterion.

Qualitative data were thematically analysed following Braun and Clarke's (2006) six-step framework, combining inductive and deductive coding aligned to the study constructs. Coding was conducted interactively to ensure analytical consistency and reliability within the embedded mixed methods design. Triangulation between key informant interviews, qualitative survey responses, and secondary data enhanced interpretive credibility. The integrated analysis was used to explain and contextualize SEM findings, providing a holistic understanding of the fiscal, institutional, and behavioural implications of SLDTS in emerging digitized economies.

Because all constructs were collected using a single survey instrument, same-source perceptual measures, and a cross-sectional design, potential common method variance (CMV) was considered. Procedural remedies, including assuring anonymity, voluntary participation, and clearer separation of construct items, were applied to reduce response consistency bias (Podsakoff et al., 2003). Collinearity diagnostics showed that indicator VIF values were largely within acceptable limits, with only one item marginally exceeding the conventional threshold, suggesting localised overlap rather than severe multicollinearity concerns (Hair et al., 2019). Together with complementary qualitative evidence, these safeguards suggest that CMV is unlikely to substantially bias the structural relationships. Nevertheless, given the perception-based and cross-sectional design, the results are interpreted cautiously as reflecting expert stakeholder perceptions of digital taxation governance rather than definitive causal effects.

## Ethical Considerations

The study complied with international ethical standards for social science research (Resnik, 2018; Bryman, 2016; Flick, 2018). The survey clearly outlined the study's purpose, defined the e-levy, and explained its relevance to SR, including tax compliance, social trust, and development. Participation was voluntary, with respondents free to withdraw at any time. Completion implied informed consent, and data were used solely for academic purposes.

Confidentiality and anonymity were ensured, with all responses securely stored and reported without identifiers. The study posed no harm and respected participants' dignity and autonomy, adhering to principles of informed consent, voluntariness, confidentiality, non-maleficence, and respect for persons.

## Results and Discussion

### Measurement Model and Advanced PLS-SEM Diagnostics

Consistent with partial least squares structural equation modelling (PLS-SEM) practice, the measurement model evaluation incorporated advanced diagnostics that strengthen measurement robustness and predictive credibility (Hair et al., 2019; Sarstedt et al., 2022). Such assessment is particularly important in governance and public policy research, where perceptual constructs such as institutional trust, fiscal performance, and development outcomes are conceptually related and may exhibit empirical proximity (Henseler et al., 2015).

### Reliability and Convergent Validity

Table 1 presents the reliability and validity results for the study constructs, SLDTS, SR, FP, and SDOs. Cronbach's Alpha and Composite reliability values for all constructs exceed the recommended threshold of 0.70 (Hair et al., 2019), confirming internal consistency. For example, FP (CA = 0.93, CR = 0.94) and SDOs (CA = 0.97, CR = 0.98) demonstrate very high reliability, while SR (CA = 0.80, CR = 0.85) remains well within acceptable limits, reflecting the multidimensional nature of the construct. These results suggest that the items consistently measure their respective latent constructs.

**Table 1**

*Construct Reliability, Convergent Validity and Fornell-Larcker Discriminant Validity*

| *Constructs* | *CA* | *rho_A* | *CR* | *AVE* | *FP* | *SLDTS* | *SDOs* | *SR* |
|---|---|---|---|---|---|---|---|---|
| FP | 0.93 | 0.93 | 0.94 | 0.73 | 0.85 | | | |
| SLDTS | 0.92 | 0.93 | 0.93 | 0.58 | 0.74 | 0.76 | | |
| SDOs | 0.97 | 0.98 | 0.98 | 0.77 | 0.80 | 0.85 | 0.88 | |
| SR | 0.80 | 0.86 | 0.85 | 0.50 | 0.71 | 0.76 | 0.73 | 0.71 |

*Source: Authors' Survey Results*

*Note: Fiscal Performance (FP), Strategic Leadership of Digital Taxation Systems (SLDTS), Sustainable Development Outcomes (SDOs), Social Responsibility (SR), (Cronbach's Alpha (CA), Dijkstra-Henseler's rho (rho_A), Composite Reliability (CR), Average Variance Extracted (AVE). Diagonal values in bold represent the square root of AVE.*

Convergent validity was assessed using AVE, with all constructs exceeding the recommended 0.50 threshold. FP (0.73), SLDTS (0.58), and SDOs (0.77) demonstrate strong explanatory power. SR records an AVE of 0.50, meeting the minimum acceptable level (Fornell & Larcker, 1981). Given that SR integrates both taxpayer compliance and perceptions of government accountability, this is considered theoretically acceptable.

The Fornell-Larcker criterion confirms the discriminant validity, as the square root of AVE for each construct exceeds inter-construct correlations. For instance, FP's AVE square root (0.85) surpasses its correlations with SLDTS (0.74), SDOs (0.80), and SR (0.71), indicating empirical distinctiveness.

### Discriminant Validity: Fornell-Larcker and HTMT Criteria

To provide a more stringent assessment, discriminant validity was further evaluated using the heterotrait-monotrait ratio (HTMT) (Henseler et al., 2015). As shown in Table 2, HTMT values varied from 0.774 to 0.881, remaining below the conservative 0.90 threshold. These findings suggest that SLDTS, SR, FP, and SDOs represent distinct yet empirically separable governance dimensions. This pattern aligns with FS perspectives, which conceptualize taxation as interconnected but analytically distinct state-society processes (Prichard, 2016; Luttmer & Singhal, 2014).

**Table 2**

*Heterotrait-Monotrait Ratio (HTMT)*

| *Label* | *FP* | *SLDTS* | *SDOs* | *SR* |
|---|---|---|---|---|
| FP | | | | |
| SLDTS | 0.782 | | | |
| SDOs | 0.831 | 0.881 | | |
| SR | 0.782 | 0.835 | 0.774 | |

*Source: Authors' Survey Results*

*Note: Fiscal Performance (FP), Strategic Leadership of Digital Taxation Systems (SLDTS), Sustainable Development Outcomes (SDOs), Social Responsibility (SR). All HTMT values are below the 0.90 threshold, indicating acceptable discriminant validity.*

### Indicator Reliability and Cross-Loading Assessment

Cross-loading analysis (Table 3) was conducted to assess indicator reliability and discriminant validity further. The results indicate that indicators generally loaded highest among assigned constructs, supporting indicator reliability (Hair et al., 2019; Henseler et al., 2015). However, relatively high secondary loadings among SLDTS, SR, FP, and SDOs suggest that, although the constructs are distinguishable, they are also empirically interrelated and should be interpreted with caution.

**Table 3**

*Indicator Cross Loadings*

| *Label* | *FP* | *SLDTS* | *SDOs* | *SR* |
|---|---|---|---|---|
| SLDTS1 | 0.679 | 0.817 | 0.691 | 0.592 |
| SLDTS2 | 0.692 | 0.915 | 0.802 | 0.735 |
| SLDTS3 | 0.596 | 0.826 | 0.709 | 0.594 |
| SLDTS4 | 0.405 | 0.664 | 0.512 | 0.439 |
| SLDTS5 | 0.504 | 0.696 | 0.579 | 0.536 |
| SLDTS6 | 0.596 | 0.821 | 0.709 | 0.621 |
| SLDTS7 | 0.527 | 0.734 | 0.654 | 0.576 |
| SLDTS8 | 0.448 | 0.713 | 0.514 | 0.531 |
| SLDTS9 | 0.707 | 0.859 | 0.772 | 0.704 |
| SR1 | 0.719 | 0.797 | 0.759 | 0.813 |
| SR2 | 0.223 | 0.246 | 0.206 | 0.429 |
| SR3 | 0.427 | 0.415 | 0.399 | 0.610 |
| SR4 | 0.542 | 0.587 | 0.556 | 0.845 |
| SR5 | 0.468 | 0.509 | 0.525 | 0.775 |
| SR6 | 0.473 | 0.482 | 0.427 | 0.699 |
| FP1 | 0.870 | 0.595 | 0.658 | 0.594 |
| FP2 | 0.884 | 0.595 | 0.708 | 0.570 |
| FP3 | 0.828 | 0.669 | 0.710 | 0.639 |
| FP4 | 0.784 | 0.604 | 0.599 | 0.614 |
| FP5 | 0.892 | 0.583 | 0.640 | 0.578 |
| SDOs1 | 0.718 | 0.837 | 0.934 | 0.706 |
| SDOs2 | 0.759 | 0.796 | 0.936 | 0.660 |
| SDOs3 | 0.738 | 0.813 | 0.953 | 0.670 |
| SDOs4 | 0.780 | 0.816 | 0.964 | 0.695 |

*Source: Authors' Survey Results*

*Note: Primary loadings are shown in bold. Although all indicators load highest on their assigned constructs, some relatively high secondary loadings are observed, particularly among SLDTS, SR, FP, and SDOs.*

The SLDTS indicators exhibit strong primary loadings, especially SLDTS2 (0.915) and SLDTS9 (0.859). FP indicators also loaded strongly on fiscal performance, ranging from 0.784 to 0.892, while SDOs items recorded very high primary loadings from 0.934 to 0.964). The SR items loaded highest on SR, particularly SR4 (0.845) and SR1 (0.813). Nonetheless, some indicators showed notable cross-loadings. For instance, SR1 loaded 0.813 on SR, but also 0.797 on SLDTS and 0.759 on SDOs. Similarly, the SDOs items loaded on SLDTS in addition to their primary construct.

These results suggest moderate overlap among conceptually related governance, fiscal and development constructs. Such pattern is theoretically plausible, given the close relationship between SLDTS, SR, FP, institutional trust, compliance behaviour, and sustainable development outcomes within taxation systems (Alm, 2019; Joshi & Prichard, 2018). However, because the data were collected from the same respondents through a single survey instrument, the possibility of residual common method variance cannot be ruled out (Podsakoff et al., 2003, 2012).

Table 3 provides cautious support for indicator reliability and construct distinctiveness, as the high cross-loadings suggest possible conceptual overlap or shared method effects. However, the HTMT results in Table 2 confirm acceptable discriminant validity. Accordingly, the findings remain theoretically meaningful, although some shared method influence or construct proximity may have affected the observed relationships. Overall, the cross-loading pattern confirms indicator reliability and reinforces discriminant validity, indicating that the measurement model captures empirically distinct yet theoretically related dimensions of strategic leadership of digital taxation systems (Sarstedt et al., 2022).

## Multicollinearity Assessment

Variance inflation factor (VIF) analysis was conducted to ensure that multicollinearity did not bias structural estimates. Across constructs, VIF values largely varied from 1.356 to 3.392 (Table 4), indicating acceptable correlations among indicators (Hair et al., 2019).

**Table 4**

*Variance Inflation Factor*

| *Label* | *Measure* | *VIF* |
|---|---|---|
| | *Strategic Leadership of Digital Taxation Systems (SLDTS)* | |
| SLDTS1 | Digital taxation policies are clearly communicated and transparently implemented. | 3.392 |
| SLDTS2 | Digital taxation systems are designed to support participation in e-commerce and digital transactions. | 3.125 |
| SLDTS3 | Digital tax policies are designed to minimise excessive cost burden on users and consumers. | 1.692 |
| SLDTS4 | Digital taxation systems consider labour market condition and income realities. | 3.063 |
| SLDTS5 | Digital taxation systems are structured to avoid undue pressure on household welfare and social obligations. | 1.884 |
| SLDTS6 | Digital taxation systems are administered with accountability and sound public financial management. | 3.104 |
| SLDTS7 | Digital tax systems align with policies promoting secure, inclusive commerce and livelihood opportunities. | 2.175 |
| SLDTS8 | Digital taxation systems are supported by clear, credible and evidence-based policy justification. | 1.956 |

| | | |
|---|---|---|
| SLDTS9 | Digital taxation systems are implemented in ways that sustain confidence in formal digital payment systems. | 1.358 |
| | *Fiscal Performance (FP)* | |
| FP1 | Domestic tax revenue mobilisation and tax-to-GDP ratio have improved. | 3.200 |
| FP2 | Illicit financial flows within the economy have decreased. | 2.398 |
| FP3 | Taxpayer self-assessment compliance and tax return filing have improved. | 2.020 |
| FP4 | The informal sector has become more included in the tax net. | 5.157 |
| FP5 | Fiscal capacity has improved, reducing dependence on donor support for government budgets. | 2.711 |
| | *Social Responsibility (SR)* | |
| SR1 | Paying digital taxes alongside existing taxes is regarded as a civic responsibility. | 1.700 |
| SR2 | Accurate declaration of income for tax purposes is regarded as a responsible civic obligation. | 1.356 |
| SR3 | Compliance with tax filing requirements reflects responsible taxpayer behaviour. | 1.620 |
| SR4 | Tax evasion is socially unacceptable under a fair tax system. | 2.863 |
| SR5 | Aggressive tax avoidance is viewed as socially irresponsible. | 2.518 |
| SR6 | Timely payment of taxes reflects a reciprocal obligation between citizens and the state. | 1.507 |
| | *Sustainable Development Outcomes (SDOs)* | |
| SDOs1 | Macroeconomic stability supports sustained investment in education and human capital development (SDG 4). | 1.899 |
| SDOs2 | Income stability and inclusive economic participation contribute to improved living standards (SDGs 4 & 9). | 1.929 |
| SDOs3 | Investment, innovation, and digital infrastructure development are improving within the economy (SDG 9). | 4.427 |
| SDOs4 | Institutional effectiveness, transparency, and collaborative governance are strengthening sustainable development partnerships (SDGs 16 & 17). | 2.668 |

*Source: Authors' Survey Results*

*Note: Variance Inflation Factor (VIF). Most values fall within acceptable limits, although FP4 slightly exceeds the conventional threshold of 5.0, and accordingly interpreted with caution.*

Within SLDTS, VIF values fall within moderate levels, suggesting that indicators capture complementary aspects of digital taxation leadership without redundancy. Similarly, SR indicators show consistently low VIF values, confirming that dimensions of compliance behaviour and perceived government accountability remain empirically distinct.

Within FP, item FP4 recorded the highest VIF (5. 157), reflecting its strong conceptual association with broader fiscal capacity and informal sector integration. Likewise, SDOs3 registered a relatively higher VIF (4.427) due to its close linkage with investment and sustainable development outcomes. Despite these higher values, all indicators remain within tolerable limits and were retained due to strong theoretical relevance. Overall, the VIF results indicate that multicollinearity is not a significant concern, supporting stability and interpretability of the structural model estimates.

### Model Fit Evaluation

Global model fit was assessed using standardised root mean square residual (SRMR) and discrepancy indices. The saturated model produced an SRMR value of 0.070 (Table 5), below the recommended 0.080 threshold, indicating acceptable model fit (Hu & Bentler, 1999). Supporting statistics (d_ULS = 3.286; d_G = 2.754) further indicate adequate approximation between the empirical and model-implied correlations. The Normed Fit Index (NFI = 0.746) reflects moderate fit, which is common in predictive PLS-SEM applications involving complex socio-institutional constructs where explanatory capability is prioritised over covariance reproduction (Sarstedt et al., 2022).

**Table 5**

*Model Fit Summary*

| *Measure* | *Saturated Model* | *Recommended Threshold* |
|---|---|---|
| SRMR | 0.07 | < 0.08 |
| d_ULS | 3.286 | Lower values preferred |
| d_G | 2.754 | Lower values preferred |
| Chi-Square | 1328.592 | Lower values preferred |
| NFI | 0.746 | > 0.90 |

*Source: Authors' Survey Results*

*Note: Standardised Root Mean Square Residual (SRMR), squared Euclidean distance between the empirical and model-implied correlation matrices (d_ULS), geodesic distance between the empirical and model-implied correlation matrices (d_G ).*

### Model Selection and Predictive Adequacy

Information-theoretic model selection criteria (Table 6), including Akaike's Information Criterion (AIC), Unbiased Akaike's Information Criterion (AICu), Corrected Akaike's Information Criterion (AICc), Bayesian Information Criterion (BIC), Hannan-Quinn Criterion (HQ), and Corrected Hannan-Quinn Criterion (HQc), were examined to assess the model parsimony and predictive adequacy. The predominantly negative AIC, BIC and HQ values observed across FP, SR, and SDOs indicate improved model fit relative to complexity. This suggests that the structural specification achieves efficient explanatory performance.

**Table 6**

***Model Selection Criteria***

| *Item* | *AIC* | *AICu* | *AICc* | *BIC* | *HQ* | *HQc* |
|---|---|---|---|---|---|---|
| FP | -96.302 | -93.261 | 18.072 | -88.147 | -92.993 | -92.558 |
| SDOs | -164.618 | -160.545 | -50.052 | -153.744 | -160.206 | -159.503 |
| SR | -94.273 | -92.255 | 19.949 | -88.836 | -92.067 | -91.837 |

*Source: Authors' Survey Results*

*Note: Akaike Information Criterion (AIC), Unbiased Akaike Information Criterion (AICu); Corrected Akaike Information Criterion (AICc); Bayesian Information Criterion (BIC); Hannan-Quinn Criterion (HQ); Corrected Hannan-Quinn Criterion (HQc).*

Although corrected criteria (AICc) vary across constructs, the overall pattern supports a parsimonious and theoretically coherent representation of SLDTS relationships (Burnham & Anderson, 2004).

### Structural Model Evaluation and Bootstrapping

Structural relationships were assessed using bootstrapping procedures to generate stable standard errors, confidence intervals, and significance estimates for path coefficients. Bootstrapping is particularly appropriate for PLS-SEM because it avoids strict distributional assumptions and enhances inferential robustness in behavioural and policy research contexts (Hair et al., 2019). Together with predictive relevance ($Q^2$) assessment reported in the structural model results, the findings indicate satisfactory explanatory and predictive capability.

### Integrative Interpretation

Collectively, the reliability statistics, HTMT ratios, cross-loading diagnostics, multicollinearity checks, SRMR model fit indices, and model selection criteria provide convergent evidence that the measurement and structural models meet contemporary PLS-SEM robustness expectations. These diagnostics strengthen confidence that the observed relationships represent substantive effects of strategic leadership of digital taxation systems rather than results arising from measurement overlap or model misspecification issues.

### PLS-SEM Path Analysis and Hypothesis Testing

The path analysis results in Table 7 provide strong empirical support for the hypothesized relationships among SLDTS, SR, FP, and SDOs. The model demonstrates strong explanatory power, with $R^2$ values of 0.580 for SR, 0.595 for FP, and 0.784 for SDOs. This means that the framework explains nearly 78% of the variance in SDOs, underscoring its robustness and relevance in understanding fiscal-development linkages in emerging economies.

**Table 7**

*Path Analysis of the Relationship Among SLDTS, SR, FP, and SDOs*

| *Hypotheses* | *Relationships* | *B* | *Total Effects* | *Std Dev* | *T-statistics* | *p-Values* | *Decision* | *$f^2$* | *Remarks* |
|---|---|---|---|---|---|---|---|---|---|
| | **Direct Effects** | | | | | | | | |
| **$H_1$** | SLDTS -> SR | 0.762 | 0.762 | 0.0440 | 17.390 | 0.000 | Supported | 1.380 | Large |
| **$H_2$** | SLDTS -> FP | 0.462 | 0.736 | 0.0440 | 16.600 | 0.000 | Supported | 0.220 | Large |
| **$H_3$** | SR -> FP | 0.359 | 0.359 | 0.1080 | 3.337 | 0.001 | Supported | 0.130 | Small |
| **$H_4$** | FP -> SDOs | 0.360 | 0.360 | 0.0870 | 4.164 | 0.000 | Supported | 0.240 | Large |
| **$H_5$** | SLDTS -> SDOs | 0.534 | 0.846 | 0.0360 | 23.790 | 0.000 | Supported | 0.450 | Large |
| **$H_6$** | SR -> SDOs | 0.063 | 0.192 | 0.0820 | 2.343 | 0.019 | Supported | 0.010 | Small |
| | **Indirect Effects** | | | | | | | | |
| **$H_7$** | SLDTS -> SR ->FP | 0.274 | 0.274 | 0.0890 | 3.071 | 0.002 | Supported | | |
| **$H_8$** | SLDTS -> SR -> SDOs | 0.048 | 0.048 | 0.0570 | 0.834 | 0.404 | Not Supported | | |
| **$H_9$** | SR -> FP -> SDOs | 0.129 | 0.129 | 0.0530 | 2.438 | 0.015 | Supported | | |
| **$H_{10}$** | SLDTS -> FP -> SDOs | 0.166 | 0.166 | 0.0540 | 3.110 | 0.002 | Supported | | |
| **$H^{11}$** | SLDTS -> SR ->FP -> SDOs | 0.099 | 0.099 | 0.0420 | 2.328 | 0.020 | Supported | | |
| | **Endogenous Construct** | **$R^2$** | **$R^2$ Adjusted** | | | | | | |
| | SR | 0.580 | 0.577 | | | | | | |
| | FP | 0.595 | 0.588 | | | | | | |
| | SDOs | 0.784 | 0.778 | | | | | | |

*Source: Authors' Survey Results*

## Direct Effects

The findings show that SLDTS has a strong and significant effect on SR ($H_1$: $\beta = 0.762$, $p < 0.001$, $f^2 = 1.38$, large), indicating that SLDTS strengthens institutional trust, perceived fairness, and compliance behaviour. This result suggests that well-designed digital taxation systems enhance citizens' willingness to cooperate with fiscal authorities by promoting transparency, accountability, and confidence in revenue governance rather than merely enforcing compliance.

Similarly, SLDTS exerts a direct and significant positive influence on FP ($H_2$: $\beta = 0.462$, $p < 0.001$, $f^2 = 0.22$, large). The result confirms that SLDTS improves fiscal capacity by broadening the tax base by formalising previously untaxed financial flows, including mobile money and digital transactions. Although the magnitude of the effect is smaller than the impact on SR, it highlights that fiscal gains arise not only from direct revenue mobilisation but also from governance improvements that strengthen compliance systems.

The role of SR is equally critical. The analysis shows that SR significantly predicts FP ($H_3$: $\beta = 0.359$, $p = 0.001$, $f^2 = 0.13$, small), demonstrating that responsible taxpayer behaviour and institutional accountability jointly enhance revenue outcomes. In addition, FP significantly influences SDOs ($H_4$: $\beta =$

0.360, $p < 0.001$, $f^2 = 0.24$, large), confirming that improved fiscal capacity translates into greater investment in public goods and development programmes aligned with the SDGs.

Interestingly, the direct effect of SR on SDOs ($H_6$: $\beta = 0.063$, $p = 0.019$, $f^2 = 0.01$, small) is weak though statistically significant. This suggests that responsible taxpayer behaviour alone contributes only modestly to development unless supported by effective fiscal management and credible allocation of public resources. By contrast, SLDTS directly predicts SDOs ($H_5$: $\beta = 0.534$, $p < 0.001$, $f^2 = 0.45$, large), emphasising that strategically governed digital taxation systems can directly support development through improved revenue administration, transparency, and targeted public investment in areas such as education, infrastructure, and governance strengthening.

**Indirect Effects**

The mediation results provide further nuance. SR mediates the relationship between SLDTS and FP ($H_7$: $\beta = 0.274$, $p = 0.002$), underscoring compliance and trust as the bridge between tax design and fiscal outcomes. However, the pathway from SLDTS through SR to SDOs was not supported ($H_8$: $\beta = 0.048$, $p = 0.404$), indicating that compliance alone is insufficient to guarantee developmental outcomes unless supported by credible fiscal governance.

Other mediation pathways were significant. SR influences SDOs indirectly through FP (H9: $\beta = 0.129$, $p = 0.015$), showing that responsible behaviour only translates into development when it boosts fiscal capacity. Similarly, SLDTS indirectly impacts SDOs via FP (H10: $\beta = 0.166$, $p = 0.002$), reaffirming FP as a critical mechanism. The extended chain, SLDTS → SR → FP → SDOs (H11: $\beta = 0.099$, $p = 0.020$), further validates the reciprocal contract between taxpayers and the state: taxation strengthens fiscal space, which, when managed responsibly, delivers developmental dividends.

**Discussions**

Taken together, these findings reinforce the insights from the literature review and provide empirical validation of the conceptual framework. SLDTS emerges not merely as a revenue tool but as a dual fiscal-developmental instrument whose effectiveness depends on the mediating role of SR, specifically the reciprocal contract between taxpayers and the state. As highlighted by Alm (2019) and Kirchler (2007), deterrence and compliance cannot be sustained without trust and fairness. The results confirm that FP is enhanced when citizens perceive taxation as equitable and governments demonstrate transparency and accountability in resource use.

The weak direct effect of SR on SDOs further reflects lessons from prior failures in Ghana, Uganda, and Hungary, where levies collapsed under weak institutional credibility (Spadavecchia, 2025; ICTD, 2025). Compliance alone, without visible and accountable reinvestment, risks eroding trust, echoing Moore's (2015) and Joshi and Prichard's (2018) argument that taxation is sustainable only when it strengthens the state-society contract. This validates the framework's positioning of FP as the critical pathway through which compliance and institutional trust translate into developmental outcomes.

The novelty of this study lies in empirically integrating SLDTS, SR, FP, and SDOs within a single analytical model. By demonstrating how SLDTS enhances fiscal capacity (e.g., TTGDPR) while simultaneously conditioning state-society relations, the framework extends fiscal sociology to the digital era. Moreover, the results highlight that legitimacy and SDG alignment, particularly SDGs 4, 9, 16, and 17, depend not just on the design of taxes but on their ability to close the loop between collection and visible social investment. In this sense, the study bridges behavioural, institutional, and developmental literatures, responding directly to the gaps identified in the review.

## Qualitative Results and Discussion

To complement the quantitative findings, which identified SR as a mediator linking SLDTS with FP and SDOs, qualitative evidence from ten purposively selected key informants, tax professionals, business owners, and government officials, provided interview responses that elaborated on open-ended questions embedded within the survey instrument. These responses were analysed alongside secondary evidence from failed digital taxation initiatives in Ghana, Uganda, Hungary, Canada, and the EU to provide contextual insight into policy fairness, institutional trust, compliance behaviour, and developmental expectations associated with SLDTS and e-levy.

The qualitative themes, generated through thematic analysis, involving coding iteratively aligned with the study constructs, SLDTS, SR, FP, and SDOs to ensure analytical coherence (Braun & Clarke, 2006; Flick, 2018). Consistent with the embedded explanatory design, reliability was strengthened through repeated coding checks and alignment with construct definitions rather than formal intercoder testing (Creswell & Clark, 2017). The resulting themes were used to interpret and contextualize the SEM findings, providing explanatory triangulation rather than independent causal claims (Saunders et al., 2019).

### Perceptions of Trust, Fairness, and Fiscal Sociology

Key informant interviews explored participants' perceptions of fairness, distributive impacts, and the legitimacy of digital taxation policies. Respondents frequently described e-levy as inequitable, particularly for low-income earners and small businesses, with several characterising it as double taxation on already-taxed income transfers. One interviewee noted that "the e-levy punishes small-scale businesses more than big ones." Consistent with FS (Schumpeter, 1918; Luttmer & Singhal, 2014), these narratives frame taxation within a social contract in which perceived fairness and government credibility shape compliance behaviour. Qualitative evidence, therefore, helps explain the strong SLDTS -> SR relationship ($\beta = 0.762$) observed in the SEM results, indicating that SR emerges primarily from institutional legitimacy rather than policy enforcement alone.

### Trust in Government Institutions and Accountability in Revenue Use

Interview prompts further examined expectations regarding transparency and public resource allocation. Key informants consistently linked willingness to comply with visible reinvestment of tax revenues into public infrastructure, education, and healthcare. This finding reinforces the mediating role of SR identified in the structural model, showing that FP depends on reciprocal accountability between citizens and government. The qualitative evidence clarifies that SR operates as a shared governance outcome rather than a purely taxpayer-driven behaviour, thereby strengthening the interpretation of the SR -> FP pathway.

### Ease of Compliance

Participants were also asked to reflect on administrative processes associated with digital taxation. Responses emphasised that compliance, as an expression of SR, improves when systems are simple, transparent, and predictable, whereas procedural complexity encourages avoidance behaviour. As one respondent stated, "If the process is straightforward and we see the benefits, more people will comply". These insights contextualize the positive association between SR and FP by demonstrating how administrative design translates institutional trust into actual compliance behaviour, consistent with FS's emphasis on procedural fairness.

### Impact on Fiscal Performance

Government officials acknowledged that SLDTS has the potential to broaden the tax base and enhance revenue mobilisation but stressed that outcomes depend on sustained taxpayer acceptance. These accounts help to interpret the significant SLDTS -> FP relationship (β = 0.462) by showing that fiscal gains are conditional upon perceived legitimacy and voluntary compliance. Comparative experiences from Uganda and Canada similarly (Spadavecchia, 2025; PwC, 2025) show that low acceptance undermines expected digital tax revenues, thereby confirming the mediating mechanism identified in the SEM analysis

### Sustainable Development Outcomes (SDOs)

Interview discussions explored whether SLDTS translates into tangible development outcomes. While interviewees expressed cautious optimism about SLDTS's potential to raise revenues for financing infrastructure, education, and healthcare aligned with SDGs 4, 9, 16, and 17, scepticism remained about implementation effectiveness. For instance, one respondent noted, "If the e-levy leads to real growth, more roads, education, healthcare delivery, and better public services, then it's worth it, but we haven't seen that yet". These narratives help explain why SR showed only a weak effect on SDOs (β = 0.063) despite strong indirect pathways through FP. The qualitative evidence, therefore, challenges overly linear assumptions by indicating that compliance alone does not guarantee developmental outcomes without credible governance, transparency and visible reinvestment.

Consistent with FS, the qualitative findings suggest that taxation operates as a reciprocal social contract between citizens and the state (Schumpeter, 1918; Luttmer & Singhal, 2014). Thus, simplified and transparent systems enhance legitimacy and compliance, positioning FP as the key channel through which SR contributes to SDOs and progress towards SDGs 4, 9, 16, and 17.

### Integrated Interpretation

The qualitative findings both converged with and nuanced the SEM results, reinforcing key structural relationships while revealing implementation uncertainties that help explain weaker or indirect effects observed in the model. Overall, the qualitative findings support FS's conception of taxation as a reciprocal state-society relationship (Schumpeter, 1918; Luttmer & Singhal, 2014). By explaining both strong and weaker SEM relationships, narrative evidence deepens the interpretation of the quantitative model, demonstrating that fairness perceptions, institutional trust, and administrative simplicity are critical mechanisms through which digital taxation influences FP and SDOs.

## Summary and Conclusion

This study examined DT as both a fiscal and developmental tool through the lens of FS. Findings show that its sustainability depends not only on FP but also on SR, expressed as the reciprocal contract between citizens and the state. Quantitatively, DT significantly influenced FP (β = 0.762) and SDOs (β = 0.534). SR predicted FP (β = 0.359) but had a weaker direct effect on SDOs (β = 0.063), validating taxation as a social contract beyond revenue collection.

Qualitative evidence underscored fairness, institutional trust, and administrative simplicity as drivers of compliance. Citizens were more willing to comply when taxes were transparent and reinvested in public goods, whereas opacity and inequity eroded trust. Thus, compliance alone cannot yield development without accountable governance. FP emerges as the key pathway linking SLDTS and SR to progress on SDGs 4, 9, 16, and 17, reaffirming SLDTS's legitimacy as a reciprocal social contract.

## Policy, Governance and Research Implications

### Policy Implications

The findings carry important policy implications for the design and implementation of SLDTS. The legitimacy of SLDTS depends not only on its technical efficiency but also on its alignment with SR. Governments should prioritise transparent communication about the purpose, collection, and allocation of digital tax revenues. Earmarking a portion of revenues for visible developmental projects, and ensuring equitable distribution of tax burdens can strengthen public trust and reinforce perception of fairness.

Integrating digital taxes within national SDG strategies further enhances legitimacy by visibly linking tax revenues to tangible developmental outcomes, thereby reinforcing the reciprocal fiscal contract between citizens and the state.

### Practical Implications

For tax authorities and policymakers, the practical implications lie in the design of user-friendly, low-cost systems that reduce compliance burdens. Streamlined processes and mobile-friendly platforms encourage participation, particularly among SMEs and the informal sector, while balancing enforcement with education and incentives fosters a culture of voluntary compliance. Administrative efficiency therefore, becomes not only a technical matter but also a governance strategy that strengthens the fiscal contract between citizens and the state.

### Governance Implications

From a governance perspective, the study underscores the importance of institutional credibility. Accountability mechanisms such as transparent revenue reporting, independent audits, and digital governance platforms are vital to maintaining trust. Governments must also strengthen partnerships with civil society, professional bodies, and business associations to co-create tax policies that are equitable and legitimate. By doing so, digital taxation becomes embedded not just in fiscal systems but in broader governance frameworks that foster long-term legitimacy.

### Research Implications

The research implications of this study extend fiscal sociology by empirically linking SLDTS, SR, FP, and SDOs within one framework. This integration opens new avenues for comparative cross-country studies, longitudinal analyses of compliance dynamics, and explorations of how technological innovations such as blockchain could enhance transparency and accountability in digital tax systems.

### Recommendations

Actionable recommendations follow from the results of this paper. First, governments should publish regular and accessible reports on taxes generally, but particularly digital tax revenues and their uses, earmark proceeds for priority development projects, and simplify compliance procedures through modern platforms. Second, strengthening partnerships with civil society and professional associations, balancing deterrence with supportive measures such as taxpayer education, and conducting regular policy reviews will ensure that digital taxation remains aligned with developmental objectives.

### Contributions

The contributions of this paper are threefold. Theoretically, it extends fiscal sociology to the digital age by empirically framing taxation as a reciprocal social contract. Empirically, it provides robust evidence that SR mediates the relationship between SLDTS and FP, advancing understanding of compliance and legitimacy. Practically, it offers a framework and actionable strategies for policymakers to design sustainable digital tax regimes that foster trust and developmental outcomes.

### Limitations and Future Research Agenda

Despite the methodological strengths of this study, some limitations remain. First, the stakeholder-focused sample limits generalisability beyond professionally engaged taxpayers. Second, the use of a single survey instrument, same-source perceptual measures, and a cross-sectional design means that common method variance cannot be fully ruled out, even though procedural remedies were applied. Third, some indicators showed signs of localised overlap, including a slightly elevated VIF for FP4, suggesting that certain relationships should be interpreted with caution.

In addition, although SRMR indicated acceptable approximate fit, the NFI was below the preferred threshold, implying that the model demonstrates adequate rather than strong overall fit. Further, SDOs were measured using perceptual rather than objective macroeconomic indicators, and SR may not have fully captured institutional accountability as a distinct dimension. Future research should therefore use broader and more diverse samples, incorporate objective development indicators, refine overlapping items, and apply multi-source or longitudinal designs to strengthen robustness, validity, and external generalisability.

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## Author Contribution Statement

Conceptualisation: GYF (lead), SZ (equal), AFA (supporting), ABM (supporting), AAN (equal)

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## Conflict of Interest Statement

The authors declare no conflict of interest.

## AI Disclosure Statement

No artificial intelligence (AI) tools were used in the preparation of this study.

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ORIGINAL ARTICLE

# Determinants of Access and Participation in Primary Education in Ghana

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## Abstract

The purpose of study was to investigate the factors influencing access and participation in primary education in the Bongo District. The study employed a quantitative approach with a descriptive survey design. The population of the study comprised 82 headteachers and 12804 parents of children in primary education. The simple random sampling technique was used to select 68 headteachers and 340 parents to participate in the study. A structured questionnaire was used to collect data for analysis. Descriptive statistics of mean and standard deviations were used to analyse the data. The findings revealed that factors such as child labour, parents' level of education, school facilities, teaching and learning materials, distance to school and teacher quality were rated high by respondents as factors that influence access to and participation in primary education in the district. Based on the findings of the study, it can be concluded that school-related and home-related factors have a significant influence on access to and participation of school-age children in primary education.

**Keywords:** *Access, Participation, School-Related Factors, Home-Related Factors.*

## Introduction

Education is widely recognized as a cornerstone of nation-building, playing a pivotal role in human development (Appiah & Esia-Donkoh, 2018; Moses & Kingsley, 2013). It is crucial to acknowledge the importance of education as a vital mechanism for social, economic, and political mobility (Amutabi & Oketch, 2003). Globally, education is esteemed as a key driver of social transformation and sustainable development (Tinab, 2014). In response to this essential need, numerous educational reforms and programs have been initiated both locally and internationally. Notably, in 1948, the United Nations declared education a basic human right in Article 26 of the Universal Declaration of Human Rights, emphasizing the right to free and compulsory elementary education, and ensuring equitable access to higher education based on merit (United Nations, 1949).

In September 2000, the United Nations introduced the Millennium Development Goals (MDGs), with Goal 2 focusing on achieving universal primary education by 2015, and Goal 3 aiming to promote gender equality and empower women, with a specific target to eliminate gender disparities in education by 2005 and at all levels by 2015 (MDG report, 2009). Building on the MDGs' progress, the Sustainable Development Goals (SDGs) were established in 2016, with Goal 4 dedicated to ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all.

Despite significant advances in expanding global access to education, particularly in low-income countries, universal primary education remains an unfulfilled goal. According to the UNESCO Institute for Statistics (UIS), approximately 59 million children worldwide remain out of school at the primary level, with over half (54%) of these children residing in Sub-Saharan Africa. Additionally, about 10 million children in this region drop out of primary school each year (UNESCO Institute for Statistics, 2019). These figures underscore the persistent challenges to achieving Universal Primary Education in Sub-Saharan Africa, raising concerns about the future human resource potential of the region. As a signatory to the UN charter, Ghana is committed to establishing the necessary frameworks to fulfil these educational goals, including ensuring the right to education for all.

Ghana has implemented various educational initiatives both before and after independence to advance educational development (Okujagu, 2013). The Accelerated Development Plan (ADP) for education, introduced in 1951, was a significant step toward providing fee-free primary education to all school-age children, regardless of socio-economic background or location. The Education Act of 1961 further reinforced this commitment by making fee-free primary and middle school education a constitutional right. These initiatives laid the foundation for rapid educational expansion and helped to reduce disparities in access to education. The Ghanaian Constitution, particularly Article 25 Clause 1, guarantees equal educational opportunities and mandates free, compulsory, and accessible basic education for all. Article 38 of the 1992 Constitution also requires the government to provide Free Compulsory Universal Basic Education (FCUBE) and, resources permitting, extend access to senior secondary, technical, and tertiary education, as well as lifelong learning opportunities. The introduction of capitation grants and school feeding programs has led to a significant increase in basic education enrolment across Ghana (MOE, 2008).

Despite the government's strong commitment to free, high-quality basic education and the importance placed on education by parents, primary school enrolment rates remain below universal levels in areas like the Bongo District of the Upper East Region. This district, like many rural areas across Ghana, has a high number of out-of-school children. Researchers observed that school-age children in this district are often engaged in street vending, market work, farming, and other activities during school hours, with child-motherhood and teenage pregnancies also prevalent. These circumstances raise critical questions about the factors preventing children in the Bongo District from accessing their fundamental right to education as guaranteed by the Ghanaian Constitution.

Previous studies have identified various factors affecting school attendance and participation in primary education across Ghana (Adam et al., 2016; Amagnya, 2020; Asamoah et al., 2019; Derkong-Dery, 2018; Fentiman et al., 2001). For example, Adam et al. (2016) examined the primary causes of school dropouts in rural Ghana, focusing on the Asunafo South District in the Brong Ahafo Region. Amagnya (2020) investigated the factors influencing education in the Builsa District of Northern Ghana, while Asamoah et al. (2019) explored the impact of school-related factors on girls' access to basic education in the Tarkwa-Nsuaem Municipality. Derkong-Dery (2018) assessed the factors influencing the quality of education in basic schools in the Nandom District of the Upper West Region. Fentiman et al. (2001) explored the health and cultural factors affecting basic education enrolment in rural Ghana. However, none of these studies systematically examined the factors influencing access to and participation in primary education specifically in the Bongo District. Therefore, this study aims to investigate the home and school-related factors affecting primary education access and participation in the Bongo District.

## Literature Review

This study is grounded in John Rawls' Theory of Justice (1971), which provides a foundational theoretical framework based on the social contract approach to address fairness in society. The principles of this theory help in identifying essential equalities and emphasize the need to treat all individuals equitably in all areas of life (Meuret, 2002; Rawls, 1999). Rawls outlines two principles of justice that are particularly relevant to this study, especially concerning the right of every individual to access and participate in education. The first principle asserts that "each person is to have an equal right to the most extensive scheme of equal basic liberties compatible with a similar scheme of liberties for others." The second principle states that "social and economic inequalities are to be arranged so that they are reasonably expected to be to everyone's advantage and attached to positions and offices open to all" (Rawls, 1999, p.53). Additionally, Rawls argues that all social values, including liberty, opportunity, income, wealth, and the social bases of self-respect, should be distributed equally among society's members, ensuring that any inequalities benefit everyone (p.54).

In the context of education, the principles of social justice are closely tied to fairness and equality in terms of access, opportunities, and academic achievement. This implies that the education system has a responsibility to ensure that all children have equal opportunities to learn, achieve, and develop their potential according to the curriculum and policy directives. Moreover, these principles underscore the importance of equitably distributing educational resources to reduce disparities and promote fundamental liberties. Research by García and Weiss (2017) and Suárez-Orozco et al. (2015) highlights the persistent disparities in global education systems, which adversely affect children's access to education, enrollment rates, learning, and outcomes. These inequalities often stem from socioeconomic status, parental education levels, poverty, and sociocultural factors (Anangisye, 2020; García & Weiss, 2017; Humble & Dixon, 2017; Kapinga, 2014). According to Rawls (1999), such inequalities should be addressed by prioritizing the needs of disadvantaged or vulnerable groups to ensure genuine equality of opportunity for all.

Based on these theoretical assumptions, it is clear that access to and participation in primary education is a fundamental human right that must be upheld for everyone. As Anangisye (2020) emphasizes, "school-age children, irrespective of their physical and mental status, race, colour, culture, political affiliation, religious ideology, gender, or socio-economic status, have the right to basic education." Therefore, all children should have equal opportunities to attend school, learn, and develop their potential, regardless of their background. Denial of this right can leave children vulnerable to neglect, violence, and exploitation. It is, therefore, the responsibility of the government to ensure that schools provide equitable learning conditions for all students, regardless of their socioeconomic status or geographical location. This study, grounded in the principles of justice that advocate for equal basic rights and opportunities, seeks to examine the home and school-related factors affecting access to and participation in primary education in the Bongo district. The objective is to contribute significantly to the existing body of knowledge in Ghana and support the global effort to realize universal access to education as a fundamental human right for all children.

Research consistently shows that a child's health status significantly impacts their school attendance, grade retention, and overall academic performance (Cohee et al., 2021; Fentiman et al., 2001). Malnourished and hungry students struggle with concentration and learning, leading to higher rates of absenteeism and dropout (Matingwina, 2018). Health issues such as hunger, malaria, headaches, and poor eyesight disproportionately affect children's educational experiences, with adolescent girls facing additional challenges due to the lack of sanitary facilities and menstruation-related issues (Lengha, 2014).

Socioeconomic status and parental education levels are also key barriers to educational attainment, access, and participation (Matingwina, 2018). Financial constraints related to school fees and educational resources can adversely affect a student's mental and emotional well-being, often resulting in poor academic performance and an increased risk of dropping out (Conger & Donnellan, 2007; Boateng et al., 2021). Moreover, there is a clear link between socioeconomic status and family size; families with higher socioeconomic status can often provide better educational opportunities for all their children, while those with limited resources may need to prioritize the education of certain children over others (Abenawe, 2022; Crosnoe & Cooper, 2010).

Parents are generally expected to enrol their children in school and ensure regular attendance (Education Act, 2008). However, household decisions and family size can further contribute to educational disparities. The costs associated with education, including fees, uniforms, and transportation, pose significant challenges for low-income households, influencing their decisions to enrol or withdraw their children from school (Kainuwa et al., 2013; Zhao & Glewwe, 2010). Larger families often struggle to support each child's education adequately, leading to lower participation rates, frequent absenteeism, and higher dropout rates. Gender disparities in education are also perpetuated by household decisions, with boys often being favored over girls due to cultural and religious beliefs, which limits girls' access to education in Sub-Saharan African countries, including Ghana (John & Emily, 2013).

The educational level of parents is another critical factor influencing children's academic outcomes. Studies consistently show that children of parents with higher educational backgrounds tend to perform better academically (Boonk et al., 2018; Driessen et al., 2005). Parental involvement in schoolwork, monitoring academic progress, and providing support significantly contribute to children's educational success, a trend observed across all educational levels, from primary to tertiary education. Conversely, children of parents with lower educational achievement often struggle academically, leading to higher dropout rates (Onzima, 2010; Bol, 2020).

Child labour, defined as the engagement in economic activities that are hazardous, harmful, and exploitative to a child's health and development, poses a significant threat to educational access and participation (ILO, 2002). Studies demonstrate a strong positive correlation between child labour and reduced commitment to education, resulting in higher dropout rates (He, 2016; Putnick & Bornstein, 2015). Poverty often forces children into labour, with detrimental effects on their physical and mental well-being (Hamenoo et al., 2018). While child labour may provide economic support for schooling, the associated stress and time constraints can negatively impact academic achievement (Akyeampong et al., 2007). Moreover, child labour exposes children to health risks and accidents, hindering their overall development (Hamenoo et al., 2018). In Sub-Saharan Africa, the opportunity cost of sending a child to school often includes a loss of labour and resources, leading to a reliance on child labour for various household tasks (UNICEF, 2022; Nyamubi, 2015; Bezerra et al., 2009).

Inadequate school facilities present a significant barrier to educational access and participation. UNESCO defines school infrastructure as the essential physical components of the educational environment, including classrooms, libraries, laboratories, toilets, and playgrounds (UNESCO-IIEP, 2017). The lack or insufficiency of these facilities severely impacts the quality of education, students' academic performance, and overall access to education (Kapinga, 2017; Souck & Nji, 2017). A particular concern is the lack of proper sanitation facilities, which hinders girls' attendance and participation, especially in relation to menstrual hygiene education (Rueckert, 2019). Studies from Nigeria and India highlight how inadequate infrastructure, such as the absence of toilets, leads to higher absenteeism and dropout rates among girls (Owoeye & Olatunde Yara, 2011). Similarly, in Ghana, a study by Amagnya (2020) found that many students, particularly at the basic level, lacked essential school materials such as textbooks, uniforms, tables, and chairs, with state-provided resources being insufficient. The study also revealed that many students in remote areas are forced to learn under trees, causing schools to close whenever it rains or threatens to rain. Hanushek (1995) emphasizes that infrastructure and learning materials are critical for effective teaching and learning, and their absence results in poor educational outcomes and higher dropout rates, particularly in developing countries. Globally, the situation is concerning, with many schools lacking basic sanitation and clean drinking water facilities, further exacerbating educational inequalities (UNESCO-IIEP, 2017; Kumar et al., 2019; UNESCO, UNICEF, & WFP, 2023).

Teacher supply, qualifications, and attendance are also crucial factors affecting educational access. UNESCO reports a global shortage of 69 million teachers, with the most severe deficits in sub-Saharan Africa and South Asia (UNESCO, 2022). In response to these shortages, some countries employ unqualified teachers, which diminishes the quality of education (UNESCO, 2022). The equitable distribution of teachers across regions is vital, as high student-teacher ratios can lead to lower learning outcomes (World Bank, 2018). In Ghana, challenges such as high teacher-student ratios, absenteeism, and irregular school attendance complicate teaching and learning, contributing to high dropout rates (Amagnya, 2020). A World Bank report indicated that Ghana ranks first among sub-Saharan African countries for teacher absenteeism, with an average of 43 days of absenteeism per teacher per year, compared to 11.6 days in Tunisia and 13.4 days in Morocco. Factors such as inadequate monitoring, illness, long commutes, religious obligations, and insufficient facilities contribute to these high absenteeism rates (Peace fm, 2011). Addressing teacher shortages requires decentralized placement, improved motivation, and local recruitment. Teacher absenteeism is a pervasive issue, significantly impacting learning outcomes and eroding trust in the education system (UNESCO, 2022; World Bank, 2018; UNESCO, 2014; Peacefm, 2011; Akseer & Játiva, 2021).

Road infrastructure and the distance to schools disproportionately affect educational access, particularly in rural areas of Ghana (Akyeampong et al., 2007). In these regions, challenges such as inadequate school supply and schools that can only be reached by canoe contribute to non-attendance, late enrollment, absenteeism, and dropout rates (Fentiman et al., 2001). Studies, including one by Filmer (2007), highlight the importance of reducing the distance between schools and students, showing a positive correlation with higher enrollment and retention rates. Safety concerns, especially for young girls, are a critical factor, affecting girls' enrollment more than boys'. Inadequate transportation and long distances, particularly in rural areas, are major obstacles to educational participation, underscoring the need for targeted interventions to improve accessibility (Casely-Hayford et al., 2003; Filmer, 2007; Smits & Huisman, 2013).

## Research design

The descriptive survey design was used for the study. This is because descriptive survey is commonly utilized for gathering information on individuals' attitudes, opinions, behaviours, or various aspects related to education or social science issues (Brooking, 2013).

## Participants

The target population for the study was 12,886 participants consisting of 82 headteachers and 12804 parents. Out of the targeted population, Krejcie and Morgan (1970) sample size formula was used to sample 68 headteachers and 340 parents to participate in the study. The simple random sampling technique was then used to select both the headteachers and parents for the study.

The Moazzam (2014) formula was used to obtain the sample size for both headteachers and parents.

*n= N*X/(X+N-1)*…………………………………… (1) where,

X= Z2pq/d2…………………………………...(2)

*n:* the desired sample size

*z:* the standard normal deviate usually set at 1.96 (which corresponds to 95% confidence level)

*p:* the proportion in the target population to have a specific characteristic. If no estimate is available set it at 50% (or 0.50)

q: 1-p

d: absolute precision or accuracy, normally set at 0.05.

The sample size of the headteachers in this study was calculated as follows:

Where N=82

*X*= (1.96)2*(0.5)*(0.5)/(0.5)2 = 384

*n*= 82(384)/(384+82-1)

= 10496/155

= 67.7 approximately to 68

Therefore, a sample of 68 schools was the target for the selection of 68 headteachers to be used for the study.

The sample size of the parents in this study was calculated as follows:

Where N=12804.

*X*= (1.96)2*(0.5)*(0.5)/(0.5)2 = 384

*n*= 12804(384)/(384+12804-1)

= 4916736/13187

= 372.8 approximately to 373

Therefore, a sample of 373 parents was the target to be used for the study, however 340 parents were used for the data analysis since that was the completed questionnaires received from the parents.

**Data collection**

A structured questionnaire was used in the collection of data from the participants. The questionnaire addressed participants' demographics, home-related and school-related factors influencing access to and participation in primary education in the Bongo District respectively. The questionnaire was designed on a five-point Likert scale of Strongly Agree (SA), Agree (A), Uncertain (U), Disagree (D) and Strongly Disagree (SD). Expert recommendations led to adjustments in some items of the instrument focused on clarity, wording, and relevance and adequacy of the items in addressing the variables of interest. Moreover, a pilot study was conducted involving six headteachers and adequacy of the items in addressing the variables of interest. Moreover, a pilot study was conducted involving six headteachers and 37 parents to establish the reliability of the instrument. Using Cronbach's Alpd of 0.7 (George & Mallery, 2019; Sekaran & Bougie, 2016).

## Data analysis

The selected factors that influence access to and participation in primary school education were categorized into school-related and home-related factors. To ascertain the degree to which the factors affect school-age children's access and participation in primary education, descriptive statistics were applied. Precisely, frequency, percentages, means and standard deviations were generated.

## Results and Discussion

Access to and participation in quality primary education is a fundamental right that lays the foundation for a child's academic journey. In Ghana, primary education is a 6-year education cycle after two years of kindergarten. It is universal, free, and compulsory for all school-age children between the ages of 6 and 11 years in Ghana (Pre-Tertiary Education Act, of 2020). This suggests that every child should have the liberty to access and participate fully to complete that level of education. Thus, expanding access to and participation in primary education has been one of Ghana's important goals of eliminating poverty, achieving both the Education for All (EFA) and the Sustainable Development Goal 4 (SDG 4) to eliminate gender disparities which UNESCO reports that Sub-Saharan Africa lags behind, with more girls likely to stay out of school compared to boys. However, efforts to improve access to and participation in primary education have been thwarted by diverse factors including variables within the school and home environment (Orodho, 2013).

### What home-related factors affect access to and participation in primary education?

The home-related factors that headteachers and parents responded to were socio-economic status, parent's level of education, poverty, cultural beliefs and child labour. The respondents were required to respond to each item by indicating strongly agree, agree, neutral, disagree or strongly disagree as shown in Tables 1 and 2.

**Determinants of Access and Participation**

**Table 1**

*Headteachers' Responses on Home-Related Factors that Affect Access and Participation in Primary Education*

| *STATEMENTS* | *SD (%)* | *D (%)* | *N (%)* | *A (%)* | *SA (%)* | $\bar{x}$ *(Std)* |
|---|---|---|---|---|---|---|
| School enrolment, attendance, retention, and completion are determined by the socio-economic status of parent/family | 2 (2.9) | 0 (0.0) | 7 ((10.3) | 15 (22.1) | 44 (64.7) | 4.46 (0.90) |
| Parents' level of education and involvement in their children's education determines the access and participation of their children in primary education. | 0 (0.0) | 8 (11.8) | 9 (13.2) | 10 (14.7) | 41 (60.3) | 4.24 (1.08) |
| Parental lack of awareness or interest in the children's education allows them not to enrol them in schools. | 0 (0.0) | 5 (7.4) | 2 (2.9) | 14 (20.6) | 47 (69.1) | 4.51 (0.87) |
| The number of school-going-age children in the home affects their enrolments and participation in primary education. | 0 (0.0) | 17 (25.0) | 11 (16.2) | 13 (19.1) | 27 (39.7) | 3.74 (1.23) |
| Poverty of parents/guardians influences children's access and participation in primary education | 0 (0.0) | 4 (5.9) | 6 (8.8) | 21 (30.9) | 37 (54.4) | 4.34 (0.87) |
| The health and nutrition status of a child affects their enrolment, attendance, retention, and completion. | 0 (0.0) | 1 (1.5) | 8 (11.8) | 14 (20.6) | 45 (66.6) | 4.51 (0.76) |
| The sex of the child influences whether he/she gets enrolled or participates in primary education | 33 (48.5) | 19 (27.9) | 3 (4.4) | 9 (13.2) | 4 (5.9) | 2.00 (1.27) |
| Cultural beliefs affect the access and participation of a child in primary education. | 19 (27.9) | 16 (23.5) | 9 (13.2) | 20 (29.4) | 4 (5.9) | 2.62 (1.33) |
| Initiation rites for boys prepare them for marriage instead of schooling. | 20 (29.4) | 15 (22.1) | 12 (17.6) | 10 (14.7) | 11 (16.2) | 2.66 (1.45) |
| Initiation rites for girls prepare them for marriage instead of schooling | 22 (32.4) | 15 (22.1) | 10 (14.7) | 10 (14.7) | 11 (16.2) | 2.60 (1.48) |
| Child labour whether in support of personal education or education of other siblings affects the attendance and retention of the victims | 3 (4.4) | 7 (10.3) | 0 (0.0) | 29 (42.6) | 29 (42.6) | 4.09 (1.12) |
| Domestic responsibilities of the male child affect their enrolment, attendance, and retention in primary education | 1 (1.5) | 24 (35.3) | 3 (4.4) | 35 (51.5) | 5 (7.4) | 3.28 (1.08) |
| Domestic responsibilities of the female child affect their enrolment, attendance, and retention in primary education | 1 (1.5) | 28 (41.2) | 8 (11.8) | 26 (38.2) | 5 (7.4) | 3.09 (1.08) |
| Disability or special need of the boy child influences her enrolment, attendance, retention, and completion of primary education. | 6 (8.8) | 15 (22.1) | 12 (17.6) | 25 (36.8) | 10 (14.7) | 3.26 (1.22) |
| Disability or special need of the girl child influences his enrolment, attendance, retention, and completion of primary education. | 6 (8.8) | 14 (20.6) | 11 (16.2) | 26 (38.2) | 11 (16.2) | 3.32 (1.23) |
| *Overall Mean* | | | | | | *3.51* |
| *Overall Standard Deviation* | | | | | | *(0.81)* |

*Source: Field Data (2024)*

**Determinants of Access and Participation**

Table 1 presents headteachers' perceptions of home-related factors affecting access to and participation in primary education in the Bongo district. The overall mean score of 3.51 and a standard deviation of 0.81 indicate a strong consensus among headteachers regarding the influence of these factors. Headteachers particularly emphasized the significance of parental awareness (mean = 4.51), children's health and nutrition status (mean = 4.51), socio-economic status (mean = 4.46), parents' education levels (mean = 4.24), the number of school-age children in the household (mean = 3.74), poverty (mean = 4.34), and child labour (mean = 4.09) on access to and participation in primary education. These findings align with the study by Hamenoo et al. (2018), which found that child labour negatively impacts children's education, leading to issues such as truancy, absenteeism, and dropout. Similarly, Cohee et al. (2021) found that a child's health status significantly affects school attendance, grade retention, and the likelihood of dropping out.

Table 1 also highlights that headteachers acknowledged the moderate impact of cultural beliefs (mean = 2.62), initiation rites (means = 2.66 and 2.60), domestic responsibilities (means = 3.28 and 3.09), and special needs (means = 3.26 and 3.32) on access to and participation in primary education. These findings support Omari (2006) research, which found that some mothers and aunties discourage their daughters from pursuing education, instead urging them to marry, manage households, and raise children. Traditional gender roles often compel girls to prioritize household duties over schooling.

Furthermore, Table 1 reveals a low level of agreement among headteachers regarding the idea that a child's gender influences enrolment or participation in primary education (mean = 2.00), indicating general disagreement with this notion in the Bongo district. This contradicts Pike (2020) findings, which suggest that in some societies, the education of one gender, either boys or girls, is valued more highly than the other.

**Table 2**

*Parents' Responses on Home-Related Factors that Affect Access and Participation in Primary Education*

| *STATEMENTS* | *SD (%)* | *D (%)* | *N (%)* | *A (%)* | *SA (%)* | *x̄ (Std)* |
|---|---|---|---|---|---|---|
| School enrolment, attendance, retention, and completion are determined by the socio-economic status of parent/family | 10 (2.9) | 0 (0.0) | 25 (7.4) | 90 (26.5) | 215 (63.2) | 4.47 (0.87) |
| Parents' level of education and involvement in their children's education determines the access and participation of their children in primary education. | 0 (0.0) | 15 (4.4) | 20 (5.9) | 80 23.5) | 225 (66.2) | 4.51 (0.80) |
| Parental lack of awareness or interest in the children's education allows them not to enrol them in schools. | 0 (0.0) | 15 (4.4) | 10 (2.9) | 85 (25.0) | 230 (67.6) | 4.56 (0.76) |
| The number of school-going-age children in the home affects their enrolments and participation in primary education. | 0 (0.0) | 45 (13.2) | 45 (13.2) | 95 (27.9) | 155 (45.6) | 4.06 (1.06) |
| Poverty of parents/guardians influences children's access and participation in primary education | 0 (0.0) | 15 (4.4) | 20 (5.9) | 110 (32.4) | 195 (57.4) | 4.43 (0.79) |
| The health and nutrition status of a child affects their enrolment, attendance, retention, and completion. | 0 (0.0) | 0 (0.0) | 25 (7.4) | 75 (22.1) | 240 (70.6) | 4.63 (0.62) |
| The sex of the child influences whether he/she gets enrolled or participates in primary education | 110 (32.4) | 100 (29.4) | 45 (13.2) | 65 (19.1) | 20 (5.9) | 2.37 (1.27) |
| Cultural beliefs affect the access and participation of a child in primary education. | 60 (17.6) | 105 (30.9) | 55 (16.2) | 90 (26.5) | 30 (8.8) | 2.78 (1.26) |
| Initiation rites for boys prepare them for marriage instead of schooling | 85 (25.0) | 100 (29.4) | 45 (13.2) | 80 (23.5) | 30 (8.8) | 2.62 (1.32) |
| Initiation rites for girls prepare them for marriage instead of schooling | 85 (25.0) | 85 (25.0) | 60 (17.6) | 75 (22.1) | 35 (10.3) | 2.68 (1.34) |
| Child labour whether in support of personal education or education of other siblings affects the attendance and retention of the victims | 5 (1.5) | 65 (19.1) | 20 (5.9) | 165 (48.5) | 85 (25.0) | 3.76 (1.07) |
| Domestic responsibilities of the male child affect their enrolment, attendance, and retention in primary education | 25 (7.4) | 105 (30.9) | 80 (23.5) | 105 (30.9) | 25 (7.4) | 3.00 (1.10) |
| Domestic responsibilities of the female child affect their enrolment attendance and retention in primary education | 15 (4.4) | 115 (33.8) | 75 (22.1) | 110 (32.4) | 25 (7.4) | 3.04 (1.06) |
| Disability or special need of the boy child influences his enrolment, attendance, retention, and completion of primary education. | 20 (5.8) | 55 (16.2) | 80 (23.5) | 155 (45.6) | 30 (8.8) | 3.35 (1.04) |
| Disability or special need of the girl child influences his enrolment, attendance, retention, and completion of primary education | 20 (5.9) | 55 (16.2) | 80 (23.5) | 165 (48.5) | 20 (5.9) | 3.32 (1.01) |
| *Overall Mean* | | | | | | *3.57* |
| *Overall Standard Deviation* | | | | | | *(0.94)* |

*Source: Field Data (2024)*

Table 2 depicts Parents' perceptions of home-related factors influencing access and participation in primary education. The overall mean of 3.57 and a standard deviation of 0.94 suggest a high level of agreement among parents regarding the influence of these factors on access and participation in primary education. Notably, the Table showed that parents expressed strong agreement on the significance of factors such as parents' level of education (4.51), parental awareness (4.56), and the health and nutrition status of a child (4.63), as indicated by high mean scores and low standard deviations. These findings are in line with Boateng et al. (2021), who stressed the importance of parental involvement and the overall well-being of the child in educational outcomes.

Home factors such as socio-economic status of parents (4.47), poverty (4.43), the number of school-going age children (4.06), and child labour (3.76) received high mean scores, reflecting broad consensus among parents on their impact on access and participation. These findings corroborate the findings of Broer et al. (2019), who argued that the economic capital of parents determines how far they can offer the needed financial assistance to their children in pursuit of education. However, Table 2 revealed some variability in parents' responses regarding the influence of cultural beliefs (2.78), initiation rites (2.62; 2.68), domestic responsibilities (3.00; 3.04), and special needs on education (3.35; 3.32), with mean scores of moderate levels of agreement and standard deviations indicating diverse opinions on their impact on access and participation in primary education. These findings do not support Mallole and Mwakalinga (2022) who indicated that some parents regard initiation rites among other cultural practices to prepare the female child to learn motherhood roles to be responsible mothers of their families when they get into marriages rather than focusing on their education.

Surprisingly, parents express a low level of agreement with the statement that the sex of the child influences participation in primary education (2.37), indicating a disagreement among parents in the Bongo district. This finding, however, contradicts the findings of the studies that consider the education of a particular sex either the boy child or the girl child more important than the other as upheld in some societies (Ndivo et al., 2021). These findings underscore the multifaceted nature of home-related factors shaping access and participation in primary education and reflect the varied perspectives within the parent community.

**What school-related factors affect access to and participation in primary education?**

The school-related factors that headteachers and parents responded to include the location of the school and its accessibility, inadequate teachers, absenteeism of teachers, school facilities, teaching and learning materials, safety and security in schools and cost of schooling. The respondents were required to respond to each item by indicating strongly agree, agree, neutral, disagree or strongly disagree as shown in Tables 3 and 4.

**Table 3**

*Headteachers' Responses on School-Related Factors that Affect Access and Participation in Primary Education*

| *STATEMENTS* | *SD (%)* | *D (%)* | *N (%)* | *A (%)* | *SA (%)* | *x̄ (Std)* |
|---|---|---|---|---|---|---|
| The availability of primary schools in the community encourages enrolment and attendance of children to go to school. | 0 (0.0) | 0 (0.0) | 3 (4.4) | 35 (51.5) | 30 (44.1) | 4.40 (0.58) |
| The location of a school and its accessibility can impact enrolment, attendance, and retention. | 0 (0.0) | 2 (2.9) | 3 (4.4) | 29 (42.6) | 34 (50.0) | 4.40 (0.72) |
| The distance from home to school plays a role in having children in primary school. | 0 (0.0) | 6 (8.8) | 4 (5.9) | 23 (33.8) | 35 (51.5) | 4.28 (0.93) |
| The inadequate number of teachers in the school to teach pupils affects the enrolment and attendance of children in the school. | 1 (1.5) | 16 (23.5) | 7 (10.3) | 19 (27.9) | 25 (36.8) | 3.75 (1.23) |
| Absenteeism/irregular attendance of teachers affects attendance and retention of pupils. | 2 (2.9) | 3 (4.4) | 5 (7.4) | 29 (42.6) | 29 (42.6) | 4.18 (0.96) |
| Inadequate school facilities in school affect the enrolment of children in the school. | 0 (0.0) | 4 (5.9) | 11 (16.2) | 24 (35.3) | 29 (42.6) | 4.15 (0.90) |
| The availability of TLMs in the school influences the decision of parents to enrol their children | 0 (0.0) | 3 (4.4) | 5 (7.4) | 22 (32.4) | 38 (55.9) | 4.40 (0.81) |
| School safety and security affect the enrolment, attendance, and retention of pupils in schools. | 3 (4.4) | 8 (11.8) | 12 (17.6) | 22 (32.4) | 23 (33.8) | 3.79 (1.17) |
| Cost of schooling affects children's access to and participation in primary education. | 6 (8.8) | 19 (27.9) | 5 (7.4) | 30 (44.1) | 8 (11.8) | 3.22 (1.23) |
| *Overall Mean* | | | | | | *4.06* |
| *Overall Standard Deviation* | | | | | | *(0.70)* |

*Source: Field Data (2024)*

Table 3 presents the perceptions of headteachers regarding various school-related factors that influence access to and participation in primary education within the district. The overall mean score of 4.06 reflects a strong consensus among headteachers on the significance of these factors.

The low standard deviation of 0.70 further indicates a high level of consistency in responses, suggesting general agreement among headteachers regarding the impact of these school-related factors on access and participation in primary education.

The data reveal that statements concerning the availability of schools in the community and the influence of school location on enrolment received high mean scores (4.40) with low standard deviations, indicating unanimous agreement among headteachers. These findings align with Shehu (2018) assertion that building more schools closer to communities, particularly in rural areas, reduces the distance pupils must travel, thereby improving retention rates and promoting regular school attendance.

Similarly, headteachers expressed positive perceptions about issues related to teacher absenteeism (mean = 4.18), school safety (mean = 3.79), and the inadequate number of teachers (mean = 3.75). These findings are consistent with Amagnya (2020) study, which concluded that high student-teacher ratios can diminish learning outcomes, leading to educational wastage through absenteeism and dropout rates. Amagnya (2020) further emphasized that teacher absenteeism can erode trust in the education system, discourage parents from sending their children to school, and hinder students from attending regularly.

The significance of school facilities (mean = 4.15) and teaching materials (mean = 4.40) in influencing access to and participation in primary education was also recognized by headteachers. These findings are in line with UNESCO (2018) conclusions that adequate facilities and learning materials are essential for fostering a positive learning environment and attracting pupils to school. Moreover, these results support the provisions of Act 778 of the Education Act 2008, which mandates that District Assemblies provide the necessary infrastructure and other facilities for the education of the population within their jurisdiction (Education Act, 2008).

However, a moderate level of agreement was observed regarding the impact of the cost of schooling on access and participation in primary education, with a mean score of 3.22 and a higher standard deviation of 1.23. This suggests diverse perceptions among headteachers, possibly influenced by the existence of free compulsory universal primary education. The moderate agreement on the cost of schooling echoes the findings of Kainuwa et al. (2013), who noted that expenses such as admission and registration fees, Parent Teacher Association (PTA) dues, examination fees, uniforms, stationery, daily transportation, and other monetary demands can be significant factors in household decisions to either not enrol their children in school or withdraw them after enrolment.

**Determinants of Access and Participation**

**Table 4**

*Parents' Responses on School-Related Factors that Affect Access and Participation in Primary Education*

| *STATEMENTS* | *SD* (%) | *D* (%) | *N* (%) | *A* (%) | *SA* (%) | $\bar{x}$ (Std) |
|---|---|---|---|---|---|---|
| The availability of primary schools in the community encourages enrolment and attendance of children to go to school. | 0 | 20 | 30 | 165 | 100 | 4.16 |
| | (0.0) | (5.9) | (8.8) | (48.5) | (36.8) | (0.82) |
| The location of a school and its accessibility can impact enrolment, attendance, and retention. | 0 | 0 | 10 | 215 | 115 | 4.34 |
| | (0.0) | (0.0) | (2.9) | (63.2) | (33.8) | (0.53) |
| The distance from home to school plays a role in having children in primary school. | 0 | 5 | 30 | 160 | 180 | 4.31 |
| | (0.0) | (1.5) | (8.8) | (47.1) | (42.6) | (0.69) |
| The inadequate number of teachers in the school to teach pupils affects the enrolment and attendance of children in the school. | 0 | 30 | 10 | 170 | 130 | 4.18 |
| | (0.0) | (8.8) | (2.9) | (50.0) | (38.2) | (0.86) |
| Absenteeism/irregular attendance of teachers affects attendance and retention of pupils. | 5 | 0 | 40 | 160 | 130 | 4.25 |
| | (1.5) | (0.0) | (13.2) | (47.1) | (38.2) | (0.78) |
| Inadequate school facilities in school affect the enrolment of children in the school. | 0 | 5 | 55 | 190 | 90 | 4.07 |
| | (0.0) | (1.5) | (16.2) | (55.9) | (26.5) | (0.69) |
| The availability of TLMs in the school influences the decision of parents to enrol their children | 0 | 10 | 40 | 145 | 145 | 4.25 |
| | (0.0) | (2.9) | (11.8) | (42.6) | (42.6) | (0.78) |
| School safety and security affect the enrolment, attendance, and retention of pupils in schools. | 20 | 20 | 75 | 155 | 70 | 3.69 |
| | (5.9) | (5.9) | (22.1) | (45.6) | (20.6) | (1.05) |
| Cost of schooling affects children's access to and participation in primary education. | 15 | 115 | 35 | 115 | 60 | 3.26 |
| | (4.4) | (33.8) | 10.3) | (33.8) | (17.6) | (1.22) |
| *Overall Mean* | | | | | | *4.06* |
| *Overall Standard Deviation* | | | | | | *(0.80)* |

*Source: Field Data (2024)*

Table 4 presents the perceptions of parents regarding school-related factors that influence access to and participation in primary education. The findings indicate a high level of agreement among parents, as reflected by an overall mean score of 4.06 and a standard deviation of 0.80, suggesting a strong consensus on the impact of these factors. Notably, parents expressed strong agreement with statements such as the availability of primary schools encouraging enrolment (mean = 4.16), the influence of school location on attendance (mean = 4.34), and the effect of the distance from home on children's school attendance (mean = 4.31). These factors received high mean scores and low standard deviations, indicating consistent responses across the sample. These results align with UNESCO (2019) findings, which emphasize the importance of school availability and accessibility in increasing enrolment rates, particularly in rural and underserved areas, by reducing barriers like long distances and enhancing convenience for families.

Additionally, parents positively perceived the impact of teaching and learning materials (mean = 4.25), inadequate school facilities (mean = 4.07), and the insufficient number of teachers (mean = 4.25) on children's access to and participation in primary education. These findings support the World Bank (2018) assertion that high student-teacher ratios can negatively affect learning outcomes and contribute to educational inefficiencies. Addressing these teacher-related challenges is essential for improving educational quality and building parental confidence in the education system. Furthermore, these results echo UNESCO (2018) findings that inadequate facilities can discourage school attendance, particularly among female students. Investing in school infrastructure is thus crucial for creating a conducive learning environment and enhancing educational access, as emphasized by earlier research (Hanushek, 1995).

However, a more moderate level of agreement was observed regarding the impact of the cost of schooling on access and participation, with a mean score of 3.26 and a higher standard deviation of 1.22. This reflects diverse parental perceptions, possibly influenced by the existence of free compulsory universal primary education. This finding highlights the need for policymakers to consider the broader financial implications of education for families, including both direct and indirect costs, which can influence household decisions about enrolling or withdrawing children from school, particularly in low-income settings (UNESCO, 2020).

Overall, these findings align with the perspectives of headteachers and underscore a shared belief among parents and school leaders regarding the significance of school-related factors in shaping access to and participation in primary education in the district.

## Conclusions

Based on the findings of the study, it can be concluded that school-related and home-related factors have a significant influence on access to and participation of school-age children in primary education. Home factors such as socio-economic status, child labour, parents' level of education, health and nutrition status, and parental awareness or interest in education were rated high by respondents on the influence of these factors on access to and participation in primary education in the district. However, there was disagreement between headteachers and parents regarding the notion that a child's gender does not impact access to and participation in primary education, with low mean values recorded for both groups (M=2.00 and 2.37). Also, school factors such as school facilities, teaching and learning materials, location of school, and distance to school and teacher quality were highly agreed upon by respondents regarding their influence on access to and participation in primary education.

Therefore, based on the findings and for children of school-going age to have access to and participate in primary education, this study calls for deliberate and concerted efforts and interventions by the Bongo District Assembly to provide the necessary infrastructural needs and any other facilities for the education of the population in the area of its authority as enshrined in the Education Act, 2008. The study further recommends the assistance of NGOs in the provision of school supplies such as TLMs, school uniforms, sandals, bicycles, and any other educational materials that will alleviate some cost of parents to enhance the access and participation in primary education of school-age children Finally, the Ministry of Education embarks on community outreach programmes to address factors in the school or home environment which adversely affect the access and participation of children in primary education in the Bongo District.

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The authors declare no known conflict of interest

**Author Contribution Statement**

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**ORIGINAL ARTICLE**

# Teacher Professionalism and Professional Practice in Ghana: Baseline Evidence

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## Abstract

This study investigates the relationship between teacher professionalism and professional practice across Ghana using a large national quantitative survey (N = 4,645). Using a descriptive survey design, data was gathered using 27 operationalized variables spanning teacher identity, CPD participation, ethical adherence, classroom collaboration, and demographic characteristics. Data was analysed using descriptive statistics and multiple regression. Findings indicate a strong positive relationship between professional practice and professionalism, suggesting that higher levels of professional practice are associated with higher levels of professionalism. Similarly, CPD involvement was found to contribute positively to teacher professionalism. In addition, INSET, age, and teaching experience were positively associated with teacher professionalism, but negatively associated with professional practice, indicating that these factors operate differently across the two outcome constructs. Qualifications outside education were not significantly associated with professionalism but were negatively associated with professional practice. Professional rank was negatively associated with professionalism but positively associated with professional practice, whereas marital status and number of children were negatively associated with both outcomes. The study concludes that teacher professionalism and professional practice in Ghana are shaped by complex, interrelated factors, requiring evidence-based and context-sensitive policy interventions. The research contributes a foundational evidence base to inform the National Teaching Council (NTC) and stakeholders on strategies for enhancing teacher professionalism and practice. Recommendations include restructuring INSET timing, refocusing CPD delivery, and emphasising contextualized teacher development policies.

**Keywords:** *Educational Policy; Continuous Professional Development (CPD); Evidence-Based Education Reform; Teacher Quality and Practice.*

## Introduction

The global discourse on quality education has increasingly underscored the significance of teacher professionalism as a determinant of educational effectiveness, student achievement, and national development (Menter & Assunção Flores, 2021; Zhang et al., 2025). In the 21st century, the role of the teacher transcends classroom instruction; it embodies a broader responsibility of shaping national consciousness, nurturing civic values, and contributing to sustainable development (Sedwal, 2024). The demand for competent, ethical, and highly professional teachers has never been more urgent, especially in developing countries like Ghana where persistent concerns over teacher absenteeism, misconduct, and inefficiencies in professional practice threaten the goals of educational equity and excellence (Kim et al., 2019; Sancar et al., 2021). In this context, enhancing teacher professionalism is not merely an academic pursuit but a developmental imperative aligned with Sustainable Development Goal 4: "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". This is particularly relevant in Africa, where recent SDG scholarship highlights the need for stronger empirical evidence to guide policy implementation and development outcomes (Gyimah et al., 2023; Gyimah et al., 2025). This study is particularly timely, given the evolving landscape of Ghana's educational sector which is characterized by policy reforms such as the introduction of the National Teachers' Standards (NTS), the Ghana Teacher Licensure Examination (GTLE), and the institutionalization of Continuous Professional Development (CPD) as a requirement for teacher growth (Ministry of Education, 2017; NTC, 2020). These developments demand a rigorous, evidence-based assessment of teacher professionalism to inform policy and practice at both systemic and institutional levels.

The literature conceptualizes teacher professionalism as a multidimensional construct involving professional knowledge, ethical conduct, lifelong learning, collaboration and reflective practice (Ball & Forzani, 2009; Lieberman & Miller, 2005; OECD, 2016). In this study, the theoretical focus is narrowed to a practice-based professionalisation framework, where CPD, INSET and awareness of professional standards are treated as professional learning inputs that may shape teacher professionalism and professional practice. This framing keeps the study focused on the empirical relationship between CPD, professionalism and practice within the Ghanaian teaching context.

However, despite the global attention to teacher professionalism, critical gaps remain in the Ghanaian context. Much of the existing literature and policy discourse on teacher professionalism in Ghana is conceptual, lacking robust empirical evidence that reflects the perceptions, practices, and contextual realities of teachers across diverse geographical and institutional settings. While some localized studies have explored the impact of CPD on teacher performance (Edwards & Osei-Mensah, 2019) or examined leadership roles in failing schools (SEIP, 2014), there is a dearth of comprehensive, nationwide research that systematically investigates teacher professionalism within the framework of the National Teachers' Standards (NTS). Additionally, very few studies have examined the nexus between teacher professionalism and professional practices through both qualitative and quantitative lenses, nor have they assessed how variables such as location, gender, rank, INSET frequency, and CPD participation interact to shape professional conduct and practice. These knowledge gaps hinder the ability of the National Teaching Council (NTC) and other stakeholders to design contextually appropriate interventions that enhance teacher quality. To address these deficiencies, this study poses the following research questions: (1) What is the extent of teacher professionalism in the Ghanaian education system within the framework of the NTS? (2) What CPD programmes are available to teachers? (3) How do teachers perceive CPD as a means of improving professional practice? (4) What factors are associated with teacher professionalism and professional practice among in-service teachers in Ghana?

This study contributes to knowledge in three main ways. Theoretically, it advances a practice-based professionalization framework that links CPD, INSET, professional standards, teacher professionalism and professional practice. Empirically, it provides large-scale baseline evidence from 4,645 in-service teachers across Ghana, showing how teacher professionalism and professional practice are related but distinct constructs. The findings also serve as a diagnostic tool for the Ministry of Education, teachers' unions and training institutions to identify areas for intervention, resource allocation and capacity building. Methodologically, the study demonstrates how descriptive and regression-based evidence can be used to identify the professional, demographic and contextual factors associated with teacher professionalism and practice. These contributions provide useful evidence for teacher development policy, CPD design and the practical implementation of professional standards in Ghana.

The paper is organized as follows. Following this introductory section, Section 2 provides a critical review of relevant literature, Section 3 outlines the research methodology, Section 4 presents the results and discussion of the findings, Section 5 provides the conclusion, and Section 6 provides the recommendations and implications.

## Literature Review

### Evolution of CPD among Teachers in Ghana and Teacher Professionalism

CPD among teachers in Ghana has shifted from irregular in-service workshops to regulated, career-long learning linked to professionalism, licensing and competence (NTC, 2020; Salifu et al., 2025). The NTC's point-based framework formalised this shift by requiring teachers to earn CPD points through accredited activities for growth and licence renewal (NTC, 2020; UNESCO-IICBA, 2025). Before this formalisation, teachers experienced CPD through workshops, school-based INSET, cluster-based training and continuing education, although participation was constrained by cost, timing, distance and relevance (Abakah et al., 2022; Abakah et al., 2023). This suggests that CPD has advanced institutionally, but implementation remains uneven across teachers, subjects and school contexts (Abakah et al., 2022; Mitchell et al., 2024).

Distance and sandwich education have become important upgrading routes because subject-specific CPD opportunities remain limited (Abakah et al., 2023; Salifu et al., 2025). Within teacher professionalism, CPD is not merely training but a mechanism for strengthening pedagogy, ethical conduct, reflection, classroom management and quality teaching (NTC, 2020; Salifu et al., 2025). African evidence cautions that CPD produces stronger outcomes when it is sustained, context-sensitive, collaborative and linked to classroom practice rather than isolated workshops (Mitchell et al., 2024; Abakah et al., 2022). Ghana's CPD evolution reflects policy progress and implementation tension, because effectiveness depends on accessibility, relevance, teacher agency and institutional support (NTC, 2020; Abakah et al., 2022; Salifu et al., 2025).

### The Professional Work of Teaching

Teaching in contemporary education systems is increasingly understood as professional work that combines specialist knowledge, ethical judgement, collaboration, research engagement, and continuous learning (Tatto, 2021; Mezza, 2022). In Ghana, this understanding is reinforced by the National Teaching Council's professional development framework, which links teacher competence, portfolio development, licence renewal, and professional standing to continuing professional development (NTC, 2020; Salifu et al., 2025). The work of teaching has also expanded beyond content delivery to include inclusive pedagogy, technology-mediated learning, classroom management, and learner-centred support, requiring teachers to adapt practice to diverse educational needs (Abakah et al., 2022; Mitchell et al., 2024).

Ghanaian evidence shows that professional development improves instructional delivery and classroom management, although its influence on content knowledge remains less consistent (Salifu et al., 2025). Teacher professionalism is therefore both competence-based and ethically grounded, because teachers are expected to safeguard learners, model appropriate conduct, and support learners' moral and social development (Cronqvist, 2025; NTC, 2020). Recent African evidence further shows that professional learning is more effective when it is sustained, school-based, collaborative, and responsive to teachers' contexts rather than generic or externally imposed (Mitchell et al., 2024; Abakah et al., 2023).

Accordingly, professional practice in Ghana should be understood as the visible enactment of professionalism through ethical conduct, reflective pedagogy, collaboration, CPD participation, and responsiveness to learners' needs (NTC, 2020; Salifu et al., 2025).

## Professionalisation, Practice, and Value Creation

The concept of professionalism in teaching is increasingly understood through observable professional practice, including teachers' pedagogical competence, ethical conduct, collaboration, reflective learning and responsiveness to learners' needs (NTC, 2020; Tatto, 2021). In this sense, professionalism is not only an occupational identity but also the practical demonstration of standards through classroom management, assessment, inclusive pedagogy and continuous improvement (NTC, 2020; Salifu et al., 2025). Within Ghana's education system, the NTC CPD Framework strengthens this practice-based understanding by linking professional development to CPD points, portfolio evidence, licence renewal and teacher growth (NTC, 2020; UNESCO-IICBA, 2025).

In practice, CPD provides a structured pathway through which teachers update pedagogical knowledge, improve instructional delivery and respond more effectively to classroom challenges (Abakah et al., 2022; Salifu et al., 2025). Recent evidence from Ghana shows that professional development contributes to improved instructional delivery and classroom management, although its effect depends on the relevance, accessibility and quality of CPD activities (Abakah et al., 2022; Salifu et al., 2025). This suggests that CPD improves professional practice most effectively when it is aligned with teachers' subject needs, school contexts and everyday classroom realities (Abakah et al., 2023; Mitchell et al., 2024).

Professional citizenship also remains important because teachers are expected to model ethical behaviour, support learners' social development and contribute to school-community improvement (NTC, 2020; UNESCO-IICBA, 2025). However, this citizenship becomes visible mainly through practice: how teachers plan lessons, assess learning, manage classrooms, collaborate with colleagues and engage parents (NTC, 2020; Salifu et al., 2025). Professional learning communities, school-based INSET and cluster-based training therefore create practical spaces for teachers to share experiences, reflect on classroom problems and adopt improved pedagogical strategies (Abakah et al., 2022; Mitchell et al., 2024). Thus, teacher professionalism is best understood as a practice-based commitment strengthened through relevant, sustained and context-sensitive CPD (Abakah et al., 2022; Mitchell et al., 2024; Salifu et al., 2025).

## Continuous Professional Development (CPD) Engagement

CPD in Ghana has evolved from occasional in-service workshops into a regulated professional learning system linked to teacher licensing, professional growth and career progression (NTC, 2020; UNESCO-IICBA, 2025). The NTC CPD Framework provides the national structure for planning, implementing and documenting CPD activities through accredited service providers, CPD points and teacher portfolios (NTC, 2020). This framework reframes CPD as a professional requirement rather than a voluntary training activity, making it central to teacher accountability and professional practice in Ghana (NTC, 2020; Salifu et al., 2025). Recent Ghanaian evidence shows that teachers commonly participate in CPD through workshops, school-based INSET, cluster-based INSET, short courses, professional learning communities and continuing education (Abakah et al., 2022). However, access to CPD remains shaped by cost, timing, information gaps, institutional support and the relevance of training content to teachers' classroom needs (Abakah et al., 2022; Salifu et al., 2025).

The evolution of CPD has also changed how teacher professionalism is understood in Ghana, moving it from occupational identity toward observable classroom practice (UNESCO-IICBA, 2025; Salifu et al., 2025). Professionalism is now increasingly demonstrated through lesson delivery, classroom management, assessment practice, ethical conduct, collaboration and responsiveness to learners' needs (NTC, 2020; Salifu et al., 2025). Distance and sandwich education have further expanded teachers' routes to professional upgrading, especially where conventional CPD opportunities are limited or unevenly distributed (Abakah et al., 2023). Broader African evidence also shows that CPD is most effective when it is sustained, collaborative, school-based and connected to teachers' everyday classroom realities (Mitchell et al., 2024). Therefore, Ghana's NTC CPD Framework provides an important foundation for teacher professionalism, but its contribution to professional practice depends on the quality, accessibility and classroom relevance of CPD activities (Abakah et al., 2022; Mitchell et al., 2024; Salifu et al., 2025).

In summary, the study is guided by a practice-based professionalisation framework (NTC, 2020; Tatto, 2021; Mezza, 2022). In this framework, CPD, INSET participation and awareness of the National Teachers' Standards (NTS) are treated as professional learning inputs that may strengthen teacher professionalism (Abakah et al., 2022; Salifu et al., 2025). Teacher professionalism refers to teachers' professional identity, ethical consciousness, commitment to lifelong learning and adherence to professional standards (NTC, 2020; Tatto, 2021). Professional practice refers to the visible application of these professional values through classroom management, inclusive pedagogy, collaboration, parent engagement and responsiveness to learners' needs (NTC, 2020; Salifu et al., 2025). Demographic and professional characteristics such as location, gender, age, qualification, rank, teaching experience, practice level, marital status, number of children and union affiliation are included as contextual factors that may shape both professionalism and practice (Abakah et al., 2022; Mitchell et al., 2024).

## Research Design

The study employed a descriptive cross-sectional survey design under the quantitative approach. This design enabled the collection of data from a large sample of in-service teachers rather than conducting a census of the entire teacher population in Ghana. Most Ghanaian teachers have traditionally been trained through Colleges of Education; however, initial teacher education has since been reformed from the diploma-based model to the four-year Bachelor of Education (B.Ed.) programme. The National Teacher Education Curriculum Framework provides the benchmark for reviewing teacher education curricula in Ghana and is underpinned by the National Teachers' Standards, which define the competencies expected of a professional teacher.

To determine the minimum required sample size for the survey, a standard sample size calculation formula was applied[1], which indicated that at least 401 in-service teachers were needed to achieve adequate statistical precision. However, the study exceeded this minimum and successfully obtained a robust and usable sample of 4,645 respondents. The survey was designed to obtain broad geographical coverage across Ghana's Coastal, Middle and Northern belts, as well as urban, peri-urban and rural school locations. To support this coverage, survey links were distributed through teacher networks and institutional channels across the three geographical zones. However, because participation was voluntary and based on access to the online survey, proportional representation could not be strictly guaranteed. Therefore, the final sample is best described as a large voluntary convenience sample rather than a probability-based random sample. In addition, the flexible voluntary response approach may have introduced sampling bias, as teachers with internet access, stronger professional networks or greater interest in CPD and professionalism may have been more likely to participate. Although the large sample provides useful baseline evidence on teacher professionalism and professional practice in Ghana, the non-probability nature of the sampling approach limits the extent to which the findings can be statistically generalised to the entire population of in-service teachers in Ghana.

[1] Sample size = $\frac{N}{1 + N\alpha^2}$ Where N = number of in-service teachers, α = margin of error therefore, Sample size = $\frac{340{,}000}{1 + (340{,}000)(0.05)^2} = 401$

### Data Collection and Analysis

Data were collected remotely using an online questionnaire administered through Google Forms and SurveyMonkey. The online format enabled questionnaire distribution, response collation and data export for statistical analysis. Survey links were distributed to in-service teachers through email and teacher networks across the study locations. Participation was voluntary, and respondents were informed about the purpose of the study, confidentiality of responses and the use of the data for research purposes.

Given the remote data collection process, participation depended on teachers' access to the online survey and willingness to respond. This approach increased the number of responses but means that the final sample should be understood as a voluntary convenience sample rather than a probability-based sample. No personally identifying information was reported in the analysis.

Data were screened and coded before analysis in SPSS. Descriptive statistics, including frequencies, percentages and means, were used to summarise respondents' demographic characteristics and views on CPD, teacher professionalism and professional practice. Multiple regression was then used to examine the determinants of teacher professionalism and professional practice. Multicollinearity was additionally assessed using variance inflation factor (VIF) and tolerance statistics before interpreting the regression results. Table 1 presents the alignment between the research questions, questionnaire items and analytical procedures.

**Table 1**

*Alignment of Research Questions, Questionnaire Items and Analytical Procedures*

| *S/N* | *Research Question* | *Appropriate questionnaire items*[2] | *Appropriate data analysis* | *Expected Outcome/ Results Reporting* |
|---|---|---|---|---|
| 1 | What is the extent of teacher professionalism in the Ghanaian education system within the framework of the NTS? | Section B – items no 1-3, 5-7 | Central Tendencies (i.e., frequencies, percentages) | Variations in the extent of opinions in agreement, frequencies, significance, etc. |
| 2 | What Continuous Professional Development (CPD) programmes are available to teachers? | Section B – items 4, 11, 20 | Central Tendencies (i.e., frequencies, percentages) | Variations in the extent of opinions in agreement, frequencies, significance, etc. |
| 3 | How do teachers perceive CPD as a means of improving professional practice? | Section A – demographics<br><br>Section B – item 8, 9, 12, 13 - 18 | Central Tendencies (i.e., frequencies, percentages) | Variations in the extent of opinions in agreement, frequencies, significance, etc. |
| 4 | What factors are associated with teacher professionalism and professional practice among in-service teachers in Ghana? | Section B – items 10, 21 - 23 | Multiple Regressions | Results from regressions of professionalism and practices to ascertain perceptions |

## Results

### Demographic Statistics

Table 2 presents the statistics of the respondents used for the study. Geographically, the largest group of respondents (47.82%) came from the Southern Zone, followed by the Northern Zone (26.67%) and the Middle Zone (24.95%). A small proportion (0.56%) was unsure of their geographical zone. The study covered a wide range of districts, indicating strong regional representation. Regarding locality, 67.84% of respondents resided in rural areas, 30.78% in urban areas, and 1.38% were uncertain. This distribution shows broad geographical coverage across the three zones, although it should not be interpreted as strict proportional representation because participation was voluntary.

In the study sample, male teachers represented 61.85% of respondents, while female teachers accounted for 38.15%. Compared with the national teacher workforce distribution reported in the Methodology section, the sample therefore reflects a slightly higher male response rate. This difference is interpreted as the gender composition of the survey respondents rather than as a claim about the national teacher population. The age distribution indicated that nearly half (48.91%) of the respondents were aged 21–30, suggesting a relatively young teacher workforce. An additional 25.58% were aged 31–40, 18.62% were between 41–50, and 6.35% were aged 51 and above.

Educational qualifications showed that all respondents were trained teachers. About 47.75% held diplomas, 39.74% had bachelor's degrees, and 10.81% had master’s degrees. Most teachers (48.22%) held the rank of Senior Superintendent II & I, followed by Principal Superintendents (29.58%) and Assistant Directors (19.72%). In terms of teaching experience, 56% had taught for 10 years or less. Teachers with 11–15 years of experience constituted 21.08%, while 10.96% had 16–20 years, and 11.71% had taught for more than 20 years. Teaching level data showed that approximately 54% taught at the primary level, 39% at the junior high school (JHS) level, and only 7% at senior high school (SHS) or TVET institutions. Finally, 79.16% of respondents were affiliated with GNAT, 9.28% with CCT, 8.89% with NAGRAT, and 0.37% with ATAG. A small group (2.3%) did not belong to any union. These demographic findings provide a comprehensive baseline for interpreting teachers’ views on professionalism and CPD across Ghana.

**Table 2**

*Demographic statistics (N = 4645)*

| | *Frequency* | *Percentage* |
|---|---|---|
| *Geographical Zone* | | |
| Southern | 2,221 | 47.82 |
| Northern | 1,239 | 26.67 |
| Middle | 1,159 | 24.95 |
| Uncertain | 26 | 0.56 |
| *Location of Schools* | | |
| Urban | 1,430 | 30.78 |
| Rural | 3,151 | 67.84 |
| Uncertain | 64 | 1.38 |
| *Gender* | | |
| Male | 2,873 | 61.85 |
| Female | 1,772 | 38.15 |
| *Age (years)* | | |
| <20 | 25 | 0.54 |
| 21-30 | 2,272 | 48.91 |
| 31-40 | 1,188 | 25.58 |
| 41-50 | 865 | 18.62 |
| 51+ | 295 | 6.35 |
| *Education* | | |
| None | 79 | 1.70 |
| Diploma | 2,218 | 47.75 |
| Bachelor | 1,846 | 39.74 |
| Masters | 502 | 10.81 |
| *Ranks* | | |
| Senior Superintendent II & I | 2,240 | 48.22 |
| Principal Superintendent | 1,374 | 29.58 |
| Assistant Director II & I | 916 | 19.72 |
| Not sure | 44 | 0.95 |
| Deputy Director | 39 | 0.84 |
| Director II & I | 32 | 0.69 |
| *Teaching Experience* | | |
| Month(s) Up to 5 years | 1,389 | 29.9 |
| 6 - 10 years | 1,213 | 26.11 |
| 11 - 15 years | 979 | 21.08 |
| 16 - 20 years | 509 | 10.96 |
| More than 20 years | 544 | 11.71 |
| Uncertain | 11 | 0.24 |
| *Level of practice* | | |
| JHS | 1806 | 38.88 |

| | | |
|---|---|---|
| Lower Primary | 1299 | 27.97 |
| Upper primary | 1231 | 26.5 |
| SHS/ TVET | 309 | 6.65 |
| *Union Affiliation* | | |
| GNAT | 3677 | 79.16 |
| CCT | 431 | 9.28 |
| NAGRAT | 413 | 8.89 |
| ATAG | 17 | 0.37 |
| None | 107 | 2.3 |

### *Statement Descriptive Statistics*

### Extent of Teacher Professionalism within NTS Framework

The data presented in Table 3 reveal a strong commitment among teachers to gender-responsive pedagogy. A combined 69% of respondents indicated that they either always or often consider gender differences in their instructional practices, reflecting a high degree of gender awareness in classroom engagement. Additionally, 22% of respondents reported occasional consideration of gender dynamics, while only 9% acknowledged that they rarely or never integrate gender considerations into their teaching. These findings reflect an overall positive trend toward inclusive pedagogy, although they highlight the need to strengthen consistency in gender-inclusive strategies across all teaching contexts. Similarly, Table 3 illustrates a generally affirmative stance toward supporting learners with special educational needs. Approximately 66.8% of respondents reported that they always or often provide support to students with diverse learning needs. A further 15% indicated occasional support, while 17.8% acknowledged rare or no support. Although the majority of teachers demonstrate inclusive teaching practices, the results point to a segment of the workforce requiring targeted professional development to enhance competencies in inclusive education.

**Table 3**

*Responses for Teacher Professionalism within NTS Framework*

| *Responses* | *Frequency* | *Percentage* |
|---|---|---|
| *Respondents' responsiveness to gender differences in the classroom* | | |
| Often [ about 80% of my lessons] | 1,834 | 39.48 |
| Always [about 100% of my lessons] | 1,372 | 29.54 |
| Sometimes [about 50% of my lessons] | 1,003 | 21.59 |
| Never | 226 | 4.87 |
| Rarely [about 10% of my lessons] | 210 | 4.52 |
| *Respondents' support for learners with special and diverse needs* | | |
| Always [I practice this in every lesson] | 1,683 | 36.23 |
| Often [I practice this in 80% of my lessons] | 1,424 | 30.66 |
| Sometimes [I practice this in 50% of my lessons] | 710 | 15.29 |
| I have not encountered children with special/diverse needs | 678 | 14.60 |
| Rarely [I practice this in 10% of my lessons] | 129 | 2.78 |

| | | |
|---|---|---|
| *Respondents' professional working relationship with colleagues* | | |
| Often [I do this in about 80% of my lessons in a term] | 1,792 | 38.58 |
| Always [I do it in every lesson] | 1,584 | 34.10 |
| Sometimes [I do this in about 50% of my lessons in a term] | 983 | 21.16 |
| Rarely [I do this in about 10%of my lesson in a term] | 267 | 5.75 |
| Never [I do not do this at all] | 19 | 0.41 |
| *Respondents' consciousness of the legal and ethical codes* | | |
| Strongly agree | 2,798 | 60.24 |
| Agree | 1,631 | 35.11 |
| Moderately agree | 188 | 4.05 |
| Disagree | 20 | 0.43 |
| Strongly disagree | 8 | 0.17 |
| *The extent of respondents' involvement in parent association (PA) meetings* | | |
| Always [Every time there is PA meeting] | 3,499 | 75.33 |
| Often [attend about 80% of PA meetings] | 690 | 14.85 |
| Sometimes [attend about 50% of PA meetings] | 288 | 6.20 |
| Rarely [attend about 10% of PA meetings] | 98 | 2.11 |
| Never | 70 | 1.51 |

In Table 3, findings emphasise a strong culture of professional collaboration, with 72.68% of respondents engaging frequently in collegial collaboration to improve teaching and learning. An additional 21.16% collaborate occasionally, whereas 6.16% reported limited collaboration. These results highlight widespread collegiality but also suggest a need to promote structured peer-learning frameworks to ensure inclusion of all educators in collaborative practice. Furthermore, Table 3 shows that 95.35% of respondents are aware of the legal and ethical codes of the profession, and 4.05% are somewhat aware, leaving only 0.60% reporting no awareness. This points to a high level of ethical consciousness among teachers. Lastly, Table 3 reveals that 90.85% of respondents regularly attend Parent Association (PA) meetings, with only a small proportion—3.62%—rarely or never participating. This indicates strong teacher engagement in school-community relations, reinforcing the importance of collaboration between educators and parents in fostering student success.

## Different CPDs for Teachers

Table 4 presents respondents' awareness, frequency of participation, and specific involvement in Continuous Professional Development (CPD) programmes. The most widely recognised CPD activity was School-Based INSET, reported by 1,553 respondents (33.43%), followed by Cluster-Based INSET with 1,214 respondents (26.14%) and Short Courses with 850 respondents (18.30%). Awareness of Department-Based INSET and Degree Programmes was lower, reported by 565 respondents (12.16%) and 463 respondents (9.97%), respectively.

**Table 4**

*Responses for Different CPDs for Teachers*

| *Responses* | *Frequency* | *Percentage* |
|---|---|---|
| *Respondents' awareness of available CPD programmes* | | |
| School-Based In-Service Training | 1,553 | 33.43 |
| Cluster-Based In-Service Training | 1,214 | 26.14 |
| Short Courses (e.g. Seminars, workshops, online learning) | 850 | 18.30 |
| Department-Based In-service Training | 565 | 12.16 |
| Degree programmes | 463 | 9.97 |
| *Respondents' frequency of CPD participation per year* | | |
| Up to 5 CPD programmes | 2,608 | 56.15 |
| 6 - 10 CPD programmes | 1,420 | 30.57 |
| 10 - 20 CPD programmes | 412 | 8.87 |
| 21 - 30 CPD programmes | 117 | 2.52 |
| More than 30 CPD programmes | 88 | 1.89 |
| *Respondents' views on CPD programmes attended within the term* | | |
| Two School-Based INSET and one Cluster-Based INSET | 1,266 | 27.26 |
| Two School-Based INSET, one Cluster-Based INSET and Professional Learning Community (PLC) | 1,021 | 21.98 |
| Two School-Based INSET and Professional Learning Community (PLC) | 755 | 16.25 |
| Short Courses (e.g. Seminars, workshops, online learning) | 734 | 15.80 |
| Professional Learning Community (PLC) | 372 | 8.01 |
| None of the above | 248 | 5.34 |
| Department-Based INSET | 133 | 2.86 |
| Degree programmes | 116 | 2.50 |

Regarding annual CPD participation, most respondents, 2,608 (56.15%), reported attending up to five CPD programmes. A further 1,420 respondents (30.57%) participated in 6–10 CPD programmes, while 412 (8.87%) attended 10–20 programmes. Smaller proportions reported attending 21–30 programmes (117 respondents; 2.52%) and more than 30 programmes (88 respondents; 1.89%). These results suggest a moderate but varied pattern of CPD engagement among the respondents.

Table 4 also shows the CPD activities respondents attended during the previous academic term. The most common activity was participation in two School-Based INSETs and one Cluster-Based INSET, reported by 1,266 respondents (27.26%). This was followed by two School-Based INSETs, one Cluster-Based INSET and a Professional Learning Community (PLC), reported by 1,021 respondents (21.98%). Other reported activities included two School-Based INSETs and PLC, 755 respondents (16.25%); Short Courses, 734 respondents (15.80%); and PLC only, 372 respondents (8.01%). Department-Based INSET and Degree Programmes were less frequently reported, with 133 respondents (2.86%) and 116 respondents (2.50%), respectively. Notably, 248 respondents (5.34%) indicated that they had not participated in any of the listed CPD activities. Overall, the findings suggest stronger engagement with School-Based and Cluster-Based INSETs than with other CPD formats.

### Teachers' Perception of CPD for Professional Practice

Table 5 presents teachers' perceptions of CPD for professional practice. The findings show that most respondents expressed a strong professional identity, with 4,378 respondents (94.25%) indicating that they were proud to be teachers. This comprised 3,597 respondents (77.44%) who strongly agreed and 781 respondents (16.81%) who agreed. In contrast, 217 respondents (4.67%) moderately agreed, while only 50 respondents (1.08%) disagreed or strongly disagreed. Similarly, most respondents perceived themselves as role models, with 4,585 respondents (98.71%) either strongly agreeing or agreeing. This comprised 3,904 respondents (84.05%) who strongly agreed and 681 respondents (14.66%) who agreed. Only 47 respondents (1.01%) moderately agreed, while 13 respondents (0.28%) disagreed or strongly disagreed.

Regarding CPD participation within a term, 1,582 respondents (34.06%) reported participating in CPD activities twice, while 1,251 respondents (26.93%) participated five times or more. A further 1,123 respondents (24.18%) participated four times, 529 respondents (11.39%) participated once, and 160 respondents (3.44%) reported no participation. These findings suggest that most respondents had some level of CPD engagement within the academic term.

The results also show that CPD was widely perceived as useful for professional practice. A total of 4,275 respondents (92.04%) described CPD as either very helpful or helpful, comprising 2,942 respondents (63.34%) who rated it as very helpful and 1,333 respondents (28.70%) who rated it as helpful. In comparison, 185 respondents (3.98%) considered CPD moderately helpful, 174 respondents (3.75%) had not attended any CPD programme, and 11 respondents (0.24%) regarded CPD as not helpful.

Respondents also reported positive views on the content and classroom relevance of CPD. In relation to CPD content, 4,261 respondents (91.74%) considered it either very significant or significant for their teaching, while 209 respondents (4.50%) rated it as somehow significant and 175 respondents (3.77%) considered it not very significant or not significant. Similarly, 4,277 respondents (92.08%) agreed or strongly agreed that CPD had improved their classroom management, while 291 respondents (6.26%) moderately agreed and 77 respondents (1.66%) disagreed or strongly disagreed. In terms of teaching strategies, 4,108 respondents (88.44%) agreed or strongly agreed that CPD training had improved their teaching strategies, while 415 respondents (8.93%) moderately agreed and 122 respondents (2.63%) disagreed or strongly disagreed.

Regarding career advancement, 4,229 respondents (91.04%) agreed or strongly agreed that CPD supported their career growth, while 331 respondents (7.13%) moderately agreed and 85 respondents (1.83%) disagreed or strongly disagreed. Finally, Table 5 also reports respondents' general views about CPD. The most selected response was "None of the above," reported by 1,479 respondents (31.84%), followed by "Time-consuming" with 1,417 respondents (30.50%) and "Mostly expensive" with 1,366 respondents (29.41%). Other concerns included "Not easily accessible," reported by 928 respondents (19.98%), and "Content mostly irrelevant," reported by 248 respondents (5.34%). These findings suggest that although respondents generally valued CPD, concerns about time, cost, accessibility and relevance remain important implementation issues.

## Table 5

*Responses for Teachers' Perception of CPD for Professional Practice*

| *Responses* | *Frequency* | *Percentage* |
|---|---|---|
| *Respondents' recognition of their professional identity* | | |
| Strongly agree | 3,597 | 77.44 |
| Agree | 781 | 16.81 |
| Moderately agree | 217 | 4.67 |
| Disagree | 27 | 0.58 |
| Strongly disagree | 23 | 0.50 |
| *Respondents' view of their recognition as role models* | | |
| Strongly agree | 3,904 | 84.05 |
| Agree | 681 | 14.66 |
| Moderately agree | 47 | 1.01 |
| Disagree | 9 | 0.19 |
| Strongly disagree | 4 | 0.09 |
| *Respondents' participation in CPD activities within a term* | | |
| Moderate (2 times) | 1,582 | 34.06 |
| Very often (5 times or more) | 1,251 | 26.93 |
| Quite often (4 times) | 1123 | 24.18 |
| Not quite often (Once) | 529 | 11.39 |
| Not at all (Zero) | 160 | 3.44 |
| *Respondents' views on how CPD programmes influence their work* | | |
| Very helpful | 2,942 | 63.34 |
| Helpful | 1,333 | 28.70 |
| Moderate | 185 | 3.98 |
| Not attended any CPD programme | 174 | 3.75 |
| Not helpful | 11 | 0.24 |
| *Respondents' views on the impact of the content of CPD programmes on their teaching* | | |
| Very significant | 2,359 | 50.79 |
| Significant | 1,902 | 40.95 |
| Somehow significant | 209 | 4.50 |
| Not very significant | 163 | 3.51 |
| Not significant | 12 | 0.26 |
| *Respondents' views on how CPD programmes have helped them in classroom management* | | |
| Strongly agree | 2,360 | 50.81 |
| Agree | 1,917 | 41.27 |
| Moderately agree | 291 | 6.26 |
| Disagree | 40 | 0.86 |
| Strongly disagree | 37 | 0.8 |
| *Respondents' views on the impact of training on their teaching strategies* | | |
| Strongly agree | 2,083 | 44.84 |
| Agree | 2,025 | 43.60 |

| | | |
|---|---|---|
| Moderately agree | 415 | 8.93 |
| Disagree | 77 | 1.66 |
| Strongly disagree | 45 | 0.97 |
| *Respondents' views on engaging in CPD for career advancement* | | |
| Strongly agree | 2,213 | 47.64 |
| Agree | 2,016 | 43.4 |
| Moderately agree | 331 | 7.13 |
| Disagree | 52 | 1.12 |
| Strongly disagree | 33 | 0.71 |
| *Respondents' views about CPD in general* | | |
| None of the above | 1,479 | 31.84 |
| Time-consuming | 1,417 | 30.50 |
| Mostly Expensive | 1,366 | 29.41 |
| Not easily accessible | 928 | 19.98 |
| Content mostly irrelevant | 248 | 5.34 |

## Teachers' Views on Enhancing their Professional Standing

Respondents were asked to indicate the key factors that guide their decision-making as professionals. As shown in Table 6, the welfare of learners was the most frequently selected factor, reported by 1,760 respondents (37.89%). This was followed by being a good role model to learners, selected by 1,220 respondents (26.26%), and being an agent of change in the community, selected by 634 respondents (13.65%). Ethical codes of conduct were selected by 520 respondents (11.19%), while moral reasoning was selected by 456 respondents (9.82%). Only 55 respondents (1.18%) selected other factors. These findings suggest that teachers' professional decision-making is largely shaped by learner-centred, ethical and community-oriented considerations.

Table 6 also shows strong commitment to life-long learning. A total of 4,380 respondents (94.29%) agreed or strongly agreed that they were involved in life-long learning activities, comprising 2,631 respondents (56.64%) who strongly agreed and 1,749 respondents (37.65%) who agreed. A further 229 respondents (4.93%) moderately agreed, while 36 respondents (0.78%) disagreed or strongly disagreed. These results suggest broad recognition of life-long learning as part of teachers' professional growth.

**Table 6**

*Responses for Teachers' Views on Enhancing Their Professional Standing*

| *Responses* | *Frequency* | *Percentage* |
|---|---|---|
| *Factors guiding respondents' professional decision-making* | | |
| The welfare of my learners | 1,760 | 37.89 |
| Being a good role model to the learners | 1,220 | 26.26 |
| Being an agent of change in my community | 634 | 13.65 |
| Ethical codes of conduct | 520 | 11.19 |
| Moral reasoning | 456 | 9.82 |
| Others | 55 | 1.18 |
| *Respondents' involvement in lifelong learning activities* | | |
| Strongly agree | 2,631 | 56.64 |
| Agree | 1,749 | 37.65 |
| Moderately agree | 229 | 4.93 |
| Disagree | 25 | 0.54 |
| Strongly disagree | 11 | 0.24 |
| *Respondents' involvement of parents in learners' learning* | | |
| Strongly agree | 4,105 | 88.37 |
| Agree | 505 | 10.87 |
| Moderately agree | 30 | 0.65 |
| Strongly disagree | 3 | 0.06 |
| Disagree | 2 | 0.04 |
| *Respondents' views on what will elevate their status in society* | | |
| Belonging to a Professional Learning Community (PLC) - [This means, belonging to a group of teachers that support and share teaching and learning experiences for capacity building] | 2,035 | 43.81 |
| If my work as a teacher is appreciated by society | 1,155 | 24.87 |
| Increase in remuneration (eg. salaries, motivation etc) | 592 | 12.74 |
| If my personal integrity is always protected | 497 | 10.70 |
| If I become the Most Outstanding teacher of the year | 366 | 7.88 |
| *Respondents' opinion about the teacher licensure examination* | | |
| It promotes the professionalization of the teaching career | 1,770 | 38.11 |
| It helps to gain international recognition | 1,165 | 25.08 |
| It motivates teachers towards higher attainments | 847 | 18.23 |
| It frustrates teachers in their career life | 622 | 13.39 |
| It causes teachers to lose their jobs | 241 | 5.19 |

In relation to parent engagement, 4,610 respondents (99.24%) agreed or strongly agreed that they involved parents in learners' learning, comprising 4,105 respondents (88.37%) who strongly agreed and 505 respondents (10.87%) who agreed. Only 30 respondents (0.65%) moderately agreed, while 5 respondents (0.10%) disagreed or strongly disagreed. This indicates strong support for teacher-parent collaboration in learners' education.

Regarding factors that teachers believed would elevate their status in society, belonging to a Professional Learning Community (PLC) was the most selected response, reported by 2,035 respondents (43.81%). This was followed by societal appreciation of teachers' work, selected by 1,155 respondents (24.87%). Other responses included increased remuneration, selected by 592 respondents (12.74%); protection of personal integrity, selected by 497 respondents (10.70%); and becoming the Most Outstanding Teacher of the Year, selected by 366 respondents (7.88%). These findings show that teachers value both professional support structures and public recognition.

Finally, respondents expressed mixed views on the teacher licensure examination. The largest proportion, 1,770 respondents (38.11%), indicated that the licensure examination promotes the professionalization of teaching, while 1,165 respondents (25.08%) indicated that it helps teachers gain international recognition. A further 847 respondents (18.23%) believed that it motivates teachers toward higher attainment. However, 622 respondents (13.39%) indicated that it frustrates teachers' career progression, while 241 respondents (5.19%) believed that it causes job insecurity. These findings suggest that although many teachers view licensure positively, some concerns remain about its implications for career progression and job security.

### Regression Results

This section provides the results by examining the factors associated with teacher professionalism and professional practice. Given the close conceptual relationship between teacher professionalism and professional practice, the regression results are interpreted cautiously as associational evidence. Teacher professionalism and professional practice were treated as related but distinct constructs. The professionalism captures what teachers value, believe and internalise as members of a profession, whereas professional practice captures how those values are translated into behaviour. The two constructs were therefore not treated as identical or interchangeable. Instead, they were modelled separately to examine their reciprocal association in a cross-sectional baseline study.

In the first model, professional practice was included as a predictor of professionalism because repeated professional actions may reinforce teachers' professional identity and ethical commitment. In the second model, professionalism was included as a predictor of professional practice because stronger professional identity and ethical consciousness may encourage better classroom behaviour, collaboration and engagement with learners. The models should therefore be interpreted as complementary associational models rather than causal models. This clarification has been added to avoid the impression that the study assumes simultaneous causality or tautological prediction.

Multicollinearity diagnostics were examined to assess whether the high $R^2$ values reflected excessive overlap among the predictors. Additionally, although the models reported high $R^2$ values, these results should be interpreted with caution because teacher professionalism and professional practice are conceptually related constructs. Diagnostic checks for multicollinearity were therefore conducted, and the findings are interpreted as evidence of association rather than causal prediction.

### Determinants of Teachers' Professionalism

Table 7 presents a regression analysis examining the influence of professional practice and various demographic and professional factors on teacher professionalism. The results indicate that professional practice has a significant positive coefficient ($\beta = 0.5288$) at the 1% significance level ($p < 0.001$), suggesting a strong association with professionalism. Importantly, the findings reveal that all predictors, except for other qualifications, significantly affect professionalism. The "other qualifications" variable showed a negative and statistically insignificant relationship, suggesting that qualifications outside the field of teacher education (e.g., non-education degrees) do not enhance teacher professionalism. Conversely, teacher-specific qualifications such as Certificate 'A', Diploma in Education, or postgraduate degrees in education remain essential for professional growth.

**Table 7**

*Professionalism as against Practice and Other Variables*

| *Variable* | *Coef. (β)* | *Std. Err.* | *t* | *p-value* |
|---|---|---|---|---|
| Practice | 0.5288 | 0.0179 | 29.47 | 0.000 |
| INSET | 0.0474 | 0.0043 | 10.88 | 0.000 |
| Location | -0.1883 | 0.0146 | -12.89 | 0.000 |
| Gender | 0.3280 | 0.1082 | 30.30 | 0.000 |
| Age | 0.0678 | 0.0050 | 13.30 | 0.000 |
| Professional Qualification (Education) | -0.1219 | 0.0070 | -17.26 | 0.000 |
| Other Qualification | -0.0001 | 0.0021 | -0.08 | 0.939 |
| Professional Rank | -0.2138 | 0.0075 | -28.49 | 0.000 |
| Teaching Experience | 0.1249 | 0.0077 | 16.19 | 0.000 |
| National Teaching Standards | 0.0227 | 0.0071 | 3.16 | 0.002 |
| Practice Level | -0.7229 | 0.0176 | -40.90 | 0.000 |
| Marital Status | -0.1143 | 0.0098 | -11.57 | 0.000 |
| Number of Children | -0.0227 | 0.0043 | -5.22 | 0.000 |
| Teacher Unions | 0.0481 | 0.0164 | 2.92 | 0.003 |
| | 2.4688 | 0.9434 | 26.17 | 0.000 |
| *Constant* | | | | |
| Observations | 4645 | | | |
| Model Significance | 0.0000 | | | |
| R-squared | 0.9622 | | | |
| Adjusted R-squared | 0.9620 | | | |
| F-statistics | 8409.00 | | | |
| Probability (F-statistics) | 0.0000 | | | |

In-service training (INSET) emerged as a positive and significant contributor to professionalism ($\beta = 0.0474$, $p < 0.01$), affirming the value of structured, periodic training. However, location showed a significant negative relationship ($\beta = -0.1883$, $p < 0.01$), indicating that teaching in rural areas is associated with reduced professionalism. This aligns with the descriptive data, which shows that 68% of respondents teach in rural areas.

Gender ($\beta = 0.3280$, $p < 0.01$), age ($\beta = 0.0678$, $p < 0.01$), and teaching experience ($\beta = 0.1249$, $p < 0.01$) all had significant positive effects on professionalism, suggesting that both male and female teachers, as well as older and more experienced educators, tend to exhibit higher professional standards.

Unexpectedly, professional qualification ($\beta = -0.1219$, $p < 0.01$) and professional rank ($\beta = -0.2138$, $p < 0.01$) were negatively associated with professionalism. This indicates that teachers with the highest academic qualifications (e.g., Master's or Doctorate degrees in education) and those in higher professional ranks (e.g., Deputy Director, Director II/I) do not necessarily demonstrate stronger adherence to professional standards than those with lower qualifications or ranks. These surprising outcomes highlight the need for further research into the dynamics of teacher motivation and accountability across ranks and qualification levels.

## Determinants of Professional Practice

To further explore the diversity of professional practice among teachers in Ghana, the study introduced additional control variables. As shown in Table 8, the inclusion of these variables led to a reduction in the coefficient for professionalism, which stood at 0.2987 and remained statistically significant ($p < 0.001$). The coefficient for professionalism remained positive and statistically significant ($\beta = 0.2987$, $p < 0.01$), indicating that higher levels of professionalism are associated with stronger professional practice, even after controlling for demographic and professional characteristics. This suggests that socio-demographic variables and inadequate professional development efforts can undermine the overall quality of teaching practice in Ghana.

### Table 8

*Practice as against Professionalism and Other Variables*

| Variable | Coef. (β) | Std. Err. | t | p-value |
|---|---|---|---|---|
| Professionalism | 0.2987 | 0.0101 | 29.47 | 0.000 |
| INSET | -0.0601 | 0.0032 | -18.80 | 0.000 |
| Location | 0.3242 | 0.0101 | 32.07 | 0.000 |
| Gender | 0.0783 | 0.0088 | 8.87 | 0.000 |
| Age | -0.1368 | 0.0033 | -40.92 | 0.000 |
| Professional Qualification (Education) | -0.1231 | 0.0051 | -23.81 | 0.000 |
| Other Qualification | -0.0272 | 0.0015 | -17.15 | 0.000 |
| Professional Rank | 0.1463 | 0.0057 | 25.56 | 0.000 |
| Teaching Experience | -0.0931 | 0.0058 | -16.05 | 0.000 |
| National Teaching Standards | 0.0041 | 0.0054 | 0.76 | 0.447 |
| Practice Level | -0.0896 | 0.0154 | -5.81 | 0.000 |
| Marital Status | -0.0904 | 0.0074 | -12.20 | 0.000 |
| Number of Children | -0.0137 | 0.0032 | -4.20 | 0.000 |
| Teacher Unions | 0.1848 | 0.0120 | 15.29 | 0.000 |
| | 2.9572 | 0.0623 | 47.45 | 0.000 |
| *Constant* | | | | |
| Observations (df) | 4645 | | | |
| Model Significance | 0.0000 | | | |
| R-squared | 0.9784 | | | |
| Adjusted R-squared | 0.9783 | | | |
| F-statistics | 14977.27 | | | |
| Probability (F-statistics) | 0.0000 | | | |

The analysis further reveals that INSET (in-service training) has a significant negative relationship with practice ($\beta = -0.0601$, $p < 0.01$), implying that frequent INSET sessions during the term may disrupt teaching routines and negatively impact professional practice. Consequently, the study recommends scheduling INSET sessions during school vacations or limiting them to no more than twice per term.

In contrast, location exhibits a significant positive effect (β = 0.3242, $p < 0.01$), suggesting that teachers across both rural and urban settings are equally capable of adhering to professional practice. Gender also shows a positive relationship (β = 0.0783, $p < 0.01$), indicating no disparity between male and female teachers in maintaining professional standards.

However, age (β = -0.1368, $p < 0.01$) negatively affects practice, suggesting that older teachers may be less inclined to adopt new methods or engage actively in professional practices. This is mirrored in the negative effect of teaching experience (β = -0.0931, $p < 0.01$), likely linked to a sense of complacency or overreliance on past experience.

Furthermore, both professional qualification (β = -0.1231, $p < 0.01$) and other qualifications (β = -0.0272, $p < 0.01$) are negatively associated with practice. This finding challenges the assumption that higher academic credentials necessarily lead to higher levels of professional conduct. Interestingly, professional rank (β = 0.1463, $p < 0.01$) shows a positive relationship, indicating that senior-ranking teachers (e.g., Deputy Directors or Directors) are more likely to adhere to professional teaching practices.

Additional variables also revealed noteworthy patterns. Practice level (β = -0.0896, $p < 0.01$) suggests that teachers in senior high schools or TVET institutions demonstrate lower levels of professional practice compared to those in basic education (primary and JHS). Marital status (β = -0.0904, $p < 0.01$) and having more than five children (β = -0.0137, $p < 0.01$) also negatively influence professional practice, possibly due to increased personal responsibilities that limit professional engagement.

Lastly, union affiliation has a significant positive impact on professional practice (β = 0.1848, $p < 0.01$), indicating that teachers who belong to unions are more professionally engaged. Conversely, awareness of the National Teaching Standards (β = 0.0041, $p > 0.05$) shows no significant relationship, suggesting that mere awareness or possession of the standards document does not directly translate into improved practice.

In conclusion, the results underscore that while professionalism, gender, location, professional rank, and union membership positively influence professional practice, factors such as excessive INSET, teacher age and experience, higher academic qualifications, and personal life circumstances (e.g., marital status and family size) can negatively affect professional engagement. These insights call for more targeted and context-sensitive professional development strategies that consider both systemic and individual-level factors influencing teacher performance in Ghana.

**Table 9**

*Multicollinearity Diagnostic Results*

| *Variable* | *Model 1: Professionalism* | | *Model 2: Professional Practice* | |
|---|---|---|---|---|
| | *VIF* | *Tolerance* | *VIF* | *Tolerance* |
| Professional Practice / Professionalism | 2.64 | 0.379 | 2.51 | 0.398 |
| INSET | 1.37 | 0.730 | 1.41 | 0.709 |
| Location | 1.19 | 0.840 | 1.22 | 0.820 |
| Gender | 1.08 | 0.926 | 1.09 | 0.917 |
| Age | 3.42 | 0.292 | 3.68 | 0.272 |
| Professional Qualification | 1.76 | 0.568 | 1.84 | 0.543 |
| Other Qualification | 1.22 | 0.820 | 1.26 | 0.794 |
| Professional Rank | 3.88 | 0.258 | 4.03 | 0.248 |
| Teaching Experience | 4.26 | 0.235 | 4.48 | 0.223 |
| National Teaching Standards | 1.31 | 0.763 | 1.29 | 0.775 |
| Practice Level | 1.44 | 0.694 | 1.46 | 0.685 |
| Marital Status | 1.58 | 0.633 | 1.61 | 0.621 |
| Number of Children | 1.83 | 0.546 | 1.87 | 0.535 |
| Teacher Union Affiliation | 1.17 | 0.855 | 1.20 | 0.833 |
| *Mean VIF* | *2.01* | | *2.07* | |
| *Maximum VIF* | *4.26* | | *4.48* | |

The diagnostic results in Table 9 indicate that multicollinearity does not pose a serious threat to the regression models. The VIF values ranged from 1.08 to 4.26 in the professionalism model and from 1.09 to 4.48 in the professional practice model, with mean VIF values of 2.01 and 2.07, respectively. Since all VIF values are below the commonly accepted threshold of 5.0 and all tolerance values are above 0.20, the results suggest that the regression estimates are not unduly affected by multicollinearity. The high R-squared values are therefore interpreted cautiously as reflecting the close conceptual relationship between professionalism and professional practice, rather than as evidence of model invalidity. The models are also interpreted as associational rather than causal.

## Discussion of Findings

This study provides robust insights into teacher professionalism and professional practice in Ghana, situated within an evolving educational context marked by reforms such as the National Teaching Standards (Ministry of Education, 2017), the Ghana Teacher Licensure Examination (GTLE), and CPD institutionalisation.

The demographic results provide important context for interpreting teacher professionalism and professional practice in Ghana. The finding that more than 74% of respondents were below 40 years suggests that the respondent group was largely youthful, while the dominance of Senior Superintendents indicates that many participants were still within active career-development stages. This is important because teacher professionalism is increasingly understood as a career-long process shaped by professional learning, ethical judgement, institutional standards and classroom experience (Tatto, 2021; Mezza, 2022; NTC, 2020; Salifu et al., 2025). The finding also suggests that early- and mid-career teachers may be a strategic group for strengthening CPD participation, professional identity and practical engagement with the National Teaching Standards.

The findings on gender-responsive pedagogy, inclusive education, collegial collaboration and parent engagement further show that professionalism is not merely an abstract professional identity but a visible practice enacted through teachers' day-to-day responsibilities. This interpretation is consistent with recent literature which argues that teacher professionalism is both competence-based and ethically grounded, requiring teachers to safeguard learners, model appropriate conduct, collaborate with colleagues and respond to diverse learner needs (NTC, 2020; Tatto, 2021; Mezza, 2022; Cronqvist, 2025). Thus, the high levels of reported ethical awareness, role modelling, support for learners with diverse needs and parent engagement suggest that many teachers understand professionalism as a learner-centred and community-facing responsibility.

However, the findings also reveal an important implementation gap. While teachers reported strong professional identity and positive perceptions of CPD, awareness or possession of professional standards alone may not be sufficient to improve professional practice. This supports recent Ghanaian and African evidence that CPD contributes more effectively to instructional delivery and classroom management when it is sustained, relevant, school-based, collaborative and connected to teachers' everyday classroom realities (Abakah et al., 2022; Abakah et al., 2023; Mitchell et al., 2024; Salifu et al., 2025). The mixed effect of INSET further reinforces this point. Although INSET was positively associated with professionalism, its negative association with professional practice suggests that training may strengthen professional identity but disrupt classroom routines when poorly timed or insufficiently aligned with teaching demands. Therefore, CPD and INSET should not be evaluated only by participation rates, but by their relevance, timing, accessibility and capacity to support teachers in translating professional standards into classroom practice (NTC, 2020; UNESCO-IICBA, 2025; Salifu et al., 2025).

The results show a positive association between professional practice and professionalism ($\beta = 0.5288$, $p < 0.01$), and between professionalism and professional practice ($\beta = 0.2987$, $p < 0.01$). This finding suggests that teacher professionalism and professional practice are mutually reinforcing but not identical constructs. While professional practice may strengthen teachers' professional identity and ethical commitment, professionalism may also support improved classroom conduct, collaboration and learner-centred engagement. This interpretation is consistent with recent literature which views teaching as both an ethical and practice-based profession, shaped by professional identity, ethical judgement, continuous learning and responsiveness to learners' needs (Tatto, 2021; Mezza, 2022; NTC, 2020; Salifu et al., 2025).

The findings also show that professional qualification was negatively associated with both professionalism ($\beta = -0.1219$, $p < 0.01$) and professional practice ($\beta = -0.1231$, $p < 0.01$), while other qualifications were insignificant in the professionalism model but negatively associated with professional practice ($\beta = -0.0272$, $p < 0.01$). This suggests that higher qualifications or non-education credentials do not automatically translate into stronger professional conduct or improved classroom practice. Rather, the usefulness of qualification and professional development appears to depend on their relevance to teachers' classroom realities. This aligns with recent evidence that CPD is most effective when it is sustained, collaborative, school-based and responsive to teachers' instructional needs, rather than delivered as isolated or generic training (Abakah et al., 2022; Abakah et al., 2023; Mitchell et al., 2024; Salifu et al., 2025).

The insignificant effect of National Teaching Standards awareness on professional practice further suggests that policy knowledge alone is insufficient unless teachers are supported to translate standards into lesson planning, classroom management, assessment, inclusion and parent engagement. This reinforces the need for CPD and INSET programmes that move beyond awareness creation to practical implementation of professional standards. Overall, the findings deepen existing debates on teacher professionalization by showing that professional identity and classroom practice do not always develop uniformly, and that professional development should be judged by its relevance, timing and classroom applicability rather than by participation or credentials alone (NTC, 2020; UNESCO-IICBA, 2025; Tatto, 2021; Mezza, 2022).

Other socio-demographic factors, including age and teaching experience, produced different effects across the two models. In the professionalism model, age and teaching experience were positively associated with professionalism, suggesting that older and more experienced teachers may have stronger professional identity, ethical awareness and familiarity with professional expectations. This is consistent with the view that teaching is professional work shaped by continuous learning, ethical judgement and professional standing (Tatto, 2021; Mezza, 2022; NTC, 2020; Salifu et al., 2025). However, in the professional practice model, age and teaching experience were negatively associated with practice, suggesting that longer service does not automatically translate into stronger day-to-day enactment of professional practice. This may reflect reduced engagement with recent CPD practices, reliance on established routines, or limited adaptation to new pedagogical expectations. Recent evidence indicates that CPD produces stronger outcomes when it is sustained, school-based, collaborative and responsive to teachers' classroom realities rather than generic or isolated (Abakah et al., 2022; Abakah et al., 2023; Mitchell et al., 2024; Salifu et al., 2025). These results therefore suggest that professional identity and professional practice, although related, may be shaped differently by career-stage factors.

Moreover, the negative association between practice level and professional practice ($\beta = -0.0896$, $p < 0.01$) suggests that teachers at SHS and TVET levels may require more targeted professional development support. This may reflect the greater subject specialization, assessment demands and institutional pressures associated with secondary and technical education contexts. The finding reinforces recent literature which argues that CPD should be context-sensitive and aligned with teachers' specific classroom realities rather than delivered as uniform training across all levels (Abakah et al., 2022; Abakah et al., 2023; Mitchell et al., 2024; Salifu et al., 2025). Family-related variables also showed negative associations with professional practice, as marital status ($\beta = -0.0904$, $p < 0.01$) and number of children ($\beta = -0.0137$, $p < 0.01$) may reflect the pressure of balancing professional responsibilities with domestic and caregiving demands. This suggests that teacher professionalism is shaped not only by institutional policy but also by the wider social and organisational conditions within which teachers work. This interpretation is consistent with Ghanaian evidence showing that cultural profiles, interpersonal bonds and workgroup involvement can shape work outcomes in collectivist contexts (Akoto et al., 2022).

Finally, union affiliation was positively associated with professional practice ($\beta = 0.1848$, $p < 0.01$), indicating that professional networks may support teachers' engagement, identity and continuous development. However, the insignificant effect of National Teaching Standards awareness on practice ($\beta = 0.0041$, $p > 0.05$) suggests that awareness of policy documents alone is insufficient unless teachers are supported to translate standards into classroom management, inclusive pedagogy, assessment, collaboration and parent engagement. This is consistent with the view that teacher professionalism is demonstrated through practice-based application of ethical standards, reflective teaching and responsiveness to learners' needs (NTC, 2020; UNESCO-IICBA, 2025; Tatto, 2021; Mezza, 2022; Salifu et al., 2025).

## Conclusion

This baseline study offers a comprehensive empirical investigation into the dynamics of teacher professionalism and professional practice in Ghana, contributing to a critical body of evidence needed to inform policy and reform in education. Framed within a practice-based professionalization framework, the study operationalizes professionalism through measurable constructs such as CPD engagement, ethical conduct, collaboration, professional identity and instructional responsiveness.

Drawing on data from 4,645 in-service teachers across diverse geographical and institutional settings, the findings show a positive association between professional practice and professionalism ($\beta = 0.5288$, $p < 0.01$), and between professionalism and professional practice ($\beta = 0.2987$, $p < 0.01$). This suggests that teachers who demonstrate stronger professional practice are more likely to report higher levels of professionalism, while teachers with stronger professional identity, ethical commitment and adherence to professional standards are also more likely to demonstrate improved professional practice. Notably, Continuous Professional Development (CPD) emerged as a critical enabler, with teachers who actively participated in CPD activities demonstrating elevated levels of professionalism and instructional effectiveness (Edwards & Osei-Mensah, 2019; Padwad & Dixit, 2011). However, the findings also illuminate structural and demographic constraints that mediate this relationship. Variables such as teaching experience, extensive INSET engagement, and higher academic qualifications outside the education field showed inverse relationships with professional practice, raising questions about the timing, relevance, and alignment of development initiatives with the realities of practice. Moreover, contextual factors such as location, family responsibilities, and school level of instruction influence the degree to which professional values are internalized and enacted.

This study, therefore, advances the discourse on teacher professionalism by providing empirical validation of its multifaceted nature. It also highlights the importance of contextualized, data-driven interventions that bridge policy ideals with classroom realities. As Ghana aspires toward the attainment of Sustainable Development Goal 4 and the National Education Agenda 2030 (Gyimah et al., 2023; Gyimah et al., 2025), strengthening professionalism through evidence-based CPD, ethical governance, and inclusive career development policies will be indispensable. In this respect, the National Teaching Council (NTC) is strategically positioned to serve as a regulatory and developmental anchor for advancing teacher quality and professional ethics across the country (NTC, 2020; UNESCO-IICBA, 2025). In this respect, the National Teaching Council (NTC) is strategically positioned to serve as a regulatory and developmental anchor for advancing teacher quality and professional ethics across the country.

## Recommendations and Implications

### Teacher Professionalisation

Based on the findings, the study offers five evidence-based recommendations for strengthening teacher professionalism and professional practice in Ghana. First, the Ministry of Education, through the National Teaching Council, may strengthen the practical implementation of the National Teaching Standards. This recommendation is based on the finding that awareness of the National Teaching Standards was not significantly associated with professional practice, suggesting that awareness alone may not translate into classroom application.

Second, CPD programmes could be made more accessible, affordable, relevant and classroom-focused. This is supported by teachers' concerns that CPD was time-consuming, expensive, not easily accessible and sometimes not sufficiently relevant to classroom needs. CPD content may therefore be better aligned with lesson delivery, classroom management, inclusive pedagogy, assessment and parent engagement.

Third, INSET activities may be scheduled more carefully to reduce disruption to teaching and learning. The findings show that INSET was positively associated with teacher professionalism but negatively associated with professional practice. This suggests that while INSET can strengthen professional identity, its timing and delivery may affect classroom practice if not properly planned.

Fourth, the National Teaching Council and school leadership could promote Professional Learning Communities and school-based mentoring. This recommendation is supported by the finding that many teachers identified Professional Learning Communities as important for enhancing their professional standing. Such platforms may help teachers share experiences, improve instructional strategies and translate professional standards into practice.

Finally, professional development interventions should remain context-sensitive. The findings show that location, teaching level, rank, age, teaching experience, marital status and number of children were associated with differences in professionalism and professional practice. Targeted support may therefore be needed for teachers in rural schools, SHS/TVET contexts, early- and late-career stages, and teachers balancing professional and family responsibilities.

### Implications for National Relevance

The findings have implications for teacher development, professional standards and education quality in Ghana. First, the results suggest that teacher professionalism should be strengthened through practical engagement with the National Teaching Standards rather than awareness alone. Although many teachers reported strong ethical awareness and professional identity, the findings show that such awareness must be translated into classroom management, inclusive pedagogy, assessment, collaboration and parent engagement.

Second, the study highlights the importance of relevant and context-sensitive CPD. Teachers generally perceived CPD as useful for improving classroom management and teaching strategies, but concerns about cost, timing, accessibility and relevance remain important. This implies that CPD and INSET programmes may be more effective when they are school-based, collaborative, affordable and aligned with teachers' classroom realities.

Third, the findings suggest that teacher professionalization should consider differences in school location, teaching level, rank, experience and family responsibilities. These contextual factors influence how teachers internalize and enact professional values. Therefore, national teacher development policy may be strengthened by combining professional standards with practical support systems such as mentoring, professional learning communities and evidence-based monitoring of CPD outcomes.

## Policy Direction

Future policy direction should be guided by empirical evidence on the factors that shape teacher professionalism and professional practice. The Ministry of Education, through the National Teaching Council, may design career-long teacher development policies that strengthen ethical conduct, classroom practice, professional identity and continuous professional development. Policy attention could also focus on making CPD more accessible, relevant and affordable, while ensuring that INSET activities are scheduled in ways that do not disrupt teaching and learning. Rather than relying only on broad national policy statements, teacher professionalism could be advanced through practical implementation of the National Teaching Standards, school-based mentoring, professional learning communities and regular evidence-based monitoring of teacher development outcomes. This aligns with Ghanaian public-sector evidence that leadership, integrity and internal control systems are important for strengthening accountability and institutional performance (Bonsu et al., 2023).

## Limitations and Future Studies

This study provides important baseline evidence on teacher professionalism and professional practice in Ghana; however, some limitations should be acknowledged. First, although the study obtained a large national respondent pool of 4,645 in-service teachers, the use of voluntary convenience sampling limits the extent to which the findings can be statistically generalised to the entire population of Ghanaian teachers. Although respondents were drawn from all three geographical zones, the voluntary participation approach means that the zonal distribution should be interpreted as broad coverage rather than probability-based geographical representation. Future studies should therefore adopt probability-based sampling designs to strengthen representativeness and population-level inference.

Second, the study relied on self-reported survey responses, which may be affected by social desirability bias, particularly on issues relating to ethics, professionalism and classroom practice. Future research could combine survey data with interviews, classroom observations and documentary evidence to provide a richer understanding of teachers' professional behaviour.

Third, though this study covered diverse geographical and school contexts, further research should examine regional, urban-rural and sociocultural differences in greater depth. Future studies should also explore how school ecology, leadership support, CPD quality and access to professional learning opportunities influence teacher professionalism and professional practice. A mixed-methods design would provide a more holistic understanding of the factors shaping teacher professionalism in Ghana.

Finally, the high $R^2$ values in the regression models may reflect the close conceptual relationship between teacher professionalism and professional practice. Future studies should use more refined measurement models, such as confirmatory factor analysis or structural equation modelling, to distinguish the constructs more clearly and reduce the risk of tautological modelling.

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## Author Contribution Statement

Conceptualisation: IB (lead), CAP (equal), PG (supporting).

Data Curation: IB (lead), CAP (Equal).

Formal Analysis: CAP (lead), IB (supporting).

Investigation: CAP (lead), IB (equal), PG (supporting), EAK (supporting), JNA (supporting), BK (supporting).

Methodology: CAP (lead), IB (equal), PG (supporting), EAK (supporting), JNA (supporting), BK (supporting).

## Conflict of Interest Statement

The authors declare no known conflicts of interest associated with this publication.

## AI Disclosure Statement

Artificial intelligence (AI) tools were used only for grammar checking, language refinement and improving the clarity of the paper.

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**ORIGINAL ARTICLE**

# Symbiotic Relationships and Innovation: Impacts on Export Performance of Ghanaian Entrepreneurs

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**Abstract**
Symbiotic relationships have emerged as an important strategy for enhancing firms' access to external resources, fostering innovation, and improving international competitiveness. However, limited empirical evidence exists on how these relationships influence export performance in resource-constrained emerging economies. Drawing on the resource dependency theory, this paper explores the concept of symbiotic relationships (SR) and their practical implications for the export performance (EP) of Ghanaian entrepreneurs in the non-traditional export sector, with a focus on the mediating role of product innovation (PI). The study explores how established symbiotic collaboration impacts export performance and the integral role of product innovation in this dynamic. The study employed a structural equation model (SEM) to analyze data from 301 non-traditional sector exporters in Ghana. The study found that the symbiotic relationship has a significant positive effect on export performance. In addition, the findings reveal that symbiotic relationships significantly enhance product innovation. Further, the study found that product innovation mediates the relationship between symbiotic relationships and export performance. These insights underscore the importance of enhancing innovative practices within symbiotic partnerships to boost export success among Ghanaian entrepreneurs. This study contributes to the international entrepreneurship and export performance literature by extending Resource Dependency Theory through demonstrating how product innovation serves as the mechanism through which symbiotic relationships enhance export performance. It also provides context-specific evidence from Ghana's non-traditional export sector, where institutional and resource constraints make collaborative relationships particularly valuable for international competitiveness.

**Keywords:** *Symbiotic Relationship (SR), Product Innovation (PI), Export Performance (EP), Network, Exporting Activities (EA), Ghanaian Entrepreneurs (GE)*

## Introduction

Export performance is becoming a key indicator of success for businesses, especially small and medium enterprises (SMEs) in the non-traditional export sectors in developing countries seeking to expand their presence in global markets. It concerns how well firms achieve their sales, growth, and profit goals in foreign markets (Ciszewska-Mlinaric, 2018). To measure this, researchers commonly examine indicators such as the proportion of total sales generated from exports, the number of export destinations, and export growth (Ramaswamy et al., 1996; Quaye et al., 2017). In line with this, export performance in this study was measured using general and specific export indicators developed by Thongsri and Chang (2019). Unfortunately, many non-traditional exporting sectors SMEs, especially those run by women, struggle to improve their export performance due to limited resources, funding, market knowledge, and institutional support (Takyi et al., 2022). Furthermore, limited access to financial resources, inadequate knowledge of international markets, and formal and informal institutional constraints continue to impede firms' internationalization efforts (Takyi et al., 2022 and increase their vulnerability in increasingly (Beck et al., 2006). Consequently, the internationalisation of markets and the proliferation of competition have compelled businesses to seek innovative strategies to enhance their competitiveness and expand internationally. One important strategic approach gaining attention is forming partnerships with other businesses to support each other. These types of collaborations are known as symbiotic relationships (Eijdenberg et al., 2019; Kijkasiwat et al., 2021). Even though more people are recognising the benefits of working together, there is still much to learn about how these partnerships can improve export performance, particularly for non-traditional export entrepreneurs in emerging economies. This is especially important in developing countries such as Ghana, where firms often rely on collaborative relationships to compensate for resource shortages, institutional weaknesses, and limited access to international markets. Solberg and Durrieu (2006) corroborated this assertion by demonstrating that strong networking relationships significantly influence firms' international strategies.

Symbiotic relationships encompass various forms of collaboration, including strategic alliances, joint ventures, and supplier-customer partnerships, aimed at mutual benefit and the leveraging of complementary resources and capabilities (Wheelen et al. 2018). However, for this study, the definition and measure of the symbiotic relationship by Golden and Dollinger (1993) were adopted. According to Golden and Dollinger (1993), symbiotic relationships involve cooperative alliances, interorganizational strategies, collective strategies, and competitive strategies among or between firms. Its measurement covers both conjugate (direct activities with non-competitor organizations) and organic (indirect activities in the community). Extant literature consistently suggests that symbiotic relationships enable firms to strengthen their competitive position by facilitating access to complementary resources, market knowledge, technology, and information, while reducing operational costs and uncertainties associated with international business activities (Andriof et al., 2017; Kijkasiwat et al., 2021). Within international business, these collaborative arrangements also enhance firms' ability to secure financial resources, develop strategic capabilities, and respond more effectively to changing market conditions (Dana, 2006). Collectively, previous studies demonstrate that symbiotic relationships promote resource sharing, knowledge exchange, technological collaboration, and capability development, all of which contribute to improved firm competitiveness and organisational performance (Andriof et al., 2017; Gäre & Melin, 2011; Paul, 2020; Kijkasiwat et al., 2021; Morais & Franco, 2018). Consequently, symbiotic relationships have increasingly been recognised as an important strategic mechanism through which firms enhance competitiveness, sustain growth, and improve performance in both domestic and international markets (Li et al., 2018; Partanen et al., 2018).

Despite the many obvious benefits of symbiotic relationships reported in the existing literature (Li et al., 2018), the impact of symbiosis on businesses' performance, especially export activities, is seldom discussed and remains inconclusive (Kijkasiwat et al., 2021). Though several studies discuss the significant contributions of symbiotic relationships to firm performance (Kijkasiwat et al., 2021) and innovation (Xie et al., 2019), most have focused on general organisational performance, strategic alliances, or collaborative networks rather than examining how symbiotic relationships influence export performance. Moreover, existing studies have been conducted predominantly in developed economies, providing limited evidence on how symbiotic relationships operate in resource-constrained emerging markets where firms face institutional, financial, and technological challenges. In addition, the interplay between symbiotic relationships and product innovation, and its influence on export performance, remains theoretically inconclusive and empirically underdeveloped. This presents a critical gap in the literature, particularly given the unique constraints faced by non-traditional export entrepreneurs in emerging markets such as Ghana (Ackah et al., 2020; Langevang et al., 2015). In instances where the effects of a symbiotic relationship were considered, they were limited mainly to strategic alliances between small and large firms in developed economies (Mitsuhashi & Greve, 2009). Consequently, little is known about whether product innovation serves as the mechanism through which symbiotic relationships enhance export performance among non-traditional exporters operating under severe resource constraints. Addressing this gap is important because firms in Ghana's non-traditional export sector frequently depend on collaborative relationships to overcome limitations in financing, market information, technology, and institutional support. Accordingly, there is room for further studies on firms' symbiotic relationships, considering all symbiotic factors and how they synergize with export entrepreneurs' innovation to enhance export performance in terms of speed, scale, and scope.

Additionally, by adapting Golden and Dollinger's (1993) measure of symbiotic relationships, this study conceptualized symbiotic relationships as aggregates of key symbiosis factors. Rather than measuring export performance as a unidimensional measurement, which is a widely used method (Ciszewska-Mlinaric, 2018; Li, 2018; Muralidharan & Pathak, 2017; Ramaswamy et al., 1996), this study adopts a multidimensional measure of export performance to provide a more comprehensive assessment of firms' international performance, thereby addressing limitations associated with single-dimensional measurement approaches (Ramaswamy et al., 1996, p. 168). Employing the lens of international entrepreneurship and Resource Dependency Theory (RDT), this study seeks to address the identified gaps. Specifically, the study extends existing literature by examining the direct effect of symbiotic relationships on export performance, investigating the mediating role of product innovation, and providing empirical evidence from Ghana's non-traditional export sector, where the effectiveness of collaborative strategies remains largely underexplored. This paper, then, is a call for further research into firm symbiotic relationships (Kijkasiwat et al., 2021) in the international market (Dana, 2006). To address this research gap, this study examined how symbiotic relationships influence export performance, with product innovation as the mediating mechanism, focusing on non-traditional export entrepreneurs in Ghana. Specifically, it looked at (1) the direct effect of symbiotic relationships on export performance, (2) the direct effect of symbiotic relationships on product innovation, and (3) the mediating role of product innovation in the relationship between symbiotic relationships and export performance.

The study makes three important contributions to the international entrepreneurship and export performance literature. First, it extends the emerging literature on symbiotic relationships by examining their direct influence on export performance within Ghana's non-traditional export sector, a context characterized by resource constraints, institutional weaknesses, and increasing international competition. While previous studies have demonstrated that collaborative relationships enhance firm performance, competitiveness, and innovation (Dana, 2006; Kijkasiwat et al., 2021), limited attention has been given to how symbiotic relationships specifically influence export performance in emerging economies. Second, the study extends Resource Dependency Theory (RDT) by demonstrating that the benefits derived from symbiotic relationships are translated into superior export performance through product innovation, thereby providing empirical evidence on the mechanism linking external resource acquisition to international market success. Third, by adopting Golden and Dollinger's (1993) multidimensional conceptualization of symbiotic relationships and employing a multidimensional measure of export performance, the study provides a more comprehensive assessment of how collaborative relationships influence international business performance.

Moreover, although limited access to finance remains a significant obstacle to the export activities of non-traditional entrepreneurs (Ackah et al., 2020), financial constraints alone do not fully explain their relatively low export performance. Existing evidence indicates that entrepreneurs operating in Ghana's non-traditional export sector often underperform despite participating in export markets (Ackah et al., 2020; Langevang et al., 2015). This study therefore broadens existing explanations by examining how symbiotic relationships and product innovation jointly contribute to export success in an environment characterized by weak innovation systems and institutional constraints (Ortigueira-Sánche et al., 2022). The findings provide practical insights for entrepreneurs and policymakers by demonstrating that collaborative partnerships can serve as strategic mechanisms for strengthening innovation capabilities and improving export competitiveness.

In summary, this study investigates the complex relationships among symbiotic relationships, product innovation, and export performance through the lens of Resource Dependency Theory (RDT). It addresses an important gap in the international entrepreneurship literature by examining how collaborative relationships generate export advantages through innovation within Ghana's non-traditional export sector. The following sections develop the theoretical foundations of the study, formulate the research hypotheses, and empirically test the proposed relationships.

## Literature Review

### Resource Dependency Theory (RDT)

Resource Dependency Theory (RDT) explains how organizations manage external dependencies to acquire critical resources, reduce uncertainty, and enhance organisational performance (Hillman et al. 2009). Originally proposed by Pfeffer and Salancik (1978), the theory posits that firms cannot generate all the resources required for survival and growth internally; consequently, they establish relationships with external organizations to obtain valuable resources, capabilities, and information. Accordingly, firms develop cooperative relationships with stakeholders, business partners, government agencies, and other institutions to secure scarce resources and strengthen their competitive position. Previous studies have shown that firms relying on extensive external networks are better positioned to improve performance and respond to environmental uncertainty (Dickson et al., 2006; Galvão et al., 2019).

Within the context of international entrepreneurship, RDT provides an appropriate theoretical lens for understanding how symbiotic relationships enable firms to overcome resource constraints associated with exporting. Symbiotic relationships facilitate access to complementary resources, including knowledge, technology, financial capital, market information, and distribution networks, which are often unavailable within individual firms (Amoako, 2020). These externally acquired resources enhance firms' capacity to develop innovative products, improve competitiveness, and respond effectively to changing international market demands. Consequently, RDT provides a theoretical explanation for why firms engaged in mutually beneficial relationships are more likely to achieve superior export performance through enhanced innovation capabilities.

The theory is particularly relevant to Ghana's non-traditional export sector, where entrepreneurs frequently operate under conditions of limited financial resources, weak institutional support, and inadequate technological infrastructure. Under such circumstances, collaborative relationships become important mechanisms through which firms obtain the resources necessary to innovate and compete successfully in international markets. Thus, RDT suggests that symbiotic relationships contribute directly to export performance while also indirectly influencing export performance by strengthening product innovation.

Therefore, this study adopts Resource Dependency Theory as its overarching theoretical framework to explain the relationships among symbiotic relationships, product innovation, and export performance. Specifically, RDT provides the theoretical justification for examining (1) the direct effect of symbiotic relationships on export performance, (2) the influence of symbiotic relationships on product innovation, and (3) the mediating role of product innovation in the relationship between symbiotic relationships and export performance. The theory has been widely applied in studies examining internationalization, export performance, and firms' strategic responses to external resource constraints (Nam et al., 2018; Rodrigues & Dieleman, 2018; Safari & Saleh, 2020).

**Effects of Symbiotic Relationships (SR) on Export Performance (EP)**

Symbiotic relationships, characterized by mutual benefit between two or more entities, are recognised as important drivers of economic growth and sustainability. The symbiotic relationship is central in the ecosystem of symbiotic organisms (Wani et al., 2015). The species may have evolved to the point that they depend on each other for survival. If organisms are essential to the ecosystem, then symbiosis is crucial to maintaining its function. Similarly, entrepreneurs seeking success in international markets should adopt a symbiotic approach by developing mutually beneficial relationships with actors within their business ecosystem (Chertow, 2007). As Golden and Dollinger (1993) describe, symbiotic relationships involve cooperative alliances, inter-organisational strategies, collective strategies, and competitive strategies among or between firms. Their measurement includes both conjugate activities (direct engagement with non-competitor organizations) and organic activities (indirect involvement within the community), which together capture the breadth of firms' collaborative interactions. This definition and measurement were adapted for this study. From this perspective, symbiotic relationships represent an ongoing strategic process through which firms acquire complementary resources, capabilities, and market knowledge to enhance organisational performance. According to co-evolutionary theorists, firms can strengthen their competitiveness in international markets by forming alliances with local and international partners (McGaughey et al., 2016; Morais & Franco, 2018), thereby improving both market competitiveness (Monticelli et al., 2017) and product quality (Tse et al., 2021).

Extant literature consistently suggests that symbiotic relationships contribute to export performance by facilitating resource acquisition, knowledge sharing, technological collaboration, market access, and risk reduction. In international business, networking with entrepreneurs, government officials, political contacts, and business partners enhances firms' market knowledge and innovation capabilities, both of which support export performance (Tse et al., 2021). Similarly, relationships with suppliers, distributors, and intermediaries provide exporters with access to new markets, strengthen market positioning, facilitate knowledge transfer, and reduce the uncertainties associated with international trade. Collectively, these studies suggest that firms embedded in strong collaborative networks are better positioned to compete in foreign markets because they can leverage complementary resources that would otherwise be unavailable through internal capabilities alone.

Empirical evidence further supports this argument. Kryeziu et al. (2022) found that collaborative alliances enable family firms to improve product quality, diversify product offerings, reduce operational risks, and strengthen international operations. Similarly, Dana (2006) reported that collaborative relationships improve firm efficiency, competitiveness, and market expansion, while Dana et al. (2008) and Etemad and Wright (2001) demonstrated that partnerships reduce barriers associated with internationalization. Other studies show that symbiotic relationships facilitate risk diversification (Kijkasiwat et al., 2021), business expansion (Boso et al., 2019), access to strategic resources (Igwe & Kanyembo, 2019), technological advancement and stronger competitive positioning (Safari & Saleh, 2020). Taken together, these findings indicate that symbiotic relationships enhance export performance by enabling firms to access external resources, build strategic capabilities, and respond more effectively to international market opportunities.

Despite this growing body of evidence, important gaps remain. Most existing studies examine strategic alliances, business networks, or supply chain partnerships in relation to general firm performance rather than export performance (Nguyen & Kim, 2021). Moreover, empirical evidence on symbiotic relationships remains concentrated in developed economies, with limited attention given to non-traditional exporters operating in resource-constrained environments such as Ghana (Adegbite et al., 2013). Consequently, the mechanisms through which symbiotic relationships contribute to sustained export performance under institutional and resource constraints remain insufficiently understood. Addressing this gap is particularly important because exporters in Ghana's non-traditional sector depend heavily on collaborative relationships to overcome financing constraints, information asymmetries, and limited access to international markets. Therefore, this study proposes that stronger symbiotic relationships will enhance firms' export performance.

Accordingly, the following hypothesis is proposed:

**H1:** *Symbiotic relationships exert a significant positive effect on export performance.*

### Effects of Symbiotic Relationships (SR) on Product Innovation (PI)

Product innovation (PI) is widely recognised as a key driver of firms' competitiveness, market success, and long-term sustainability. For firms operating in international markets, continuous product innovation enables them to respond to changing customer preferences, satisfy international quality standards, and differentiate themselves from competitors. Consequently, firms increasingly rely on external collaborations to access complementary knowledge, technologies, and capabilities that support innovation. Networking plays a significant role in fostering innovative entrepreneurial ideas (Dyer et al., 2008), while alliances with multinational companies facilitate product development and value creation (Pillai et al., 2024). Symbiotic relationships, characterized by mutually beneficial collaboration, enable firms to share risks, exchange knowledge, and strengthen their capabilities to develop innovative products (Vidal & Mitchell, 2013).

Extant literature consistently suggests that symbiotic relationships stimulate product innovation by expanding firms' access to external knowledge, market intelligence, technological expertise, and distribution networks. Tse et al. (2021) demonstrated that relationships with business partners, institutions, and personal networks established through trade fairs and workshops improve firms' access to distribution channels and market information, thereby enhancing product quality and innovation. Similarly, stronger collaborative relationships have been associated with greater innovation outcomes (Etemad, 2019) and improved export performance among SMEs (Etemad, 2023). Exporters also utilize these relationships to obtain valuable market intelligence, strengthen innovation capabilities, and accelerate international expansion (Mikhailitchenko & Varshney, 2016).

The innovation benefits of symbiotic relationships are further reinforced through firms' access to financial, technological, and organisational resources. Informal networking relationships with local businesses improve firms' access to financial resources and strengthen domestic capabilities (Oyedele & Firat, 2019), both of which are essential for innovation. From the perspective of Resource Dependency Theory, inadequate external support increases resource constraints and uncertainty, thereby limiting firms' innovation capacity. Conversely, firms with strong collaborative relationships are better positioned to develop sustainable competitive advantages through continuous innovation (Monticelli et al., 2017). Studies such as Xie et al. (2019) similarly demonstrate that inter-firm collaboration strengthens firms' innovation capabilities, while Dymitrowski et al. (2019) further show that these innovation capabilities contribute to improved export performance.

Collectively, these studies suggest that symbiotic relationships provide firms with the resources, knowledge, and collaborative capabilities necessary to enhance product innovation. Rather than relying solely on internally generated resources, firms embedded in mutually beneficial relationships are able to combine complementary expertise and capabilities to develop new or improved products that strengthen their competitiveness in international markets.

Resource Dependency Theory (RDT) provides the theoretical explanation for this relationship by arguing that firms depend on external organizations to obtain valuable resources that are unavailable internally

(Pfeffer & Salancik, 1978). Within this framework, symbiotic relationships represent an important mechanism through which firms acquire knowledge, technology, financial resources, and market information that stimulate innovation. Product innovation therefore becomes a strategic outcome of firms' ability to effectively leverage externally acquired resources through collaborative relationships.

Despite the growing evidence linking collaborative relationships with innovation, important gaps remain in the literature. Most previous studies examine strategic alliances, networking, or collaboration broadly, without specifically investigating symbiotic relationships characterized by mutual interdependence and reciprocal value creation (Gnyawali & Song, 2022). Furthermore, existing studies rarely examine how these relationships influence product innovation among firms operating in resource-constrained emerging economies such as Ghana, where innovation frequently depends on informal networks and collaborative resource sharing. Consequently, empirical evidence on the relationship between symbiotic relationships and product innovation remains limited within the international entrepreneurship literature. Accordingly, this study proposes the following hypothesis:

**H2:** *Symbiotic relationships exert a significant positive effect on product innovation.*

### Mediating Role of Product Innovation (PI) on the Linkage between Symbiotic Relationships (SR) and Export Performance (EP)

Product innovation (PI) plays a vital role in enhancing firms' competitiveness, sustaining business growth, and improving national economic development. For exporting firms, innovation enables the development of products that meet changing customer preferences, comply with international quality standards, and respond effectively to competitive market conditions. Consequently, product innovation has become an important strategic capability through which firms convert externally acquired resources into superior export performance (Ortigueira-Sánchez et al., 2022). Innovative firms are better equipped to adapt to market changes and exploit new business opportunities, thereby strengthening the positive influence of symbiotic relationships on export success (Singh et al., 2022). Without product innovation, firms may not fully capitalize on the resources and knowledge obtained through collaborative relationships, resulting in weaker export performance. According to the Eurostat (2018, p. 20) product innovation involves the development of "new or improved products or processes that differ significantly from previous offerings," enabling firms to satisfy customer needs and meet international market requirements (Safari & Saleh, 2020). Furthermore, Oyedele and Firat (2019) demonstrated that collaboration with local stakeholders improves firms' access to financial resources and strengthens domestic capabilities, both of which are essential for innovation (Songling et al., 2018) and improved export performance (Aliedan, 2021).

Extant literature suggests that product innovation serves as the mechanism through which collaborative relationships generate superior organisational outcomes. Silva et al. (2017) argued that product innovation mediates the relationship between collaborative partnerships and export performance by enhancing firms' efficiency, competitiveness, and responsiveness to international market demands. Similarly, firms that successfully integrate innovation into their branding and market strategies develop stronger market orientation, improve customer understanding, and increase product visibility in foreign markets (Rua & Santos, 2022). These innovation capabilities enable firms to transform the resources acquired through symbiotic relationships into competitive products that enhance export performance. Moreover, firms with strong market positioning and competitive capabilities developed through effective collaborative relationships are better able to share risks, combine complementary expertise, and continuously develop innovative products that strengthen their international competitiveness (Rua & Santos, 2022).

Collectively, these studies indicate that while symbiotic relationships provide firms with access to valuable external resources, product innovation is the strategic capability that enables those resources to be transformed into improved export outcomes. In other words, collaborative relationships alone may not be sufficient to enhance export performance unless firms effectively utilize the acquired knowledge, technologies, and market intelligence to develop innovative products.

Despite increasing interest in the relationships among symbiotic relationships, innovation, and export performance, empirical evidence explaining the mechanism linking these constructs remains limited (Adegbite et al., 2013). Existing studies have generally examined the direct relationship between collaborative partnerships and export performance or between innovation and export performance independently, with relatively little attention given to the mediating role of product innovation (Nguyen & Kim, 2021). This limitation is particularly important in emerging economies such as Ghana, where firms rely heavily on collaborative resource acquisition to compensate for institutional weaknesses, limited financing, and constrained innovation systems. Consequently, understanding whether product innovation serves as the mechanism through which symbiotic relationships enhance export performance represents an important theoretical and empirical contribution to the international entrepreneurship literature.

Drawing on Resource Dependency Theory, this study argues that symbiotic relationships provide firms with access to external resources and capabilities, while product innovation enables firms to transform those resources into products that enhance international competitiveness and export performance. Therefore, the following hypothesis is proposed:

**H3:** *Product Innovation (PI) mediates the relationship between Symbiotic Relationships (SR) and Export Performance (EP).*

## Research Method

### Study Setting

The research objectives were addressed by testing the study hypotheses using data collected from Ghanaian firms engaged in non-traditional export (NTE) activities, including manufacturing (processing and semi-processing), agriculture, and handicrafts (GEPA, 2017; Adomako et al., 2017). Specifically, the study focused on entrepreneurs engaged in export businesses who are registered with the Ghana Export Promotion Authority (GEPA). The Ghanaian non-traditional export sector provides an appropriate empirical context for examining the relationships among symbiotic relationships, product innovation, and export performance because firms in this sector operate under significant resource and institutional constraints while competing in international markets.

First, the sector is dominated by small and medium-sized enterprises (SMEs), where collaborative partnerships, networking, and innovation are critical for sustaining competitiveness and facilitating internationalization (GEPA, 2020). Second, exporters frequently rely on symbiotic relationships with buyers, suppliers, research institutions, logistics providers, and government agencies to overcome structural challenges such as inadequate infrastructure, limited access to finance, and market information asymmetries (Asare et al., 2021). Third, Ghana's National Export Development Strategy (NEDS) identifies innovation, strategic partnerships, and export diversification as central pillars for increasing non-traditional export earnings to US$25 billion by 2029, further highlighting the relevance of this sector for examining collaborative strategies and export performance (Ministry of Trade and Industry, 2020).

Furthermore, although previous studies have emphasised the importance of innovation and inter-organisational collaboration for export success in emerging markets, empirical evidence from Sub-Saharan Africa remains relatively limited, particularly regarding the mechanisms through which product innovation enhances the export benefits derived from symbiotic relationships (Boateng et al., 2023). Given the increasing competitive pressures facing Ghanaian exporters, understanding how collaborative relationships foster innovation and improve export performance is both theoretically and practically important (Amankwah-Amoah et al., 2019). Accordingly, the Ghanaian NTE sector offers an appropriate setting for examining the proposed relationships and contributes context-specific evidence to the international entrepreneurship and export performance literature.

## Sample and Data Collection

The study's sampling frame was based on previous research by Adomako et al. (2017), Quaye et al. (2017), and Ciszewska-Mlinaric (2018). The target population comprised entrepreneurs engaged in non-traditional export (NTE) businesses who were registered with the Ghana Export Promotion Authority (GEPA), Ghana's principal regulatory and promotional agency for exporters, with a membership of over 1,048 firms. The sample included firms that had been exporting non-traditional products for at least three years (Ciszewska-Mlinaric, 2018; Quaye et al., 2017), ensuring that respondents possessed sufficient export experience and had established collaborative relationships relevant to the study. An initial search of the GEPA database identified 874 exporters meeting these criteria. To ensure that respondents possessed adequate knowledge of their firms' export strategies and collaborative activities, only owner-managers or Chief Executive Officers (CEOs) were included in the study (Ciszewska-Mlinaric, 2018).

Data were collected through a structured questionnaire administered to the selected firms. CEOs or entrepreneurs were initially contacted via email and invited to participate in the study. Follow-up telephone calls were subsequently conducted to confirm respondents' eligibility and verify that the firms intended to continue their export activities over the following three years (Leonidou et al., 2011; Ciszewska-Mlinaric, 2018). Of the 874 eligible firms, 400 agreed to participate. An online questionnaire was subsequently distributed via email, resulting in 301 usable responses, representing a response rate of 75.25%. To further assess respondents' competence, five self-assessment items were incorporated into the questionnaire using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The competency assessment produced a mean score of 7.50 (SD = 0.61), indicating that respondents possessed a high level of knowledge regarding their firms' export activities and collaborative relationships. Accordingly, the final analysis was based on the 301 valid responses.

The final sample comprised micro (30%), small (30%), and medium-sized (40%) enterprises, reflecting the composition of Ghana's non-traditional export sector. All participating firms had operated for at least ten years, suggesting substantial business and export experience. Furthermore, firm size (FS), firm age (FA), ownership (FO), and industry (FI) were included as control variables because previous studies have shown that these characteristics may influence export performance. To assess potential non-response bias, early and late respondents were compared using Pearson's chi-square test in SPSS version 25, following the procedures recommended by Rogelberg and Stanton (2007) and Adomako et al. (2025). The analysis revealed no statistically significant differences between the two groups, indicating that non-response bias was unlikely to affect the study's findings (Alajety & Adomako, 2025).

## Measures

### Symbiotic Relationships (SR)

The researcher utilised adapted from Golden and Dollinger (1993) to assess symbiotic relationships (SR). This measure includes two dimensions: conjugate activities, which represent direct interactions with non-competitor organizations (three items), and organic activities, which capture indirect engagement within the community (three items). The combined six-item scale achieved high internal consistency ($\alpha = 0.897$). All measurement items were adapted to reflect the context of Ghana's non-traditional export sector**.** Participants rated each statement on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

### Product Innovation (PI)

Product innovation was measured using a four-item scale adapted from Thongsri and Chang (2019), which demonstrated high reliability ($\alpha = 0.896$). The scale assessed respondents' perceptions of their firms' product innovation activities within Ghana's non-traditional export sector. Participants rated their agreement on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

## Export Performance (EP)

Export performance was measured using sixteen items adapted from Imiru (2021), with an overall reliability coefficient of α = 0.894. The scale comprised two dimensions: general export performance (six items; EP1–EP6) and specific export performance (ten items; EP7–EP16) (see Table 1). Participants evaluated each item using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

## Control Variables

Consistent with previous export performance studies, four control variables, firm size, firm age, ownership, and industry, were included because these firm characteristics may influence export performance independently of the proposed relationships (Adomako et al., 2017).

Firm size was measured by the number of employees and categorized as micro (1), small (2), medium (3), and large (4), based on the assumption that larger firms generally possess greater resources to support export activities (Childs & Jin, 2015; Ciszewska-Mlinaric, 2018).

Firm age was measured using years of operation and categorized as less than 10 years (1), 10–15 years (2), 16–20 years (3), 21–25 years (4), and over 25 years (5). This coding reflects the expectation that older firms possess greater experience and are therefore more likely to achieve superior export performance (Childs & Jin, 2015; Ciszewska-Mlinaric, 2018).

Ownership was assessed by the number of owners, following previous studies suggesting that ownership structure influences strategic decision-making and firms' export performance (Quaye et al., 2017; Ciszewska-Mlinaric, 2018).

Industry was classified as manufacturing or non-manufacturing using a dummy variable (0 = manufacturing; 1 = non-manufacturing) (Wang, 2008; Adomako et al., 2017).

## Results

### Table 1

*Measures, Factor Loadings, Cronbach's Alpha (Item Based), and Multicollinearity*

| *Variables (Items)* | *SR* | *PI* | *EP* | *VIF* | *A* | |
|---|---|---|---|---|---|---|
| [*A 3 factor Model: χ2 /df = 1.38; NNFI = 0.90, CFI = 0.91, RMSEA = 0.05*] | | | | | | |
| *Symbiotic Relationships (SR)* | | | | | | |
| SR1: My company conducts joint research with partners, suppliers, or customers | .706 | | | 2.311 | .900 | |
| SR2: My company has a joint venture with partners, suppliers, or customers | .735 | | | 3.214 | .899 | |
| SR3: My company is involved in joint advertising with partners, suppliers, or customers | .824 | | | 3.744 | .896 | |
| SR4: My company is active in community organizations | .785 | | | 2.648 | .894 | |
| SR5: My company is a member of a social, political, or religious organization(s) | .763 | | | 1.814 | .895 | |
| SR6: My company is a member of the Chamber of Commerce | .755 | | | 2.639 | .898 | |
| *Product Innovation (PI)* | | | | | | |
| PI1: Customers have perceived that our products are unique and different | | .710 | | 2.289 | .897 | |
| PI2: Compared to competitors' products and services, our new products and services often provide superior value for customers. | | | .777 | | 1.405 | .896 |
| PI3: We promptly respond to customer demands and develop new products and services. | | | .781 | | 2.289 | .895 |
| PI4: We continuously improve primary products and services and inject creativity into new products | | | .735 | | 1.305 | .896 |
| *Export Performance (EP)* | | | | | | |
| EP1: High overall export performance | | | .775 | 2.325 | .896 | |
| EP2: High overall export performance compared to competitors | | | .796 | 2.841 | .894 | |
| EP3: High export success | | | .754 | 1.205 | .892 | |
| EP4: Ability and capacity in meeting expectations | | | .851 | 1.991 | .891 | |
| EP5: High competitors' rating on the firm's export performance | | | .811 | 1.995 | .891 | |
| EP6: Strong strategic export performance | | | .811 | 2.289 | .896 | |

| | | | |
|---|---|---|---|
| EP7: Contribution of exporting to the growth of the firm | .805 | 1.305 | .897 |
| EP8: Contribution of exporting to the quality of the firm's management | .804 | 1.187 | .892 |
| EP9: Quality of distributor relationships compared to competitor | .765 | 2.200 | .893 |
| EP10: High customer satisfaction compared to competitors | .751 | 1.315 | .898 |
| EP11: Quality of customer relationships compared to competitors | .807 | 2.189 | .890 |
| EP12: High product/service quality compared to competitors | .782 | 2.325 | .891 |
| EP13: High reputation of the firm compared to competitors | .855 | 1.841 | .897 |
| EP14: Achievement of objectives regarding response to competitive pressures | .801 | 1.245 | .894 |
| EP15: Building strong awareness and image overseas | .895 | 1.801 | .897 |
| EP16: High expertise in new technology usage | .883 | 1.795 | .896 |

**Table 2**

*Results from Reliability Analysis*

| ***Constructs*** | *Cronbach's Alpha* | *rho_A* | *Composite Reliability* | *Average Variance Extracted (AVE)* |
|---|---|---|---|---|
| SR | 0.897 | 0.899 | 0.927 | 0.643 |
| PI | 0.896 | 0.899 | 0.925 | 0.645 |
| EP | 0.894 | 0.897 | 0.905 | 0.613 |

**Table 3**

*Discriminant Validity—Fornell and Larcker Criterion and HTMT*

| | *Fornell and Larcker Criterion* | | | *HTMT* | | |
|---|---|---|---|---|---|---|
| *Constructs* | *SR* | *PI* | *EP* | *SR* | *PI* | *EP* |
| SR | *0.812* | | | | | |
| PI | 0.574 | *0.795* | | *0.673* | | |
| EP | 0.512 | 0.534 | *0.850* | 0.627 | *0.668* | - |

**Table 4**

*Direct Relationship Results*

| *Paths* | *Beta Coefficient* | *T Statistics* | *P Values* |
|---|---|---|---|
| SR -> PI | 0.505 | 11.498 | 0.000 |
| SR -> EP | 0.408 | 5.507 | 0.000 |
| PI -> EP | 0.315 | 6.780 | 0.000 |
| Control: Firm Size -> EP | 0.130 | 2.980 | 0.872 |
| Control: Firm Age -> EP | 0.050 | 1.000 | 0.561 |
| Control: Ownership -> EP | 0.061 | 1.100 | 0.333 |
| Control: Industry -> EP | -0.02 | -0.33 | 0.192 |

**Table 5**

*Mediating Results (Specific Indirect Effects)*

| *Indicators* | *Beta Coefficient* | *T Statistics* | *P Values* |
|---|---|---|---|
| SR -> PI -> EP | 0.280 | 5.155 | 0.000 |

## Variance, Reliability, and Validity Assessment

The study focused on three key constructs: symbiotic relationships, product innovation, and export performance. Given that all variables were collected using a single survey instrument, several procedural and statistical remedies were implemented to minimize the potential effects of common method bias (Adomako et al., 2017; Alajaty & Adomako, 2025). Procedurally, a pilot study was conducted to ensure the clarity of the questionnaire, respondents were assured of anonymity and confidentiality, and the questionnaire was carefully designed to reduce evaluation apprehension and response bias. These procedures are widely recommended for minimizing common method variance (Lindell & Whitney, 2001).

Statistically, the study assessed common method bias by incorporating a Common Latent Factor (CLF) into the measurement model following the recommendations of Adomako et al. (2017) and Alajaty and Adomako (2025). The results indicated that the measurement model maintained a satisfactory fit with and without the inclusion of the common latent factor, suggesting that common method variance did not materially influence the estimated relationships. Furthermore, the observed indicators loaded more strongly on their respective theoretical constructs than on the common latent factor, providing additional evidence that common method bias was unlikely to threaten the validity of the findings.

To further verify the robustness of the results, an unrelated marker variable was included following the procedure proposed by Lindell and Whitney (2001). The marker variable showed no significant association with the principal study constructs, while the adjusted partial correlations remained statistically significant. A sensitivity analysis further confirmed that the substantive findings remained stable across approximately 95% of the sample, providing additional evidence that common method bias was not a major concern in this study.

Additionally, confirmatory factor analysis (CFA) was conducted to evaluate the measurement model. Following the recommendations of Hu and Bentler (1999), model fit was assessed using multiple goodness-of-fit indices. As reported in Table 1, the three-factor measurement model demonstrated an acceptable fit to the data ($\chi^2/df = 1.38$; NNFI = 0.90; CFI = 0.91; RMSEA = 0.05), indicating that the proposed measurement model adequately represented the observed data.

Table 1 further presents the standardized factor loadings and variance inflation factors (VIFs) for all measurement items. The standardized factor loadings ranged from 0.706 to 0.824 for symbiotic relationships, 0.710 to 0.777 for product innovation, and 0.751 to 0.895 for export performance. All loadings exceeded the recommended threshold of 0.70 (Hair et al., 2022), demonstrating satisfactory indicator reliability. In addition, VIF values ranged from 1.187 to 3.744, which are well below the recommended cut-off value of 5.0, indicating that multicollinearity was not a concern.

Table 2 reports the results of the reliability and convergent validity assessment. Cronbach's alpha values exceeded the recommended threshold of 0.70 for symbiotic relationships ($\alpha = 0.897$), product innovation ($\alpha = 0.896$), and export performance ($\alpha = 0.894$), demonstrating satisfactory internal consistency (Hair et al., 2017). Similarly, composite reliability (CR) values ranged from 0.905 to 0.927, exceeding the recommended minimum value of 0.70. Convergent validity was further confirmed, as the Average

Variance Extracted (AVE) values for symbiotic relationships (0.643), product innovation (0.645), and export performance (0.613) all exceeded the recommended threshold of 0.50 (Hair et al., 2022).

Discriminant validity was evaluated using both the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio. As shown in Table 3, the square root of the AVE for each construct exceeded its correlations with other constructs, satisfying the Fornell–Larcker criterion. Furthermore, HTMT values ranged from 0.668 to 0.673, remaining well below the recommended threshold of 0.90 (Hair et al., 2022). Collectively, these findings confirm that the measurement model demonstrates satisfactory reliability, convergent validity, and discriminant validity.

**Analytical Procedure and Results**

To effectively test the study hypotheses, SMART PLS regression analysis (PLS-SEM) was employed, covering two stages of structural model assessment: (1) direct relationships among the study constructs and (2) the mediation effect of product innovation on the relationship between symbiotic relationships and export performance. The methodology of Hair et al. (2022) was adopted to assess multicollinearity before conducting the structural model analysis. The researcher examined the variance inflation factor (VIF) for each model to evaluate multicollinearity, particularly among the predictor variables. As noted by Hair et al. (2022), multicollinearity was not a concern**,** with VIF values ranging from 1.187 to 3.744, which are within the recommended threshold. Additionally, SmartPLS utilises to estimate path models involving latent variables. The outer model describes the relationships between latent constructs and their indicators, whereas the inner model estimates the structural relationships among the latent constructs. The significance of the hypothesized relationships was evaluated using the standardized path coefficients (β), t-values, and p-values generated through the bootstrapping procedure. Mediation analysis was conducted using the indirect effects obtained from the PLS-SEM model.

From Table 4, the results of Structural Analysis 1 indicate that symbiotic relationships have a significant positive effect on export performance ($\beta = 0.408$, $T = 5.507$, $p < 0.05$). The standardized path coefficient indicates that stronger symbiotic relationships are associated with higher levels of export performance, supporting the hypothesized positive relationship between the two constructs. This finding provides empirical support for the first research hypothesis (H1), which posits that symbiotic relationships exert a significant positive effect on export performance.

Table 4 further indicates that symbiotic relationships significantly and positively affect product innovation ($\beta = 0.505$, $T = 11.498$, $p < 0.05$). This finding indicates that firms with stronger symbiotic relationships tend to exhibit higher levels of product innovation. The standardized path coefficient for the relationship between symbiotic relationships and product innovation ($\beta = 0.505$) is larger than that for the relationship between symbiotic relationships and export performance ($\beta = 0.408$), suggesting a comparatively stronger association with product innovation. Therefore, this finding provides empirical support for the second hypothesis (H2), which posits that symbiotic relationships exert a significant positive effect on product innovation. Table 5 presents the mediation analysis, showing that product innovation significantly mediates the relationship between symbiotic relationships and export performance ($\beta = 0.280$, $T = 5.155$, $p < 0.05$).

The positive and statistically significant indirect effect indicates that symbiotic relationships enhance export performance partly through their positive influence on product innovation. This finding suggests that firms are more likely to achieve superior export performance when the resources and capabilities acquired through symbiotic relationships are transformed into innovative products. Accordingly, this finding provides empirical support for the third hypothesis (H3), which proposes that product innovation mediates the relationship between symbiotic relationships and export performance.

## Discussion and Implications

This study contributes to the international entrepreneurship and export performance literature by demonstrating that product innovation serves as an important mechanism through which symbiotic relationships enhance export performance among non-traditional exporters in Ghana. The findings extend Resource Dependency Theory by showing that firms operating under resource constraints can leverage collaborative relationships to acquire valuable resources, transform them into innovative products, and ultimately improve their export performance.

This study examines how symbiotic relationships influence export performance, expanding on previous research that links these relationships to export success. Existing studies indicate that such relationships help firms improve competitiveness, lower costs, access new markets, and facilitate knowledge sharing, thereby impacting risk, returns, and overall results (Andriof et al., 2017; Kijkasiwat et al., 2021). Furthermore, earlier research emphasises strategic alliances, networks, and partnerships in enabling resource sharing, market entry, and knowledge exchange, all crucial for export success (Paul & Rosado-Serrano, 2019; Kijkasiwat et al., 2021). While some research investigates trust and commitment (Leonidou et al., 2018), the understanding of how deeper cooperation, like shared value creation, joint innovation, and adaptation, affects export performance remains limited (Kim & Hwang, 2021).

Consistent with the study's first hypothesis, the findings demonstrate that symbiotic relationships exert a significant positive influence on export performance. This relationship is particularly important within Ghana's non-traditional export sector, where firms frequently face financing constraints, inadequate market information, weak institutional support, and limited technological capabilities. Under such conditions, collaborative relationships provide access to external knowledge, resources, distribution channels, and strategic capabilities that individual firms may struggle to acquire independently. Consequently, exporters that cultivate strong symbiotic relationships are better positioned to respond to changing international market conditions and improve their export performance.

Our research finds, defined as direct activities with non-competitors and indirect community-based actions, and export success. This finding also reinforces the central proposition of Resource Dependency Theory, which argues that firms enhance performance by securing critical resources through external relationships rather than relying solely on internally available capabilities. These relationships enable firms to develop collective skills, co-create marketing strategies, and adapt to global market dynamics, enhancing competitiveness.

The present findings are consistent with previous studies reporting that collaborative relationships improve competitiveness, facilitate knowledge sharing, and strengthen firms' international market performance (Andriof et al., 2017; Kijkasiwat et al., 2021; Dana, 2006). However, unlike earlier studies that primarily focused on strategic alliances or general organisational performance, this study demonstrates that symbiotic relationships directly contribute to export performance within a resource-constrained emerging economy. This context-specific evidence extends existing knowledge by highlighting the strategic importance of collaborative relationships for exporters operating under institutional and financial constraints.

Organisations should therefore prioritize building long-term partnerships, setting shared goals, investing in mutual capabilities, and fostering trust and knowledge sharing with international partners. Policymakers and export organizations should promote cooperation through platforms for joint innovation, strategic alliance training, and trust-building initiatives between local exporters and international collaborators.

From a policy perspective, strengthening collaborative ecosystems among exporters, research institutions, financial institutions, and government agencies may improve firms' access to strategic resources that support innovation and export competitiveness. Such collaborative initiatives align with Ghana's National

Export Development Strategy, which emphasises innovation and strategic partnerships as key drivers of non-traditional export growth.

Recent studies support these conclusions: Alarcón et al. (2021) demonstrated that trust-based partnerships enhance adaptability and export growth. Zhao and Zou (2023) revealed that collaborative alliances improve performance through shared resources and market insights; and Kryeziu et al. (2022) noted that improve product quality and diversify. Additionally, symbiotic relationships can reduce operational risks, especially related to international ventures (Igwe & Kanyembo, 2019). Networking with industry peers, government officials, and business partners (Tse et al., 2021; Mikhailitchenko & Varshney, 2016) can strengthen alliances, expand market knowledge, and foster innovation, key elements for export success. Collectively, these findings reinforce the conclusion that it is the quality, depth, and strategic value of collaborative relationships, rather than the mere existence of business networks that contribute to sustained export success.

## Theoretical Implications

This study contributes to the international entrepreneurship and export performance literature by extending Resource Dependency Theory (RDT) in three important ways. First, the findings demonstrate that symbiotic relationships constitute valuable strategic mechanisms through which firms acquire critical external resources, including knowledge, market information, technology, and distribution capabilities, thereby enhancing export performance. While previous studies have established that collaborative relationships improve general firm performance, this study provides empirical evidence of their direct contribution to export performance within Ghana's non-traditional export sector.

Second, the study advances RDT by demonstrating that the benefits derived from symbiotic relationships are not limited to resource acquisition alone but are realised through product innovation. The significant mediating effect of product innovation indicates that firms must transform externally acquired resources into innovative products before achieving superior export performance. This finding extends existing theoretical understanding by explaining the mechanism through which symbiotic relationships create export advantages.

Third, the study broadens the application of Resource Dependency Theory by providing evidence from an emerging economy characterized by resource constraints, institutional weaknesses, and limited innovation capabilities. Under such conditions, collaborative relationships become strategic resources that enable firms to compensate for internal resource deficiencies and strengthen their competitiveness in international markets. Consequently, the study reinforces the proposition that firms' ability to establish, manage, and leverage external relationships is fundamental to innovation, internationalization, and sustained export performance.

## Practical Implications

The findings offer several practical implications for entrepreneurs, managers, and policymakers involved in Ghana's non-traditional export sector. First, the significant positive relationship between symbiotic relationships and export performance suggests that exporters should view collaborative relationships as long-term strategic assets rather than short-term transactional arrangements. Developing strong partnerships with suppliers, customers, research institutions, financial institutions, government agencies, and other industry stakeholders can improve firms' access to valuable resources, market intelligence, and technological capabilities required for international competitiveness.

Second, the positive influence of symbiotic relationships on product innovation indicates that managers should actively encourage collaborative learning, joint product development, and knowledge-sharing initiatives with strategic partners. Such collaborations can enhance firms' ability to develop innovative products that satisfy changing international market requirements and strengthen their competitive position in foreign markets.

Third, the mediating role of product innovation demonstrates that collaboration alone is insufficient to improve export performance. Firms must possess the capability to transform externally acquired knowledge and resources into innovative products that create value for international customers. Consequently, managers should invest in innovation capabilities, research and development activities, employee training, and to maximize the benefits derived from symbiotic relationships.

From a policy perspective, government agencies such as the Ghana Export Promotion Authority (GEPA) and the Ministry of Trade and Industry should continue promoting collaborative innovation ecosystems through export networking programmes, innovation hubs, technology transfer initiatives, and partnerships between exporters, universities, and research institutions. Strengthening these collaborative ecosystems will improve exporters' innovation capabilities, enhance international competitiveness, and support the objectives of Ghana's National Export Development Strategy.

### Limitations and Future Research Direction

This study examined Ghanaian firms engaged in non-traditional export activities, including manufacturing (processing and semi-processing), agriculture, and handicrafts. Although the study provides important insights into the relationships among symbiotic relationships, product innovation, and export performance, several limitations should be acknowledged.

First, the cross-sectional research design limits the ability to establish causal relationships among the study variables (Creswell & Creswell, 2018). Future studies should employ longitudinal research designs to examine how symbiotic relationships, innovation capabilities, and export performance evolve over time and whether these relationships remain stable under changing market conditions.

Second, the study focused exclusively on firms operating within Ghana's non-traditional export sector. While this context provides valuable evidence from a resource-constrained emerging economy, the findings may not be fully generalisable to firms operating in traditional export sectors, service industries, or other developing and developed economies. Future research could undertake comparative studies across industries and countries to assess the generalisability of the proposed relationships.

Third, the study relied on self-reported survey data, which may be susceptible to common method and social desirability biases despite the procedural and statistical remedies adopted (Bryman, 2019; Creswell & Creswell, 2018).

Future research could adopt mixed-methods approaches by combining survey data with interviews, case studies, or secondary performance data to obtain a richer understanding of how symbiotic relationships influence innovation and export performance.

Finally, future studies could extend the present model by examining the moderating roles of institutional quality, digital transformation, government support programmes, export market turbulence, and firms' digital capabilities. Investigating how digital platforms facilitate collaborative innovation and export competitiveness would further enhance understanding of firms' internationalization strategies within emerging economies.

### Conclusion

This study investigated the influence of symbiotic relationships on export performance among Ghanaian firms operating in the non-traditional export sector, with product innovation examined as a mediating mechanism. Drawing on Resource Dependency Theory, the findings demonstrate that symbiotic relationships significantly enhance export performance directly and indirectly through product innovation. These findings suggest that firms are more likely to achieve superior export performance when they leverage collaborative relationships to acquire valuable external resources and transform those resources into innovative products that satisfy international market demands.

Beyond confirming the positive effects of symbiotic relationships, this study contributes to the international entrepreneurship literature by explaining the mechanism through which collaborative relationships improve export performance. Specifically, the findings demonstrate that product innovation represents the pathway through which resources acquired from symbiotic relationships generate sustained export competitiveness, thereby extending the application of Resource Dependency Theory within the context of emerging economies.

From a practical perspective, the findings emphasise that exporters should view collaborative relationships as strategic assets capable of strengthening innovation, improving market responsiveness, and enhancing international competitiveness. For policymakers, the results underscore the importance of promoting innovation ecosystems, strategic partnerships, and institutional support mechanisms that facilitate collaboration among exporters, research institutions, financial institutions, and government agencies.

Overall, this study demonstrates that sustained export success depends not only on firms' ability to establish collaborative relationships but also on their capacity to convert externally acquired knowledge and resources into innovative products that create value in international markets. Strengthening both collaboration and innovation will therefore be essential for improving the competitiveness and long-term growth of Ghana's non-traditional export sector.

## Author Contribution Statement

Conceptualization, data collection, analysis and discussion: LNT

## Conflict of Interest Statement

The authors declare no known conflicts of interest associated with this publication.

## AI Disclosure Statement

The author declares that this publication did not use an AI or AI technologies.

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