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Exploring the Multidimensional Determinants of Local Economic Development in Rural Communities in Ghana: A Comparative Analysis

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Abstract. Local economic development (LED) in rural communities is a vital aspect of achieving balanced national growth and enhancing the well-being of rural households. However, rural areas face unique challenges that necessitate a focused understanding of the determinants influencing their economic development. This paper aims to examine the determinants that influence LED in rural communities, comparing their importance and impact across different rural areas, understanding the interrelationships among these determinants, and providing evidence-based recommendations for policymakers and community leaders. Drawing on a comprehensive analysis of survey data with a sample size of 911, this study investigates a diverse set of eight rural communities selected from four regions and four districts in Ghana. Quantitative data was collected to analyse demographic factors, economic indicators, and infrastructure characteristics of each community. Regression models, namely ordered logistic regression and ordered probit regression and factor analysis was employed to identify significant determinants and their interrelationships. The findings highlighted that the key determinants of LED in rural communities are economic capital, human capital, social and governance capital, cultural capital, infrastructure, and environmental capital. These identified key determinants were integrated as a framework for policymakers and community leaders to prioritize and design targeted interventions and policies that address the unique needs and challenges of rural areas. The findings highlight the significance of investing in human capital, economic resources, social and governance structures, cultural assets, infrastructure, and environmental sustainability to promote inclusive and sustainable economic growth. Hence, the study contributes to the academic literature on rural economics and serve as a foundation for further research in the field. By investigating the multidimensional determinants that influence LED in rural communities, this study aims to provide valuable insights and recommendations for fostering employment creation, poverty reduction, sustainable development, reducing disparities, and enhancing the overall well-being of communities in rural areas.

1. Introduction

Local economic growth has a substantial effect on the socioeconomic landscape of a country, particularly in rural areas [1][2][3]. Understanding the factors that influence local economic development (LED) is vital for stakeholders seeking to promote sustainable growth and reduce regional disparities. Various factors exert influence on the development and potential for prosperity of a given community, thereby contributing to its overall economic performance. This study focuses on several

key factors that are deemed critical, namely human capital, economic capital, social and governance capital, cultural capital, infrastructure and environmental capital [4].

While there has been extensive research conducted on these factors at a global level [5-7], it is crucial to investigate their precise relevance and influence within rural communities in Ghana. The context-specific nature of these determinants also requires further exploration and a comparative analysis across different types of rural communities and regions. Different rural areas may have unique characteristics, assets, and challenges that require context-specific interventions and strategies. By focusing on Ghana, this research shed light on the distinctive obstacles and prospects faced by these communities, thereby offering policymakers, development practitioners, and local stakeholders significant perspectives.

2. Literature Review

2.1. Theoretical Perspective on Economic Development in Rural Areas
Several significant theories provide a theoretical basis for understanding the factors influencing economic outcomes in this particular context. These theoretical frameworks function as tools for guiding research and as structures for analysing the interconnections among the variables under investigation. This study employed three theories namely Human Capital theory, Resource-Based View (RBV) theory and the Livelihood Concept by Ian Scoones. The Human Capital theory postulates that economic development is positively influenced by investments in human capital, encompassing education, skills, and health [8]. Within the framework of this study, the theoretical proposition posits that increased levels of human capital, as indicated by the intellectual, technical, and socio-emotional proficiencies of individuals, will exert a positive influence on the advancement of the local economy [9]. Individuals who possess advanced levels of education and skills exhibit a greater propensity for productivity, innovation, and adaptability, thereby resulting in heightened levels of productivity and economic growth [10]. Additionally, they have the potential to attract employment opportunities with higher remuneration and facilitate entrepreneurial endeavours, thereby fostering the creation of jobs and the generation of income within rural communities [11]. Thus, when stakeholders effectively bolster the economic capacity and competitiveness of rural areas by directing their attention towards the enhancement of human capital through education and skill development initiatives, it can ultimately foster LED.

Also, the Resource-Based View (RBV) theory places significant emphasis on the pivotal role of resources, encompassing both natural resources and capabilities, in the attainment of competitive advantage and the facilitation of economic growth [12]. Within the framework of this study, the theory posits those various forms of capital, including economic capital, social and governance capital, cultural capital, infrastructure, and environmental capital, function as valuable assets for facilitating LED. One illustration of this phenomenon is the concept of economic capital, encompassing financial assets and investments, which can facilitate entrepreneurial endeavours, stimulate investment inflows, and foster economic expansion within rural areas [13]. Social and governance capital, which is distinguished by robust social networks and efficient governance systems, has the potential to enhance collaboration, trust, and the mobilisation of resources. This, in turn, can promote entrepreneurship and the dissemination of knowledge [14]. Moreover, cultural capital, as exemplified by cultural assets and traditions, possesses the capacity to allure tourists and foster cultural entrepreneurship, thereby yielding economic advantages [15]. Infrastructure, encompassing various systems such as transportation and communication networks, plays a crucial role in facilitating connectivity, mitigating transaction costs, and bolstering business operations [16]. Environmental capital, with its emphasis on the management of resources in a sustainable manner and the implementation of environmentally friendly practices, has the potential to stimulate industrial growth, attract investments, and guarantee both economic and environmental sustainability in the long run [17]. By utilising and efficiently managing these resources, rural communities have the potential to stimulate LED and attain a competitive edge within their specific contexts.

The livelihood concept, as put forth by Ian Scoones, offers a holistic framework for understanding and promoting sustainable rural development. It recognizes that rural communities depend on a diverse

range of resources and strategies to secure their well-being. This concept emphasizes the dynamic relationship between assets, strategies, and institutions that shape livelihoods, encompassing natural, human, social, and financial resources, as well as activities like farming, off-farm work, and entrepreneurship. Scoones' framework has had a significant impact due to its holistic approach, considering diverse dimensions and encouraging strategies that meet various needs. It highlights vulnerabilities, enabling resilience-building, and underscores community involvement in development. By balancing economic growth with environmental preservation, this concept promotes sustainable resource management. Importantly, its focus on assets and strategies guides practical policy development, while acknowledging the role of context and the evolving nature of livelihoods over time. In shaping rural development, Scoones' livelihood concept promotes inclusivity, agency, and sustainability in communities [18].

Human Capital theory, Resource-Based View theory, and Ian Scoones' livelihood concept all find practical applicability in diverse social contexts, including the multifaceted rural settings of Ghana. These theories collectively enrich our understanding of sustainable rural development. Human Capital theory's spotlight on individual skills, education, and health resonates strongly in rural Ghana, where varying levels of education and skill development call for targeted interventions. Resource-Based View theory's strategic focus on optimizing available resources aligns well with the mix of economic activities in different rural communities, aiding efficient resource utilization for sustainable growth. Ian Scoones' livelihood concept, with its emphasis on diverse assets and engagement of local communities, is particularly relevant in Ghana's culturally and geographically varied rural areas. It underpins context-sensitive development strategies that empower communities and foster sustainable progress.

These theories combine to suit Ghana's diverse rural landscapes by providing comprehensive lenses through which to understand and address unique challenges and opportunities. Integrating insights from these frameworks allows policymakers and practitioners to tailor interventions that consider education disparities, resource optimization, and community engagement, fostering holistic and sustainable development across the diverse rural regions of Ghana.

2.2. Defining Local Economic Development (LED)

LED refers to a holistic approach to fostering economic growth, with a particular focus on rural areas, districts, and regions, particularly in developing countries [19][20]. LED is a multidisciplinary approach that integrates various fields such as physical planning, economics, and marketing. Its primary aim is to enhance the economic potential of a specific locality, thereby ensuring future prosperity and improving the overall well-being of its inhabitants. According to the World Bank [21], LED refers to the collaborative efforts of public, business, and non-governmental sector partners to enhance economic growth and generate employment opportunities, ultimately aiming to enhance the overall quality of life for all community members. The definition underscores the collaborative aspect of LED, underscoring the necessity for a wide range of stakeholders to come together and synchronise their endeavours in order to achieve economic development and improve community welfare.

Thus, LED encompasses a diverse range of endeavours and strategies, including the facilitation of entrepreneurial activities, the attraction of investments, the cultivation of local industries and supply chains, the enhancement of infrastructure and transportation networks, the promotion of innovation, the augmentation of human capital through education and skill development, and the pursuit of sustainable and inclusive economic growth [22]. LED endeavours to establish a conducive setting that facilitates the generation of employment opportunities, augmentation of income levels, alleviation of poverty, and advancement of equitable development by integrating economic, social, and physical dimensions [23]. This economic development approach acknowledges the unique challenges and opportunities faced by different cities, districts, and regions, while also recognising their characteristics and potentials [24]. The discussion emphasises the importance of local self-governance, local proprietorship, and approaches that align with the economic, social, and cultural intricacies of the community.

2.3. Determinants influencing Local Economic Development (LED)

2.3.1. Human capital. Human capital is a critical factor in driving the progress of LED through its positive impact on productivity, labour market outcomes, and the promotion of entrepreneurship and innovation [21]. Several scholarly investigations have provided empirical evidence supporting a positive association between human capital and economic growth. Deming (2022) found that there is a positive correlation between educational attainment and expertise within communities and the level of productivity and economic development [25]. Moreover, there exists a robust correlation between human capital and various labour market indicators, including rates of employment and levels of remuneration. Saldanha et al. (2022) have demonstrated that regions characterised by a labour force possessing advanced education and skills exhibit a decrease in unemployment rates and an increase in wage levels [26]. These various factors play a role in the augmentation of discretionary income and consumption, thereby fostering local economic growth. Furthermore, the presence of human capital serves as a driving force behind entrepreneurial pursuits and fosters the advancement of innovation. The findings of Fadhli et al., (2020) study indicate that there exists a positive correlation between the level of human capital within a region and the rate of entrepreneurial activity [24]. The possession of knowledge and skills by individuals empowers them to capitalise on opportunities, adjust to evolving circumstances, and drive advancements in technology, consequently fostering the expansion of the local economy. The hypothesis posits that an elevated level of human capital, which encompasses the skills, knowledge, and health of individuals residing in rural communities, will catalyse stimulating economic growth at the local level. Thus, the hypothesis suggests in interrelation between human capital and LED:
H_1 Human capital positively influences LED

2.3.2. Economic capital. Existing research on the relationship between economic capital and LED indicates a strong interdependence between these two variables. The positive impact of financial resources and investments on the growth of LED is a significant finding in the existing body of research [2][27]. The availability of financial resources, such as bank loans, venture capital, and government funding, is crucial for supporting entrepreneurial endeavours, facilitating the establishment and growth of businesses, and fostering innovation [21]. Besides, Cannavale et al. (2020) found that communities with greater economic resources exhibit higher levels of entrepreneurial activity, employment creation, and overall economic development [28]. Also, previous studies emphasise the significance of entrepreneurship as a key catalyst for the development of local economies. Several scholars argue that engagement in entrepreneurial endeavours, driven by financial resources, contributes significantly to the diversification of local economies, the establishment of new sectors, and the promotion of the acquisition of competitive advantages. Successful entrepreneurs frequently serve as catalysts for the creation of employment opportunities, income generation, and investment attraction, resulting in a multiplier effect on the growth of local economies [29][30]. Thus, the hypothesis suggests in interrelation between economic capital and LED:
H_2 Better access to economic capital within rural communities facilitates LED

2.3.3. Social and governance capital. The concept of social capital, encompassing the interconnected networks, interpersonal relationships, and shared norms within a given community, has been identified as a significant factor in promoting and supporting economic development endeavours. Research has shown that there is a positive relationship between social capital, which encompasses trust, cooperation, and civic engagement, and various outcomes such as entrepreneurship, knowledge sharing, and resource mobilisation [31]. Social capital plays a crucial role in facilitating the acquisition of information, fostering collaboration among individuals and businesses, and promoting collective action aimed at achieving economic progress [32][33]. Communities that possess elevated levels of social capital frequently demonstrate enhanced resilience, innovation, and economic competitiveness [33]. Moreover, the impact of governance capital on LED is substantial, as it encompasses the efficacy of institutions, the rule of law, and government policies. The implementation of effective governance measures, such

as transparency, accountability, and efficient public administration, fosters a favourable climate for business expansion, investment attraction, and the delivery of public services [21][35]. The literature also underscores the significance of inclusive and participatory governance processes, wherein local communities are allowed to actively engage in decision-making and resource allocation. Participatory governance facilitates the active involvement of communities in determining their development agendas, prioritising local needs, and fostering fair economic opportunities. Responsive governance systems that cater to the demands of residents and businesses have been found to have a positive impact on social trust, promote collaboration, and contribute to the sustainable and inclusive development of the local economy [36]. Thus, the hypothesis suggests in interrelation between social and governance capital and LED:

H_3 Enhanced social and governance capitals within rural communities circulates to LED

2.3.4. Cultural capital. Cultural capital refers to the inherent resources contained within a given community's cultural heritage, traditions, arts, and creative industries. Through a variety of mechanisms, cultural capital has the potential to facilitate LED [37]. Cultural assets have the potential to serve as tourist attractions, thereby attracting visitors to a community and generating economic benefits for local businesses and industries. Cultural tourism activities have the potential to create jobs, stimulate local businesses, and aid in the preservation of cultural heritage [38]. In addition, cultural capital has the potential to stimulate cultural entrepreneurship and promote the expansion of creative industries. Cultural entrepreneurs, which include individuals in fields such as art, design, and craftsmanship, play a significant role in fostering LED by creating unique products, services, and experiences [2][20]. The presence of cultural infrastructure plays a crucial role in fostering innovation, attracting creative individuals, and contributing significantly to the vitality of regional economies [4][39]. In addition, cultural capital influences the formulation of community identity and social cohesion, both of which are significant determinants of local economic growth. The presence of a strong cultural identity has the potential to increase community pride, attract individuals and businesses to a given area, and foster a sense of connectedness and cooperation among community members [24][39]. Cultural capital plays an important role in enhancing the social cohesion of a community by nurturing trust, cooperation, and collective efforts, which are all essential for facilitating economic development and adaptability [40]. Thus, the hypothesis suggests in interrelation between cultural capital and LED:

H_4 Improved cultural capital within rural communities contributes to LED

2.3.5. Infrastructure capital. Infrastructure plays a crucial role in promoting LED by facilitating the movement of goods, services, and information, facilitating productive activities, and luring investments [41]. Existing scholarly literature highlights the significance of infrastructure in facilitating and fostering LED. A robust infrastructure, which includes transport networks, energy systems, and telecommunications facilities, functions as the foundation for economic endeavours [3][16][42]. This technology's implementation leads to a reduction in transaction costs, an improvement in connectivity, and the facilitation of efficient supply chains. Therefore, these factors contribute to the enhanced competitiveness of local businesses and their ability to attract investment. Improving the transportation infrastructure, which includes modalities such as roads, seaports, and airports, is essential for accelerating the movement of goods and people. This, in turn, enables businesses to access larger markets and boosts economic prospects. Sufficient energy infrastructure is essential for guaranteeing a reliable power supply, which is a crucial factor in facilitating industrial production and business operations [42]. In addition, the establishment of a resilient telecommunications infrastructure facilitates the efficient transmission of information, improves market accessibility, and fosters digital connectivity. These factors collectively stimulate innovation and enable individuals to participate actively in the digital economy. Thus, the hypothesis suggests in interrelation between infrastructure capital and LED:

H_5 Better infrastructure within rural communities stimulates to LED

2.3.6. Environmental capital. The literature emphasises the significance of environmental capital in the context of LED. The incorporation of responsible natural resource management and environmentally friendly practices yields a multitude of advantages. The concept of environmental sustainability is associated with the promotion of resource efficiency, which entails the reduction of waste and the subsequent decrease in production costs [43]. This phenomenon contributes to the increased competitiveness of businesses operating within the local market. Moreover, the conservation of natural resources such as forests, water resources, and biodiversity plays a significant role in supporting industries such as tourism and agriculture, thereby creating economic prospects [24][44]. According to Sarkis and Zhu (2018), environmental sustainability plays a crucial role in promoting social and economic resilience by mitigating vulnerability to environmental risks and the impacts of climate change [45]. According to the World Bank (2021), the promotion of renewable energy sources serves to foster the growth of environmentally friendly employment opportunities and provide support for industries that prioritise sustainability [21]. In addition, the implementation of sustainable practices contributes to the enhancement of the quality of life within local communities through the improvement of air and water quality, as well as the preservation of natural landscapes [21]. The successful integration of environmental sustainability into LED strategies necessitates the active participation and cooperation of various stakeholders. This endeavour demands a well-rounded approach that takes into account the dual objectives of fostering economic growth while safeguarding the environment. Drawing on the findings of the Ghana Statistical Service (2021) regarding the crucial role of environmental sustainability in fostering enduring economic growth and bolstering community resilience [46]. Thus, the hypothesis suggests in interrelation between environmental capital and LED:

H6 Greater emphasis on environmental capital within rural communities promotes LED

2.4. Conceptual Framework
The conceptual framework diagrammatically depicts the nexus between human capital, economic capital, social and governance capital, cultural capital, infrastructure, environmental capital and the outcome variable LED (Table 1).

Table 1. Conceptual framework

Key Determinants	Inputs/ Processes	Outputs	Outcomes	Impact
Economic	Access to finance and investment opportunities	Increased entrepreneurship and business development	Economic growth and development in rural communities	• Employment creation • Poverty reduction • Sustainable development • Reduce disparities • Well-being of rural communities
Human	Quality education and skills training programs	Enhanced human capital through education and skills	Poverty reduction and improved livelihoods	
Social and Governance	Community engagement and participation in decision-making	Strengthened social networks and community cohesion	Employment creation and income generation	
Cultural	Preservation and promotion of local cultural heritage	Promotion and preservation of local cultural identity	Reduced disparities between rural and urban areas	
Infrastructure	Improvement of rural infrastructure	Improved infrastructure	Enhanced market access, connectivity, and overall development	
Environmental	Sustainable resource management and environmental preservation	Enhanced environmental sustainability	Enhanced well-being and resilience in rural areas	

2.5. Rural Development Process, Policies and Rural Planning Agencies in Ghana
The National Development Planning (System) Act of 1994, Act 480 and legislative instrument (LI 2232), outlines a comprehensive framework for rural development, encompassing the following key

processes: Issuance of planning guidelines from the National Development Planning Commission (NDPC) to Ministries, Departments, and Agencies (MDAs) as well as Metropolitan, Municipal, and District Assemblies (MMDAs) in alignment with the National Development policy framework. The process then begins with a thorough needs assessment, identifying Potentials opportunities challenges and constraints faced by rural communities. Subsequent planning activities aim to address these identified needs holistically. This involves considering various facets such as agriculture, infrastructure, education, healthcare, and local economic development.

Concrete steps are taken to fulfil the planned objectives with the implementation of planned programmes and projects with continuous monitoring and evaluation processes established to assess the progress and impact of rural development initiatives. The goal is to ensure that targets are met, and results reported for further policy and planning decisions. The Ministry of Local Government Decentralisation and Rural Development (MLGDRD), the NDPC, the 261 MMDAs and MDAs are the primary agencies responsible rural planning and development in Ghana. Ghana's Main Rural Planning and Development Policies are: Agenda for Jobs II: Creating Prosperity and Equal Opportunities for everyone (2022-2025), National local Economic Development Policy, District Assembly Common Fund Act 1993, (Act 455), the Local Governance Act 2016 (Act 936), the National Medium-Term Development Policy Framework (NMTDPF), All 261 MMDAs District Medium-Term Development Plans, Planting for Food and Jobs (PFJ), Free Senior High School (SHS) Policy and the NRDP: National Rural Development Policy. Ghana's commitment to rural development signifies a pursuit of balanced growth, ensuring all citizens partake in economic progress and improved living standards.

2.6. Types of Rural Settlements in Ghana

The rural areas in Ghana exhibit diverse characteristics and are classified into different types based on their primary economic activities and geographical location (Table 2). Understanding the types of rural settlements is crucial for analyzing their specific challenges and designing targeted interventions. These types of rural settlements are not mutually exclusive, and some communities may have characteristics of multiple types. These mixed-settlement rural areas have diverse economic and cultural activities, including agriculture, fishing, mining, and traditional practices. Each rural settlement has unique challenges that require tailored interventions and policies. Sustainable economic development, inequality reduction, and rural community well-being in Ghana depend on understanding these rural settlements. Ghanaian rural communities' diversity of activities shows their adaptability. It emphasises the need for integrated development approaches that consider the interplay of sectors and activities and the multifaceted nature of rural economies.

Table 2. Characteristic and background of type of rural settlements in Ghana

| Type of Rural Settlements	Characteristic	Rural Areas
Mining-Based rural settlements (MBRS)	- Some Ghanaian villages depend on mining. Gold, bauxite, and manganese-rich areas host these settlements. - These settlements depend on mining companies for jobs and income. - Mining-dependent communities face environmental degradation, land disputes, health and safety risks, and social issues related to illegal mining (galamsey). - These communities depend on mineral resource management and mining's social and environmental impacts.	Akwasiho
Fishing based rural settlements (FBRS)	- Ghana's long coastline and many inland waterways make fishing-based settlements a major source of settlement and livelihood. - These settlements make their living from fishing, fish processing, and related activities. - Overfishing, bad fishing practises, declining fish stocks, inadequate fish processing and storage infrastructure, and limited credit and market opportunities plague fishing-based settlements. - Pollution and coastal erosion can also harm fishing communities.	Kotoso, Komenda

Agricultural-based rural settlements (ABRS)	• These communities make their living from farming, livestock, crop production, and subsistence farming. • Cocoa, maize, yam, and vegetables are grown in fertile agricultural communities. • Markets, irrigation, farm inputs, and modern agriculture may be obstacles in these communities. • Climate change and environmental factors can also affect agricultural productivity and sustainability	Kworania, Pungu, Busunu Eguafo,
Traditional/ historical rural settlements (T/HRS)	• Cultural heritage, historical landmarks, and traditional practises give these settlements their identity. • Traditional rural settlements may struggle to preserve their culture while adapting to changing economic and social conditions. • Sustainable communities must balance cultural preservation with economic development and infrastructure improvements	Laribanga

3. Methodology

This study employed a quantitative methodology and descriptive survey design to investigate the factors influencing LED in rural communities in Ghana. The study was carried out in the Upper East Region (Kassena Nanakana Municipality), Eastern Region (Kwahu East District), Central Region (Komenda-Edina-Eguafo-Abirem Municipality) and Savannah Region (West Gonja Municipality) of Ghana. The selection of these localities was based on the objective of ensuring a comprehensive representation of all types of rural settlements, encompassing a range of geographical and economic characteristics [47]. Two communities were selected through a random sampling method from each región/district to partake in the investigation. The communities that were chosen for the study include Komenda, Eguafo, Pungu, Kworania, Akwasiho, Kotoso, Busunu, and Laribanga (Table 2 and Figure 1). The selection of these communities was based on their representation of diverse economic sectors, including fishery, agriculture, and mining, as well as their significance as traditional and historical rural settlements. This choice enables a comprehensive analysis of the factors influencing LED across a range of contexts. By investigating a diverse set of eight rural communities selected from four regions in Ghana, this research aims to identify the key determinants and their interrelationships. The findings of this study will provide a thorough understanding of the various factors that are crucial for the formulation of impactful policies and strategies aimed at addressing the unique needs of rural communities in Ghana.

The research sample consisted of individuals residing in the eight selected communities. Each community was represented by a sample size of 120 community members, resulting in a cumulative sample size of 960 participants. The scientific methodology employed in sample selection entailed the use of random sampling techniques to guarantee the adequate representation of each community. The utilisation of this methodology serves to mitigate bias and enables the extrapolation of the research findings to the broader rural population in Ghana [48]. To align with the objectives of the study, a meticulously designed structured questionnaire was employed to gather comprehensive data about the various factors that exert influence on the development of the local economy. The survey instrument comprised inquiries about various determinants, alongside demographic data concerning the participants. Before conducting the primary data collection, a pretest was conducted on the questionnaire to ensure its clarity, relevance, and reliability. The pre-testing phase involved the administration of the questionnaire to a limited number of individuals who closely resembled the target population of the study. The questionnaire was then revised based on the feedback and responses obtained from this sample.
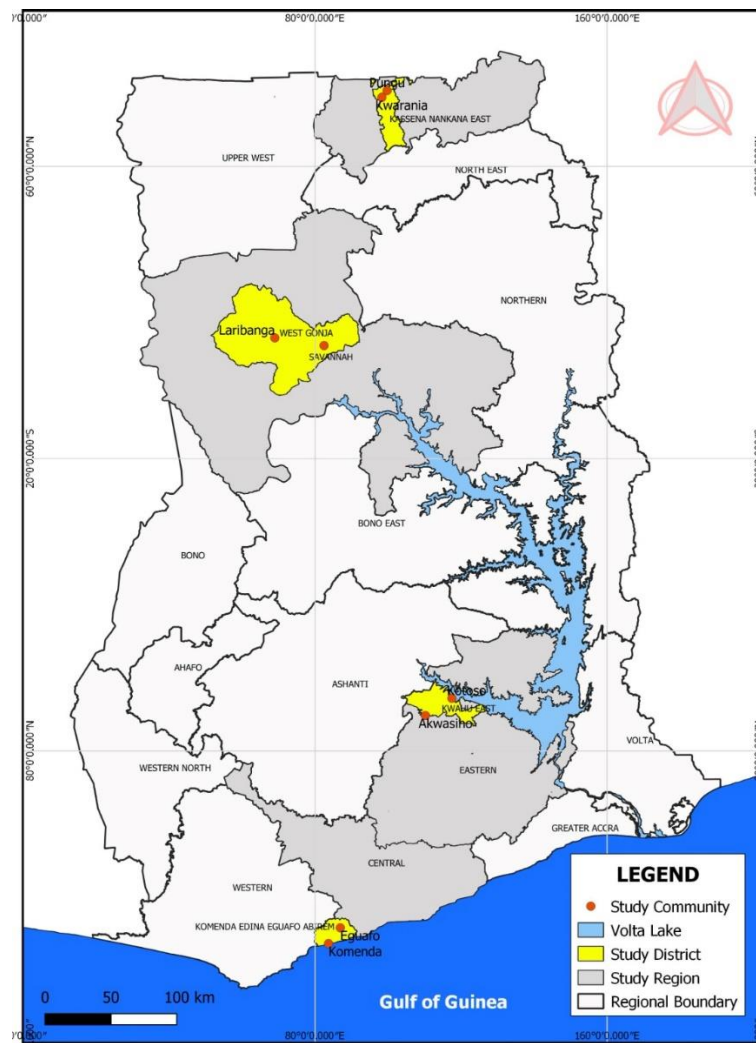
Figure 1. Map of study area in Ghana

Table 3 displays the demographic characteristics of the study participants, including age, gender, level of education, average farm income, and household size. The age group with the highest representation among participants was 41-50 years, while the age group of 31-40 years had the second highest representation. Conversely, the age group of 26-30 years had the lowest representation among participants. Majority of participants self-identified as male, with a range of educational attainment spanning from primary school to junior high school. Regarding the average income derived from farming, a significant proportion of respondents indicated that their incomes fell within the range of GHS10,001 to GHS15,000. Subsequently, individuals with incomes surpassing GHS15,000 constituted the subsequent largest group. Majority of participants exhibited household sizes of five or fewer, while smaller proportions of participants reported household sizes ranging from five to ten and eleven to fifteen. The demographic characteristics of the sample are of great importance as they offer valuable insights into its composition. These characteristics are crucial for interpreting the findings concerning the factors that influence rural economic development in Ghana. The categorization of these communities into distinct settlement types provides insight into their economic characteristics and facilitates comprehension of the LED dynamics unique to each community.

Table 3. Demographic information

Characteristics		N	%
Age	26- 30 years	99	10.9
	31- 40 years	246	27.0
	41-50 years	450	49.4
	Above 50 years	116	12.7
Gender	Female	130	14.3
	Male	781	85.7
Education Level	None	185	20.3
	Primary	337	37.0
	SS/JHS	285	31.3
	SSS/SHS	54	5.9
	Diploma	24	2.6
	Undergraduate Degree	26	2.8
Average Farm Income	GHS1001-GHS 5,000	10	1.1
	GHC 5001-GHS 10,000	161	17.7
	GHS10,001-GHS 15,000	400	43.9
	More than GHS 15,000	340	37.3
Household Size	< 5	564	61.9
	5-10	303	33.3
	11-15	44	4.8

4. Analysis of Variable's Measurements and Model Specification

4.1. Measurement of Variables

The LED dependent variable was measured with three elements. Example: "The local economy in my community is thriving and experiencing significant growth." On a seven-point Likert scale extending from firmly agree (7) to strongly disagree (1), participants were asked to rate their agreement with each item. The average of the three item scores was then used to calculate an aggregate indicator of LED [5]. The economic capital was measured using four elements. Example: "My community has access to sufficient financial resources to support LED." On a seven-point Likert scale extending from firmly agree (7) to strongly disagree (1), participants were asked to rate their agreement with each item [27]. A global measure of economic capital was calculated by averaging the four-item scores. Similarly, three items were used to measure human capital as an independent variable. An example of a statement could be, "The residents in my community possess the necessary skills and knowledge to contribute to LED." On a seven-point Likert scale, respondents rated their agreement with each item.

Table 4. Variable definition, measurement and summary statistics

Variable	Definition	Unit	Mean	Std.
LED	Factorial measure of local economic development	Quantity	5.58	1.16
HC	Factorial measure of human capital	Quantity	5.13	1.34
EC	Factorial measure of economic capital	Quantity	5.07	1.39
SGC	Factorial measure of social and governance capital	Quantity	4.76	1.43
CC	Factorial measure of cultural capital	Quantity	5.21	1.25
INF	Factorial measure of infrastructure	Quantity	5.57	0.69
ENC	Factorial measure of environmental capital	Quantity	5.32	1.18

Note: Local economic development (LED), human capital (HC), economic capital (EC), social and governance capital (SGC), cultural capital (CC), infrastructure (INF), environmental capital (ENC)

Measurement of human capital was derived by averaging the three-item scores [49]. Social and governance capital, cultural capital, infrastructure, and environmental capital were measured with four items easily. Examples of items for each variable could be: "There is a strong sense of community cooperation and collaboration in my area" (social and governance capital), "The cultural heritage and traditions in my community contribute to its economic vitality" (cultural capital), "The infrastructure in my community is well-developed and supports economic activities" (infrastructure), and "Environmental sustainability is prioritised in LED initiatives" (environmental sustainability). On a seven-point Likert scale, participants rated their agreement with each item, and the scores for the four items in each variable were averaged to derive overall measures [5][23].

Table 4 presents the variables of the study's definitions, measurements, and summary statistics. local economic development, human capital, economic capital, social and governance capital, cultural capital, infrastructure, and environmental capital are the variables included in the study. The mean values indicate the average level of each variable observed in the rural communities of Ghana that were the subject of the study. The standard deviations serve as indicators of the degree to which the data deviates from the mean or extends out. The summary statistics provide valuable information about the central tendencies and variances of the variables. These statistics serve as a basis for further investigation and interpretation.

4.2. Measurement of Variables

The study employed factor analysis as a method to ascertain the latent factors within the variables, and subsequently utilised factor loadings to conduct regression analysis. To analyse the impact of various factors on LED, the study utilised ordinal logistic regression estimation methods. Ordinal logistic regression is an appropriate statistical method to employ when the dependent variable exhibits ordinal characteristics. In this study, the dependent variable, LED, is measured on a Likert scale, thereby meeting the criteria for the application of ordinal logistic regression. The utilisation of theoretical and empirical models in ordinal logistic regression facilitated the examination of the associations between various independent variables, including human capital (HC), economic capital (EC), social and governance capital (SGC), cultural capital (CC), infrastructure (INF), environmental capital (ENC) and dependent variable Local economic development (LED). This study employs an ordinal logistic regression model to analyse the impact of independent variables on the dependent variable.

The ordinal logistic regression model is represented as follows:

$$logit\big(P(LED \leq k)\big) = \alpha k + \beta_1 HC + \beta_2 EC + \beta_3 SGC + \beta_4 CC + \beta_5 INF + \beta_6 ENC + \varepsilon$$

where logit (P(LED $\leq$ k)) represents the log odds of the dependent variable being less than or equal to the threshold category k. αk denotes the threshold-specific intercept, capturing the differences in the baseline log odds between the threshold categories. β_1, β_2, β_3, β_4, and β_5 are the coefficients representing the effects of the independent variables namely human capital (HC), economic capital (EC), social and governance capital (SGC), cultural capital (CC), infrastructure (INF), environmental capital (ENC) on the log-odds of the dependent variable local economic development (LED).

4.3. Sensitivity Analysis/Robustness Checks

In addition to employing the ordinal logistic regression model, the study estimated an ordinal probit regression model for sensitivity analysis and robustness checks. This measure was implemented to determine the dependability and durability of our research results. Similar to the ordinal logistic regression model, the probit model examines the influence of independent variables on the dependent variable.

$$Pr(LED \leq k) = \alpha k + \beta_1 HC + \beta_2 EC + \beta_3 SGC + \beta_4 CC + \beta_5 INF + \beta_6 ENC + \varepsilon$$

In this model, logit(P(LED $\leq$ k)) represents the log odds of the dependent variable being less than or equal to the threshold category k. αk denotes the threshold-specific intercept, capturing the differences in the baseline log odds between the threshold categories. β1, β2, β3, β4, and β5 are the coefficients

representing the effects of the independent variables as described in the ordinal logistic model, on the log odds of the dependent variable. ε represents the error term that accounts for unobserved factors affecting the dependent variable.

5. Results and Discussion

5.1. Factor Analysis
The factor analysis was employed to determine the underlying factors among the variables related to LED, along with their factor loadings, explained variance, and Cronbach's alpha reliability coefficient. The results of the factor analysis are presented in Table 5. Table 5 presents the results of a factor analysis conducted on the variables in the study, providing insight into their characteristics and relationships. The analysis produced distinct factors that correspond to different dimensions of the investigated constructs. The Local Economic Development (LED) factor consists of three variables (LED1, LED2, and LED3) with significant factor loadings, which collectively account for 67.576% of the observed variance in LED. Similarly, the Human Capital (HC) factor consists of three variables (HC1, HC2, and HC3) that explain 75.473% of the variance in human capital.

The Economic Capital (EC) factor consists of four variables: EC1, EC2, EC3, and EC4. These variables have substantial factor loadings and account for 90.955% of the variance in economic capital collectively. The Social and Governance Capital (SGC) factor consists of four variables: SGC1, SGC2, SGC3, and SGC4. These variables account for 81.601% of the observed variance in social and governance capital. The Cultural Capital (CC) factor consists of four variables (CC1, CC2, CC3, and CC4) that account for 81.722% of the observed variance in cultural capital. The infrastructure (INF) factor is comprised of four variables: INF1, INF2, INF3, and INF4. These variables account for 60.619% of the observed variability in infrastructure. The Environmental Capital (EC) factor consists of four variables (EC1, EC2, EC3, and EC4) that account for 63.552% of the observed variance in environmental capital.

Table 5. Results of factors analysis

Factor Name	Variables	Factor Loading	% of Variance Explained	Cronbach's Alpha
Local Economic Development	LED1	0.791		
	LED2	0.871	67.576	0.757
	LED3	0.802		
	KMO = 0.665			
	Bartlett's test of sphericity	Chi-squared = 707.78	p-value = 0.000	
Human Capital	HC1	0.866		
	HC2	0.921	75.473	0.833
	HC3	0.816		
	KMO = 0.668			
	Bartlett's test of sphericity	Chi-squared = 1202.081	p-value = 0.000	
Economic Capital	EC1	0.946		
	EC2	0.971		
	EC3	0.944	90.955	0.948
	EC4	0.885		
	KMO = 0.746			
	Bartlett's test of sphericity	Chi-squared = 2833.259	p-value = 0.000	
Social and Governance Capital	SGC1	0.915		
	SGC2	0.844		
	SGC3	0.948	81.601	0.885
	SGC4	0.914		
	KMO = 0.678			
	Bartlett's test of sphericity	Chi-squared = 1799.645	p-value = 0.000	

Cultural Capital	CC1	0.972	81.722	0.886
	CC2	0.939		
	CC3	0.791		
	CC4	0.890		
	KMO = 0.567			
	Bartlett's test of sphericity	Chi-squared = 2809.258	p-value = 0.000	
Infrastructure Capital	INF1	0.929	60.619	0.731
	INF2	0.914		
	INF3	0.821		
	INF4	0.854		
	KMO = 0.604			
	Bartlett's test of sphericity	Chi-squared = 963.308	p-value = 0.000	
Environmental Capital	EC1	0.526	63.552	0.883
	EC2	0.939		
	EC3	0.865		
	EC4	0.872		
	KMO = 0.674			
	Bartlett's test of sphericity	Chi-squared = 995.869	p-value = 0.000	

Note: KMO: Kaiser-Meyer-Olkin

Cronbach's alpha coefficients indicate adequate levels of internal consistency for each factor's variables. In addition, the Kaiser-Meyer-Olkin (KMO) values, which range from 0.567 to 0.746, indicate an adequate level of sampling adequacy, thereby confirming the suitability of the variables for the factor analysis. Bartlett's test of sphericity, which yielded a statistically significant result ($p < 0.001$), provides additional evidence that the variables are interconnected. In general, the findings contribute to a comprehensive understanding of the measurement and characteristics of the variables, laying the groundwork for further analysis and interpretation within the study.

5.2. Regression Analysis

The results of the ordinal logistic regression model and the ordinal probit regression model, which served as a robustness check, are shown in Table 6. Both models were utilised to examine the impacts of the independent variables (human capital, natural resources, entrepreneurship and innovation, infrastructure, and environmental sustainability) on the dependent variable (local economic development). The table presents the coefficients, standard errors, z-values, and p-values associated with the independent variables of both models. The pseudo R-squared for the ordered logistic regression model is 0.673, while the pseudo R-squared for the ordered probit regression model is 0.582. These findings indicate that the models effectively explain a substantial portion of the variability observed in LED. A higher log-likelihood value signifies a more appropriate level of fit. Furthermore, the AIC and BIC values are utilised as criteria for the selection of models, with lower values indicating models that fit the data better. The statistical results of the chi-squared test and the associated p-values for Bartlett's test of sphericity suggest the presence of substantial multicollinearity among the variables, thereby providing evidence for the reliability and validity of the models.

Table 6. Ordered logistic and probit regression results

Dependent Variable: Local Economic Development		
Variable	**Ordered Logistic**	**Ordered Probit**
Human Capital	1.655***	0.889***
	(12.17)	(12.08)
Economic Capital	0.293**	0.211***
	(2.50)	(3.11)
Social and Governance Capital	1.779***	0.837***
	(8.63)	(7.49)
Cultural Capital	0.975***	0.621***

	(5.52)	(6.29)
Infrastructure	1.337***	0.003*
	(18.15)	(1.80)
Environmental Capital	0.189***	0.476***
	(3.69)	(8.38)
Cut1(*strongly disagree*)	-9.10766	-4.37571
Cut 2(*disagree*)	-8.976	-4.29123
Cut 3(*somewhat disagree*)	-8.46002	-4.01575
Cut5 (*somewhat agree*)	-6.32536	-3.12922
Cut6(*agree*)	-5.26585	-2.65122
Cut7(*strongly agree*)	-4.22633	-2.23539
Pseudo R^2	0.673	0.582
Log-Likelihood	-2171.558	-2197.813
χ^2 Test	995.67	943.16
AIC	4413.117	4465.626
BIC	4581.626	4634.135
Obs.	991	991

Note (s): ***$p<0.001$, ** $p <0.05$, *$p<0.1$. z statistics are in parentheses

The following findings have been established: Human Capital has a significant positive influence on LED, as indicated by a coefficient of 1.65 in the ordered logistic regression model and 0.888 in the ordered probit regression model. This indicates that an increase in Human Capital is associated with an increased likelihood of attaining higher levels of economic development in the local community. LED is also positively influenced by Economic Capital, albeit to a lesser extent. In the ordered logistic regression model, the coefficient is 0.293, while in the ordered probit regression model, it is 0.211. This indicates that a higher level of Economic Capital increases the likelihood of achieving higher levels of economic development.

Social and Governance Capital also have a substantial positive influence on LED. In the ordered logistic regression model, the coefficient is 1.77 and in the ordered probit regression model, it is 0.83. This suggests that enhanced Social and Governance Capital is associated with a higher likelihood of attaining greater economic development in the local community. Cultural Capital also demonstrates a positive impact on LED. In the ordered logistic regression model, the coefficient is 0.975, while in the ordered probit regression model, it is 0.621. This indicates that a higher level of Cultural Capital increases the likelihood of achieving higher levels of economic development. Infrastructure has a substantial positive effect on LED, with a logistic regression coefficient of 1.337% and a probit regression coefficient of 0.003%. This suggests that enhanced infrastructure is firmly associated with a greater probability of achieving higher levels of economic development. Environmental Capital has a positive influence on local economic growth. In the ordered logistic regression model, the coefficient is 0.189 and in the ordered probit regression model, it is 0.476. This indicates that a higher level of Environmental Capital increases the likelihood of achieving higher levels of economic development in the local community.

6. Conclusion

This paper used factorial measurement and regression approaches to assess the impact of variables on LED. Human capital, economic capital, social and governance capital, cultural capital, infrastructure, and environmental capital are the factors explored in our paper. Surveys were used to collect the data, which was then analysed using ordered logistic and probit regression models. The research findings contribute significantly to the comprehension of the factors that influence the LED in Ghana. Human capital, economic, social and governance, cultural, infrastructure, and environmental capital have a positive impact on the advancement of LED. Consistent with previous research, the research findings highlight the importance of factors such as human capital, economic capital, social and governance

capital, cultural capital, infrastructure, and environmental capitals in promoting economic development in local communities. According to the research findings, human capital, or investments in education and skill enhancement, play a crucial role in fostering economic development in rural communities. The presence of economic capital, social networks, and governance mechanisms is essential for fostering economic development. Cultural capital, which includes cultural heritage and creative industries, plays a crucial role in fostering LED via tourism and entrepreneurship. Infrastructure development plays a crucial role in the reduction of transaction costs and the improvement of connectivity. Concurrently, environmental sustainability promotion contributes to long-term economic development and resilience.

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