

SmartPLS-SEM Analyses Approach in Validity and Reliability of Entrepreneurial Orientation, Social Capital and Government Support Policies on SMEs Performance Instrument

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Abstract- SMEs vary in applying entrepreneurial orientation (EO) coupled with other internal and external resources to achieve performance goals. We determined this heterogeneity using EO, social capital, and government support policies, which are vital for SMEs strategic decisions on performance. Despite the abundance of EO research, little is known about how the predictors have impacted the performance of Ghanaian SMEs. This study validated an interactive model for SMEs sustainable performance using 372 questionnaires. Data screening issues of common method variance were conducted prior to analysis with Smart PLS-SEM. Findings established an Average Variance Extracted values above 0.50 with composite reliability (CR) values of (0.838) to (0.948) for all the variables. SMEs performance had the maximum CR value of (0.948) whilst social capital (SC) scored the lowest of (0.838). In totality, this research five EO as well as SC and Government support policies variables proved vital in contributing to Ghanaian SMEs performance. The implications are that EO, SC and prudent Government support policies are needed for SMEs sustainable performance. Next, the findings imply that government and its allied institutions support to SMEs are crucial to boost their EO and SC, making them more competitive in wealth creation in every business milieu.

Keywords: Entrepreneurial Orientation; Social Capital; Government and Allied support policies; Ghana SMEs Performance; Measurement Instruments; SmartPLS-SEM Analyses.

1.0 Introduction

Small and medium-sized entrepreneurs (SMEs) continue to play important roles in every country's economic development in job creation, reduction of economic inequality, promotion of social inclusiveness, and growth of nations. With their dominance in developed and developing countries, SMEs contribute enormously to the Gross Domestic (GDP) of countries. SMEs represent 99 per cent of all enterprises in the world offering roughly 70% of jobs and create 50 to 60 percent of value addition. However, in emerging nations, they contribute up to 45% of total jobs and 33% of GDP [1]. SMEs form about 93 per cent of businesses providing almost 80 per cent of employment and about 70 per cent to Ghana's GDP [2,3].

While much attention is devoted to the study of the economics and management of firms' performance, varied attention is given to the investigation of their use of internal and external embedded resources toward performance. In this paper we direct attention to items used for SMEs study, a key player to achieving economic and societal progress of nations like Ghana with a comprehensive interactive model of their entrepreneurial orientation strategies explained by social capital and government and its support policies enhancing or otherwise Ghanaian SMEs performance relationship in their production of goods and services.

Research investigating entrepreneurial orientation role on business performance have been around for a while, but interest in how it affects SMEs' resilience and long-

term success continues to develop. This has been investigated in entrepreneurship and management studies from various theoretical perspectives. In line with that, our study aimed to identify key variables that affect the performance of SMEs that have gotten less scholarly attention and some of which have produced mixed results, such as the individual characteristics of entrepreneurial orientation, social capital focusing shared relationship, and government assistance policies [4,5,6,7,8,9]. With some inconclusive past studies on the chosen variables, the predictive associations or weights of these factors may not have been statistically established. This may have contributed to contradictory data or weak associations between the analyzed variables resulting in lack of consensus in the conceptualization of the constructs [10,11,12,13].

Similarly, though quite a number of instruments have been utilized for EO, SC, Government support and SMEs performance studies, not all of them may be drawn from sound theoretical models and their methodological approaches may have restricted their general pertinence especially in Africa, Ghana. Hence, the justification for a reliable and validly assessed instruments on how this study antecedent factors explain and moderate the entrepreneurial orientation and SMEs performance relationship. This is indeed required, as the problem is less examined or not at all using these variables with Government, which provide various support through its

allied institutions notable for SMEs development and performance.

This study, therefore, aim to determine the metric properties of a questionnaire based on the adapted instruments from previous researchers for each of the variables [14,15,16,17] and [18]. This “new questionnaire” therefore integrates the exploration of SmartPLS-SEM analyses approach on the validity and reliability of entrepreneurial orientation, social capital along with government support policies to provide a comprehensive picture on SMEs performance instruments.

2.0 Research Questions

The objectives the study set out to achieve are stated as follows;

- 1) Does the performance of Ghanaian SMEs in relation to entrepreneurial orientation, social capital, and government support policies elucidate the study constructs? and
- 2) Does the performance of Ghanaian SMEs as measured by entrepreneurial orientation, social capital, and government support policies fulfil the criteria for validity and reliability?

3.0 Material And Methods

In this study, a quantitative research method was adopted. The study population consisted of Ghanaian SMEs registered with National Board for Small Scale Industries-NBSSI also referred to as the Ghana Enterprise Agency. A simple random sampling approach was utilised for this study after attaining 182 as the minimum sample size of the subjects using G-Power software which is regarded appropriate for computing the least acceptable respondents using the number of predictors, effect size and confidence level to serve as justifications for accepting or rejecting any stated proposition.

The research instruments of the study were adapted from previous study as exemplified by Table 1 where questionnaire items were all designed using seven-point (7) Likert Scale with one representing 'Strongly Disagree' whilst seven indicates 'Strongly Agree'. Further, the study variables are all reflective 'continuous variables' with no 'categorical variable'. Hence, continuous data was attained and utilised in this study which confirmed other prior studies that used continuous data for PLS-SEM analysis [e.g.,19,11]. In all, 500 survey questionnaires were administered to SMEs in Ghana who voluntarily participated in the survey and only 372 of the returned questionnaires were valid for this study.

Table 1. Instrument Sources and Number of Items Used

Construct	Items No.	Source(s)
1. Entrepreneurial Orientation	6	Adapted from,
1.1.1 Risk-Taking	6	[14,15,20,16]
1.1.2 Innovativeness	6	

1.1.3 Proactiveness	6	
1.1.4 Competitiveness	6	
1.1.5 Act Independent		
1.2 Social Capital (Socap)	8	[15;21,22]
1.3 Government support policies (Gosp)	8	[23,17]
1.4 SMEs Performance (Pefom)	6	[18,20]

3.1 Instrumentation and Pilot-Testing

We created an instrument for pretesting the items after going through a number of processes, including the operational definition of our constructs, and generating the items from prior studies. Assigned supervisors, members of the examination committee, and SME practitioners initially validated the questionnaire and offered helpful feedback on the constructs and items to ensure content validity and simplicity and precision. Following agreement that the items and constructs were understandable, correct, as well as pertinent, we worked to further refine and pilot-test the items to see if respondents agreed that they were reliable and valid measures that adhered to the requirements of a rigorous scientific study as outlined by [24].

The questionnaire's final form was developed after a pilot test with 30 participants, where the outcomes were deemed satisfactory. Based on preliminary data, the pilot test had no major issues with our instrument, such as item difficulty, item discrimination, internal consistency, and low response rate. To achieve a sufficient sample size and results that can match the final data, and appropriate for generalizability after data analysis, we selected a pilot test sample size larger than the number of tested variables.

4.0 DATA ANALYSIS

The data was examined by employing SPSS, 26th edition software and a Structural Equation Modeling (SmartPLS-SEM) version 3.3 analysis technique and also conducted full collinearity to reduce common method bias usual of a single source data. The SmartPLS-SEM has been utilized to determine the study's measurements and structure models that had been verified by the use of one-stage style which can be used for performing PLS analysis in testing any given hypotheses by first assessing and validating the measurement and structural models of this study. The full collinearity test also provided satisfactory VIF values within 3.3 to 5.0 range for all the study variables as per [25].

This study used a reflective model where the measurement model examined eight (8) latent variables reliability and validity of the measures based on their internal consistencies, and individual indicator reliability, convergent and discriminant validity. This stage considered their indicator loadings, Cronbach alpha values, composite reliability, average variance (AVE) and discriminant validity using the PLS-Algorithm as per [26&27]. Certifying the first model's condition, and for the structural model valuation, bootstrapping technique was

adopted to test the study proposed hypotheses as per Table 2.

Table 2. Validity and Reliability Values of the Measurement model

Rule of Thumb	Decision to approve	Explanation	References
1. Cronbach Alpha	≥ 0.70		[26]
2. Construct Reliability (CR)	≥ 0.70	Has good reliability or internal consistency if more but below 0.6 has less reliability.	[28,29]
3. The Average Variance Extracted (AVE) Value	≥ 0.50	-----	[28]
4. Constructs Validity or Convergent Validity (CV)	Suitable variable loadings ≥ 0.50 or ideally 0.70, AVE ≥ 0.50 and the CR ≥ 0.70 least.	Variables accurately reflects what it intends to measure or designed to measure	[28,30]
Discriminant Validity (AVE)	Thus, AVE squared inter-construct Correlation (SIC) or inter-construct similarity. i.e, AVE ≥ 0.50	Denotes how unique the variable is compared to other constructs.	[28,30]

4.1 Findings of PLS-SEM Measurement Model

PLS-SEM analysis was adopted in this research to get the study outcome. This option to use PLS for the examination of data also confirm the nature of the study's data as not normally dispersed and is usual of management and social science studies. Further, our study's reflective model included a mediator and moderating variables all designed as continues data. Among other reasons for using PLS-SEM analysis is what [31] added that it can predict and explain targeted constructs, use to explore the causal effects of two or more constructs and can also analyse complex study models [26].

Answer to Study Question One:

Does Entrepreneurial Orientation, Social capital and Government support policies on Ghanaian SMEs performance explained the study constructs?

To establish whether the items utilized by the study could measure related constructs in scores, the study used internal consistency reliability analysis to answer the first question. To determine internal consistency reliability, composite reliability (CR) values were used to evaluate the internal consistency validity. From [32], CR values of 0.70 and 0.90 are considered satisfactory. However, values of 0.60 and 0.70 may also be acceptable for exploratory studies. Similarly, [26] opined that for further studies the CR values should be greater than 0.70 to ensure sufficient internal consistency. Likewise, a Cronbach's Alpha that exceeds 0.70 also suggest the extent of reliability of items measuring a construct as illustrated by Table 3.

Table 3. The Consistency and Reliability Findings

Constructs	Cronbach's Alpha (α ≥ 0.7)	Composite Reliability (CR ≥ 0.7)
Risk-Taking (RK)	0.845	0.889
Innovativeness (IN)	0.849	0.887
Proactiveness (PR)	0.850	0.875
Competitiveness (Camp)	0.849	0.868
Act Independently (Aut)	0.888	0.910
Social Capital (Socap)	0.760	0.838
Government support policies via institutes (Gosp)	0.774	0.847
SMEs Performance (Pefom)	0.934	0.948

The analysed results of our study indicated CR values for the chosen constructs ranged from 0.838 to 0.948 and that of the Cronbach's Alpha values between 0.760 to 0.934. This demonstrated that the CR and Cronbach's Alpha values are justified and also good enough, and indicates that the study constructs possessed reliability and coherence [26]. Hence, the study, thus, answers the research question that Entrepreneurial Orientation, Social capital and Government support policies on Ghanaian SMEs performance explained the study constructs and therefore, are reliable.

Answer to Study Question Two:

Does Entrepreneurial Orientation, Social capital and Government support policies on Ghanaian SMEs performance meet the requirements of validity and reliability?

As an answer to the second stated question, the PLS-SEM analysed results also probed the convergent validity which measures how well an item measures related constructs in a study [26]. As a result, three tests were

conducted under convergent validity based on the constructs outer loadings, composite reliabilities (CR) and average variance's extracted (AVE) values. An outer loadings value greater than 0.70 is appropriate and may be equal to or preferably above 0.50 for the AVE value [26]. Studies, agreed that the AVE value must be greater than 0.50 and that, an outer loading value between 0.40 to 0.70 should be maintained or eliminated when necessary in order to increase the AVE or the CR value [26] as in Table 4.

As illustrated, we removed few question items and arrived at more acceptable AVE and CR values ensuring that each variable AVE and CR exceeded 0.50 and 0.70 as provided by [26]. Thus, the study variables along with their items fulfil the prescribed threshold aside from RK6, Camp6, Socap1, Socap2, Socap8, Gosp1, Gosp2, Gosp3 and Gosp4 which were deleted. This result signifies that, in every quantitative research, the number of deleted items should be minimum and not exceeding 20 percent of the total number of items.

Table 4. Convergent Validity Findings

Construct	Items Used	Loading (≥0.50)	AVE (≥0.50)	CR (≥0.70)
Risk-Taking (RK)			0.581	0.889
I take courageous actions in order to achieve my firm aim.	RK1	0.775		
I take firm stance in business in times of uncertain decisions.	RK2	0.804		
The term "risk taker" is a positive attribute in my business.	RK3	0.852		
I encouraged my staff to take moderate risks for new ideas.	RK4	0.788		
My business emphasized experimentation for opportunities.	RK5	0.844		
Innovativeness (IN)			0.570	0.887
My firm actively introduce innovative ideas in our actions.	IN1	0.579		
My firm is creative in its	IN2	0.757		
	IN3	0.751		

methods of operation.	IN4	0.750		
I pursue novel ways to do things in business.	IN5	0.814		
My staff are involved to make improvement in the business.	IN6	0.851		
I promote research and development in my business.				
I often increase product/service lines before my competitors.				
Proactiveness (PR)			0.542	0.875
I always take the initiative in every situation against my rivals.	PR1	0.826		
I excel at identifying opportunities.	PR2	0.845		
I initiate actions to which other businesses respond.	PR3	0.586		
My staff are encouraged to identify business ideas not problems	PR4	0.663		
My bold actions enable me to succeed.	PR5	0.702		
I usually kick-start in launching new goods or services.	PR6	0.761		
Competitiveness (Camp)			0.576	0.868
My firm is intensely competitive.	Cam1	0.605		
My firm takes a bold or aggressive approach when competing.	Cam2	0.562		
I try to overcome my	Cam3	0.790		
	Cam4	0.885		

competition as best as I can. I am first to introduce new technological know-how. I am not discouraged to introduce new goods or services.	Cam5	0.889		
Act Independently (Aut)			0.627	0.910
My staff are permitted to act and think without interference.	Aut1	0.783		
My staff perform jobs that allow them to initiate changes.	Aut2	0.774		
My staff are given freedom to decide how to work.	Aut3	0.768		
My staff communicate freely without interference.	Aut4	0.828		
I give authority to my staff to act alone to the firm interests.	Aut5	0.803		
I give my staff access to all vital information.	Aut6	0.792		
Social Capital (Socap)			0.510	0.838
I have high retention of my staff based on close relationship.	Scap3	0.705		
I have high network of customers within my business.	Scap4	0.738		
I have new customers by taking part in social activities.	Scap5	0.752		
I have enough assets based on trust relation	Scap6	0.699		
	Scap7	0.672		

with my suppliers. I get assistance from government to perform based on trust.			0.552	0.847
Government support policies and its Institutes (Gosp)				
Gosp and institutes tax incentives helped my firm performance.	Gos5	0.659		
Gosp / institutes assisted my firm to obtain financial assistance.	Gos6	0.879		
Gosp /institutes assistance helped in my firm management.	Gos7	0.887		
Gosp /institutes helped me to buy and use new technology.	Gos8	0.833		
SMEs Performance (Pefom)			0.751	0.948
On SMEs performance, participants responded to six (6) items on sales, gross profit, growth, market growth, ROI, and customer satisfaction and retention using 7-point Likert scale adapted from (Kellermanns, & Eddleston, 2007; Sidik, 2012).	Pefo1	0.892		
	Pefo2	0.887		
	Pefo3	0.867		
	Pefo4	0.862		
	Pefo5	0.868		
	Pefo6	0.822		

4.2 Discriminant Validity

To determine the extent to which our evaluated constructs differed from one to the other, the discriminant validity analysis was conducted. This analysis helps to establish the degree to which one construct correlates with another, as

well as the number of items that can be used to represent a particular construct [26]. Hence, we assessed discriminant validity using three approaches thus, (a) item cross-loadings, (b) Fornell Larcker, and the (c) Heterotrait-monotrait ratio (HTMT) criteria.

4.2.1 Cross Loading

From literature, the construct's loading value ought to remain higher than the loadings in the other constructs and its cross-loading cut-off coefficient value ought to range not lower than 0.70 [26,30]. Likewise, it has been agreed that a construct's outer loading should have higher values than the cross-loadings or correlations of other constructs below it on the same column. Outer cross-loading of 0.40 to 0.50 can be maintained or eliminated if they do not significantly affect the CR and AVE of a construct [26,33]. This criterion suggests that the latent variable's AVE value should be higher than all other variables, which can help reduce the prevalence of interdependence of observed variables. To add, it indicates an issue with discriminant validity if the outer loadings value for cross-related variables exceeds the acceptable threshold of the construct [26]. As illustrated in Table 4, our study cross loading values give credence to the validity for the measurement model.

4.2.2 Fornell Larcker Standard

The Fornell-Larcker criterion which was also assessed served as an essential part of discriminant validity evaluation for study variables. A comparison using the Fornell-Larcker criteria is made between the value of the AVE square root and the construct correlation value that displays the highest value in any column or row relative to the greatest correlation value of any other construct [26]. Rooted in the premise that latent variables ought to correctly describe the subject matter's variant than the variant for other latent variables, this approach was developed.

Following the elimination of some unqualified items' outer loading conditions, Table 5 displays the greater AVE squared values in comparison to the correlation values for each construct. The issue of the reliability of the construct's measurement model is addressed by Fornell-Larcker norm, hence validating discriminant validity assessment, as demonstrated.

Table 5. Findings on the Criteria of Fornell-Larcker

Variable	1	2	3	4	5	6	7	8
1. Aut	0.7 92							
2. Camp	0.1 69	0.7 59						
3. Gosp	0.2 27	0.1 68	0.7 43					
4. IN	0.6 64	0.2 68	0.2 49	0.7 55				

5. PR	0.6 19	0.2 12	0.2 74	0.6 89	0.7 36			
6. Pefom	0.3 70	0.0 32	0.1 48	0.3 88	0.4 30	0.8 67		
7. RK	0.6 65	0.2 40	0.2 23	0.6 39	0.5 92	0.2 82	0.7 62	
8. Socap	0.3 14	0.2 37	0.2 69	0.3 93	0.3 98	0.2 87	0.2 67	0.7 14

4.2.3 Heterotrait-Monotrait Ratio (HTMT)

Heterotite-Monotrait ratio (HTMT) according to [26] is the recent method when determining the authentic association of two or more hypotheses. The HTMT is also termed more reliable way of evaluating the discriminant validity of constructs. The HTMT should meet the requirement with a HTMT value not excess of 0.90. again, when reporting discriminant validity, the cut-off for HTMT values is 0.90 is deemed apt [26].

Findings as presented suggest our study constructs' values had fulfilled the condition for Heterotrait-Monotrait (HTMT) standards. As a statistical rule, none of the constructs scored one to depict no discriminant validity. As a result, the test for discriminant validity using the earlier stated three procedures were satisfactory for this study constructs and confirm existing literature [34,26]. Provided by Table 6, the HTMT values for our study constructs tested met the analysis criteria with no variable having the value one. This certified that the relationship between the tested constructs were weak devoid of discriminant validity issues.

Table 6. Findings of Criteria for Heterotrait-Monotrait Criterion Analysis

Variables	1	2	3	4	5	6	7	8
1. Aut								
2. Camp	0.1 72							
3. Gosp	0.2 12	0.1 69						
4. IN	0.7 48	0.3 21	0.2 96					
5. PR	0.7 20	0.2 36	0.2 70	0.8 24				
6. Pefom	0.3 90	0.0 77	0.1 72	0.4 10	0.4 56			
7. RK	0.7 64	0.2 98	0.2 74	0.7 61	0.7 69	0.3 21		
8. Socap	0.3 33	0.2 54	0.3 39	0.4 68	0.4 07	0.3 30	0.3 21	

Note: The other entries represent the squared Correlations, while the diagonals indicate the square root of the AVE values

Next to the PLS-SEM model measurement that assessed the reliability and validity of the study variables made of independent, mediating and moderating variables and the dependent variable is the determination of the study structural model. From literature, the structural model assessment which constitute last stage after the PLS-Algorithm analysis is required in any PLS-SEM analysis [30;26], as demonstrated by figure 1.

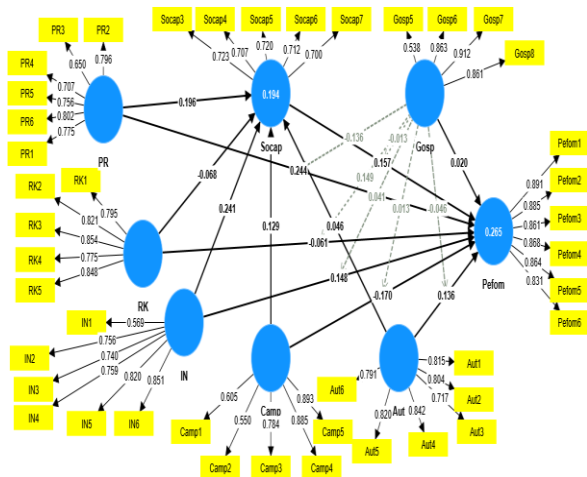


Figure 1. Output of Study Structural Model

5.0 Discussion

Our study pioneered an integrated interactive model items that have been tested and validated in Ghanaian context. PLS-SEM via the assessment of internal similarity dependability paradigm was utilized by this study, as it is effective in fulfilling complex structural equation models with several variables and indicators as well as model prediction of the study variables [26]. Additionally, PLS-SEM has benefits over other statistical analysis methods. The findings are linked to the reliability applied to ensure conformity of the item's conclusion for a single construct [26]). Hence, in accordance with [26] and [30], our study considered composite reliability (CR) values to determine internal consistency reliability and achieved sufficient internal conformity with a CR score which surpassed 0.70. To add, our study Cronbach's Alpha values were more than 0.70 which further validated the reliability of the items that measured the variables.

Furthermore, the results of our research showed that Cronbach's Alpha values varied from 0.760 to 0.934 while the CR values for each variable ranged from 0.838 to 0.948. This clarified why the Cronbach's Alpha and CR values were acceptable and satisfactory, showing that all of our research variables had high levels of internal consistency validity and reliability [30]. Thus, EO, social capital and Government support policies and SMEs performance constructs have been explained by the study.

Similarly, in determining the validity and reliability of our study, convergent validity protocol as proposed by [26] was utilized to determine the accuracy of variables by their items and related variables of a study model. As such, we conducted three tests to ascertain the convergent validity

analysis as a) outer loading which yielded more than 0.50, b) composite reliability (CR) with a value more than 0.70, and c) Average Extracted Variance (AVE) score expected to exceed 0.50. Prior studies like [26 and [30] agreed that outer loading values of 0.50 on items may be regarded as good estimators if they contribute to the AVE and CR of any variable. Based on the analysis conducted, we eliminated some items to ensure that the AVE value for each construct is above 0.50 by following this rule and obtained CR of 0.70 values or more as reported earlier.

Finally, from our study findings, almost all but a few items like RK6, Camp6, Socap1, Socap2, Socap8, Gosp1, Gosp2, Gosp3 and Gosp4 which may be as a result of respondents state, period of data collection, the applicability of the items and other reasons were disqualified for failing to comply with the minimal standards of outer loading and were also not more than 20% of the overall items [30]. Nonetheless, our findings imply that the study's items were valid and reliable, that they accurately measured all the variables, and that they complied with methodological and empirical protocols.

5.1 Conclusion and Recommendations

Our study adopted all the five or multi-dimensions of EO, social capital, government support policies through its related institutes and SMEs performance as its variables. The independent five elements of entrepreneurial orientation as postulated by [35] includes innovativeness, proactiveness, risk-taking, competitiveness, and autonomy which have been independently treated as the independent variables. The study model incorporated SC and government support policies as mediating and moderating constructs accordingly on the relationship between EO and SMEs performance.

This innovative interactive study model and validated instrument have significant consequences for SME practitioners, policymakers like the Ghana Ministry of Trade and Industry and the Ghana Enterprise Agency (GEA) in designing policies for national as well as attainment of sustainable development goals. This model could also be utilized in providing training for existing SMEs and aspiring student entrepreneurs. Application of this model will bring enormous benefits as SMEs utilize their embedded resources like EO, social capital to access support initiatives provided by government and its related institutions to apply EO in high expedition toward their performance. Again, our model tested items may provide more insight for entrepreneurs, policy makers, and other stakeholders to aid SMEs efforts by allocating resources that may help reduce the rate of SMEs poor performance. Likewise, our study tested research items may be useful to other researchers for related studies.

Importantly, an integrative model that can serve as a novel strategic tool for SME owners and all business sectors' sustainable performance has been developed using the study-tested variables with the PLS-SEM analysis. This model will enable them to be more innovative, and proactive, moderately risks, compete aggressively,

and achieve sustainable performance in self-determination. Thus, prosperous economies with required goods and services is assured as practitioners effectively use this study's integrative model and could be a panacea to reducing unemployment in every country especially Ghana toward boosting the country's economic growth, with sustainable jobs, social inclusion and development.

Our study however unravelled a number of limitations. Thus, though data was attained at once from respondents, the sampling used, sample size and the procedures to control the quality of the data (data collection, treatment and analysis), provide internal validity to the study and sufficient external validity to our findings. However, our study only defined and validated the key constructs with items and used that to assess SMEs embedded resources on Ghanaian SMEs performance and should be interpreted in that context. Future studies can use these items to assess these variables as well as other theories and across related businesses.

We further recommend that in the short term for researchers to use our instruments for evaluating other factors that predict entrepreneurial orientation, social capital, government support policies and SMEs performance like social media, and school mate's role on SMEs EO and social capital can also be explored by future studies. Another limitation is that our study participants were SMEs respondents, micro-enterprises and large firms can be examined by future research to evaluate their validity and reliabilities taking into account of other variables. To sum, this study only collected data at once using physical means and future studies can adopt other means as qualitative or mixed method to attain high response rate.

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