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EFFECTS OF COVID-19 ON THE PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES (SMEs) IN THE WESTERN AREA OF SIERRA LEONE

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Abstract:
The study aims to investigate the effect of COVID-19 on the performance of SMEs in the Western Area of Sierra Leone. An econometric model is used to investigate the effect of COVID-19 on the determinants of SME performance in the Western Area of Sierra Leone. Using a confidence interval of 95 and a margin of error of 2 percent, a total of 450 SMEs were randomly selected from the population of SMEs in the Western Area of Sierra Leone from 2018 to 2020. In the OLS, the firms are considered homogenous while in the random effect regression, they are heterogeneous. The fixed effect is not investigated here because the model has dummy variables, which do not vary over time across firms and including them in a fixed effect model provides no coefficient for the pre-pandemic period and 2020 is the pandemic period. The results reveal that capital productivity and labour productivity have positive effects on SME performance in the Western Area of Sierra Leone with the productivity of capital having an elasticity of 0.20 in the pre-COVID-19

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pandemic and that of labour being 0.64 in the pre-COVID-19 pandemic. Leverage has negative effect on firm performance in the pre-COVID-19 pandemic but it has no impact during the COVID-19 pandemic. Gender difference does not matter during the pandemic. Professional training of SME heads without distinguishing recent or old did not matter for SME performance. However, the educational status of SME heads matters for robust SME performance but its impact is stronger during the pre-pandemic than the pandemic era.

JEL: F13, F15

Keywords: COVID-19, small and medium enterprises, Sierra Leone

1. Introduction

Small and medium enterprises (SMEs) have long been considered by policymakers and academics to be important in creating value addition, employment generation and contributing to innovation and development. By creating employment opportunities, they promote inclusive growth, particularly for women, especially in the trade sector of many developing countries and also tend to include more women in the growth process. The support for the promotion of SMEs on the globe is therefore underpinned by their contributions to employment and value addition, and hence to inclusive growth. Okurut *et al.* (2016) argue that while SMEs generally contribute to employment and value addition, their full potential is not utilized when it comes to social protection, poverty reduction and empowerment of women. The reason for this is not unconnected to the various constraints they face, which have adverse effects on their productivity and competitiveness. This drawback is acute in economies that are open or trying to be open to global markets or regional markets (for example, the African Union Free Trade Agreement initiative and the ECOWAS Trade Liberalization Scheme -ELTS- for the case of Sierra Leone).

In Sierra Leone, agriculture remains the dominant sector and provides the largest share of GDP and contribution to employment. About 52 percent of GDP is from agriculture and a large number of farmers operate SME businesses, though most are not registered. The industrial sector, which comprises mining and quarrying, manufacturing and construction accounts for about 20 percent of GDP and the rest is accounted for by the services sector. SME activities tend to be dominated by trade and services in general. This is driven by the high cost of setting up businesses in mining, manufacturing and construction.

Countries all over the world including Sierra Leone are increasingly setting up business development and support institutions to address the management and environmental capability challenges experienced by SMEs. According to Davidson and Henrekson (2002), the broad mandate of these institutions is to promote and facilitate the

development of SMEs through provision of financial assistance, incubation, policy advocacy, training and capacity building.

The government of Sierra Leone has created some support institutions to enable SMEs to access funding. These include: Credit Guarantee Fund (CGF) established in 1974, Sierra Leone Investment and Export Promotion Agency (SLIEPA) in 2007, pilot SME job creation scheme and Sierra Leone Business Forum (SLBF) and most recently in 2020 the Sierra Leone Economic Diversification Project (SLEDP) to help strengthen the business enabling environment by promoting reforms to facilitate business entry and operation, facilitate strategic public investments to improve competitiveness and private investments, support SMEs and entrepreneurs and build the capacity of public institutions and private sector operators. Thus, the World Bank approved a $40 million grant from the International Development Association to support the investment and performance of SMEs in non-mining productive sectors (World Bank, 2020). Also, the government of Sierra Leone approved Le40 billion styled the 'Munafa fund' as a soft loan to assist SMEs.

Although SMEs play an important role in employment generation, poverty reduction and value addition as well as bridging gender income inequality, there is little empirical evidence on the determinants of their performance in Sierra Leone. Some studies in Sierra Leone are Kanu and Conteh (2017), Sandy (2003), ATLANTA Small-scale Survey Report (1991) and Chuta *et al.* (1981).

Some studies elsewhere, especially in sub-Saharan Africa are Yeboah (2015) in Ghana, Tefera *et al.* (2013) in Ethiopia, Mead and Liedholm (1998) in Kenya, Temtime and Pansiri (2004) in Botswana.

The overall objective of this study is to investigate the effect of COVID-19 on the performance of SMEs in the Western Area of Sierra Leone.

The specific objectives are to investigate in the Western Area of Sierra Leone, (i) the quantitative impact of COVID-19 on the productivity of capital and the productivity of labour on SME performance (ii) the firm-specific determinants of COVID-19 on the performance of SMEs and (iii) the impact of COVID-19 on demographic characteristics of SME managers on the performance of SMEs.

While there are a number of studies on the determinants of the performance of SMEs there is no known study on the effect of COVID-19 on the performance of SMEs in the Western Area of Sierra Leone. However, the impact of the COVID-19 pandemic on economic performance across countries around the globe is known to be negative. For example, Sierra Leone's economy declined by 2.2 percent in 2020, from a performance of 5.4 percent in 2019 and 3.5 percent in 2018. It is therefore important to distinguish the impact of the performance determinants before and during the pandemic, which can reveal the impact of the pandemic on the SMEs. Previous studies did not take this into account on the basis that they were not done in a global health crisis of this nature, where all economies have suffered the impact negatively at the macro level. The study incorporates this into the investigation of the performance determinants of the SMEs in the Western Area of Sierra Leone.

The rest of the paper is organized as follows; section 2 is Literature Review, section 3 is the Methodology, section 4 is the Empirical Results and section 5 is the Summary of main Findings, section 6 Robustness Check of Model Estimation, 7 Synthesis of Objectives with Main findings and 8 Conclusion and Recommendations.

2. Literature Review

2.1 Theoretical Literature

The theoretical literature on SMEs' performance provides mixed conclusions because of the divergent views held by various scholars. Studies of SMEs show that internal firm-specific characteristics, demographic characteristics, business environmental factors and capital and labour determine the performance of SMEs. In addition, the discussion in academia and policy corridors has long been noted. For example, Storey (1994) argues that the performance of SMEs depends on the entrepreneur and firm characteristics which are: the entrepreneur's age, managerial experience, education qualification and drive for starting the business; the firm characteristics are the firm's sector, age and location. According to Liedholm (2002), firm size can be measured by the number of employees hired by a firm in a given year, assets or business earnings. Using the number of employees hired in a given year as a measure of enterprise performance Liedholm (2002) observed that enterprise performance is influenced by urban location, age of the enterprise and human capital. This finding is in line with Keith (1998) using the number of employees hired as a measure of firm size, noted that firm performance is significantly influenced by urban location.

Davidson and Henrekson (2002) argue that firm performance cannot only be explained by the entrepreneur characteristics and external firm attributes such as firm sector, age and location but that internal firm characteristics are dealing with the financial structure and production efficiency of the firm that contributes significantly to SMEs performance. Davidson and Henrekson (2002) assert that government regulation and policy also play a significant role in the performance and performance of SMEs. According to Davidson and Henrekson (2002), bureaucratic business registration procedures and difficult government regulation stifle SMEs' development in Sweden. Chapman *et al.* (2003) opine that institutional support such as provision of credit, grants, subsidies, business training, mentoring and incubation also contribute towards the performance of the firm.

According to Sarwoko (2013), SMEs' performance is also determined by the owner/manager characteristics and entrepreneurial competence which determines the strategy for the performance of SMEs. This is buttressed by Sarwoko and Frisdiantara (2016) who highlighted the performance determinants of small businesses as the competency of individuals in the entrepreneurial process, the owners'/managers' characteristics, an environmental factor of organizational resources, the competence of the company, organizational culture and structure, and strategies. The environment is a factor that also influences the performance of SMEs because performance is uncertain,

due to environmental conditions such as competitive conditions and changing market dynamics. This suggests that it is necessary to examine the determinants of SMEs' performance into three dimensions, namely individual, the organization and the environment.

2.2 Empirical Literature

There is a plethora of studies on the determinants of SME performance. The key variables used in the study are common with few exceptions. However, the empirical results are not uniform but concerning capital and labour, the observation is that they contribute positively to the performance of firms. The application of survey data skills has been the uniform method.

SME performance and development are influenced by environmental factors (such as government regulations and institutional factors), entrepreneur characteristics (i.e. age, gender, marital status, education level) and enterprise characteristics (such as sector, labour, capital, leverage, and experience). According to Delmar *et al.* (2003) and Glancey (1998), SMEs' performance has been measured in different ways which include changes in the number of people employed by the firm, the firm's total assets, the firm's annual turnover, the firm's earnings and the firm's profit/surplus.

Carrying out an empirical study on SME performance, Rafiki (2019) in the Kingdom of Saudi Arabia used descriptive and multivariate regression analysis to analyse 119 managers from SMEs. A stratified sampling technique was adopted with variables delineated from theories (human capital, social capital, strategy and organization), which are associated with the firm's performance that include; the size of the firm, firm age, manager's education, training, experience, financing and network relationship. The results found that the size of the firm, the experience of the manager, training, financing and the network relationship have a significant relationship with the firm's performance. However, other variables such as education and firm's age do not have a significant relationship with the firm's performance. Mateev and Anastasov (2010) using total assets to measure firm size noted that leverage, current liability, future performance opportunities, factor productivity and internally generated funds contribute significantly to the performance of SMEs.

Tefera *et al.* (2013) from Mekelle city, Tigray regional state of Ethiopia used 178 randomly selected MSEs and four main hypotheses formulated concerning the role of gender of owner, initial investment on the firm, location and sector in which the firm operates as the main determinants of performance of an enterprise. The study found out that 76.4 percent of MSEs survive and the remaining 23.6 percent are growing and that there is a significant gender difference in the performance of MSEs with male owners growing faster than those owned by a females. In addition, the initial investment in the firm, the location and the sector in which the MSEs operate matter a lot for the performance of these enterprises. Cassia and Minola (2012) in their study used a pool of hyper-performance firms to gather insights on how the hyper-performance firms achieve hyper-performance. They used a theoretical framework from well-established

approaches to strategic management and entrepreneurship. Their findings revealed that hyper-performance exists mainly as a result of extraordinary business opportunities and extraordinary access to resources (especially knowledge-based) and that entrepreneurship appears much more as a moderating variable rather than an explanatory variable per se of hyper-performance.

Wang (2016) used survey data from the World Bank for 119 developing countries to investigate the biggest obstacles confronting SMEs and the determinants that influence the obstacles as perceived by enterprise managers, the results show that SMEs perceive access to finance as the most significant obstacle which hinders their performance. The key determinants of firms' characteristics are size, age and performance rate of firms as well as the ownership of the firm. This confirms the findings of Joshi, P.K. and Rao, P. (2017) in the Global Pulse Report conducted by Oxford Economics that surveyed opinions of 3,200 business leaders around the globe on what are the limiting factors that impede SMEs' performance. Access to finance was seen as a significant impediment by many of the survey respondents; one in two SME leaders say they struggle to access finance to grow. Also, 60 percent admit that working capital difficulties cause problems paying their suppliers on time. The Pulse Report also revealed that SMEs possess intrinsic advantages due to their scale. Their agility is playing a major role in helping them to surge ahead. They can quickly adapt to shifting trends across the gamut of business operations. The most important finding of the Global Pulse Report is that while SMEs from around the globe are each navigating through a fairly bespoke set of challenges, they share much in common, not least of which is their optimism about the future and a firm commitment to making the investments they need to accelerate performance.

Yeboah (2015) in Ghana used 121 SMEs in the Cape Coast Metropolis to determine the reason for the high failure rate of small and medium enterprises (SMEs) in Ghana despite copious government policies and stimulus schemes directed at SMEs. Thus, the study attempts to find out the consequences of the entrepreneur and firm characteristics on SME performance. The research framework adopted that of Storey (1994). Data were gathered from administering questionnaires to these 121 SMEs. Descriptive statistics and the Cramer's V statistical test were used to analyse the data. The study reveals that the educational qualification of the entrepreneur and the size of the enterprise had the most significant influence on SME performance. The study concluded that owners/managers of SMEs must be educated, even if not by formal schooling; they must periodically attend seminars and workshops to obtain the requisite knowledge and skills to advance their business performance. Entrepreneurs must not be driven solely by financial motives but must also avoid the inertia that comes with operating a business enterprise for a very long time and entrepreneurs must involve very competent people, be it employees or outsiders, to advance the performance of their enterprises.

Pasanen (2021) analysed empirical data from 20 acquisition-performance SMEs and 90 organic-performance SMEs to determine the factors affecting the performance and performance of small and medium enterprises (SMEs) using strategic factors. The analysis revealed strategic differences with important implications between the two

groups. The most noteworthy differences were related to their scale of operation, firm age, founders, and product and customer structures. The study further suggests that firm performance pattern is associated with SME characteristics and thus has managerial implications.

In what follows we focus on studies relating to particular aspects of firm characteristics, firm head demographic characteristics and firm-specific environmental characteristics.

2.2.1 Enterprise Characteristics

These are the peculiar qualities of the business and include: managerial and business experience, business training, access to credit, factor productivity, location of the business, sector of the firm, business experience, degree of leverage, current liquidity and ownership structure.

a. Managerial and Business Experience

Temtime and Pansiri (2004) in Botswana found the level of firm performance to be high among SMEs owned by individuals who have managerial experience or have prior experience as SME owners or managers whereas Hallberg (2000) in the UK found that SMEs owned by inexperienced individuals attracted low business earnings. These firms often find it very hard to survive because of the lack of business acumen that comes with experience. Temtime and Pansiri (2004), in Botswana studying 'Small firms' Critical Success/Failure determinants in Botswana', found that human resource development is one factor that limits the success of many small firms in Botswana, particularly the lack of experienced personnel. However, the study by Kalleberg and Leicht (1991) in the US found no significant relationship between the manager's experience and the performance of the firm among SMEs arguing that firm performance is not an outcome of experience but rather of the entrepreneur's innovation, proactive behavior and sound expansion strategies.

b. Business Training

Business training according to Foreman-Peck *et al.* (2006) gives the SME owner/manager the wisdom to provide what the market wants and the necessary skills to keep and manage business accounts. This attribute in turn increases the competency and performance rate of the firm. According to Foreman-Peck *et al.* (2006), entrepreneurs need to invest in business training programs to enhance their business skills. Temtime and Pansiri (2004) also shared the same sentiments arguing that a lack of managerial skills is one of the factors that limit the success and performance of SMEs. The study by Temtime and Pansiri (2004) however revealed that lack of affordable business training facilities worked against the desire by most entrepreneurs to acquire business training. Cosh *et al.* (2000) in the UK studying the relationship between business training and employment performance in SMEs found a positive link between employment performance and the acquisition of business skills by firm owners. Chatterji *et al.* (2003) testing the signalling

hypothesis found that firms operated by owners who have under gone some business training programs attract high levels of business earnings and hence grow faster than firms owned by entrepreneurs with no business training. Both Cosh *et al.* (2000) and Chatterji *et al.* (2003) argued that trained entrepreneurs experience high-performance rates because most of them employ modern-day business expansion strategies such as online advertisement to promote their products.

c. Access to Credit

According to Kapunda *et al.* (2007) in Botswana, SMEs' investment and performance is positively influenced by accessibility to business credit. Investigating the relationship between SMEs' funding, development and trade in Botswana, Kapunda *et al.* (2007) further found out that government finance schemes such as CEDA have not solved the problem of limited access to credit by SMEs, particularly for female-owned small and micro enterprises. This according to the study explains the poor performance of these firms. Bigsten *et al.* (2003) studying the performance of the manufacturing sector in African countries found that the return to physical capital in the manufacturing sector is low in Africa due to scarcity of credit. CBS, ICEG, and K-Rep (1999) in Kenya also found that the main reason for business closure was a lack of business credit. Access to credit is therefore an important variable that explains not only the performance and performance of SMEs but also the survival of these firms.

d. Factor Productivity

This refers to both Capital and Labour productivity. Salman and Yazdafar (2012) said factor productivity measures the influence of efficiency in the SME's operations on the performance and performance of the firms. Demsetz (1973) found that the level of efficiency is a key factor in distinguishing high-performing firms from low-performing firms. Jovanovic (1982) studying the selection and assessment of firms in different industries found both capital and labour productivity to be positive and statistically significant in influencing firm performance and that highly efficient firms in different sectors increase their output and grow in size over time while less efficient firms are pushed out of business in the long run. Wiboonchutikula (2002) in Thailand studying SMEs performance found that SMEs experience high performance levels when the productivity of both capital and labour is greater and more persistent. This is very much in line with the findings of Mateev and Anastasov (2010) in Central and Eastern Europe who also found a positive relationship between factor productivity and SMEs' performance.

e. Location of the Business

Glancey (2008) found that firms in urban areas grow faster than those located in rural areas. The reason advanced is that urban firms have access to a large market of consumers with high purchasing power compared to firms operating in rural areas. Garoma (2012) divided the location of the business into firms operated at home and firms operated

outside the home and found out that firms operated at home perform better and are more likely to grow faster than firms operated outside the home because of low operational cost (free rent) enjoyed by home operated firms. However, Mead and Liedholm (1998) reached a different conclusion concerning the performance and performance of home-operated firms and those operating outside the home. They (Mead and Liedholm, 1998) found firms operated in open spaces such as street markets to be profitable and more likely to expand than firms operated at home because of their exposure to a large market.

f. Sector of the Firm

Garoma (2012) in his study found that the sector of the firm has a significant influence on the performance and performance of SMEs. It has also been found that the structure of the sectors differs from country to country hence sectoral performance of SMEs will also differ from country to country. Mead and Liedholm (1998) in Kenya found that SMEs in all sectors of Kenya expanded more rapidly than those in the retail trade sector. However, Garoma (2012) in Ethiopia found the service sector to be the most profitable sector and hence SMEs operating in this sector are more likely to expand faster than those in other sectors.

g. Business Experience

The age of the firm is one of the most investigated variables affecting the performance and performance of SMEs (measured by the number of years the firm has been in existence). The variable captures the influence of firm experience on the performance of SMEs. Akoten *et al.* (2006) and Kira and He (2012) found the relationship between firm experience and the performance of SMEs to be positive. According to them commercial banks usually prefer to give loans to enterprises which have been operating for a longer period of time. The belief is that experience enhances competence in doing business, hence highly experienced firms are more likely to attract high profits and less likely to default loan payment. Woldie *et al.* (2008) also found that older firms are more likely to grow faster than younger firms because of the social capital (experience) they have gathered over time. Some studies have however found younger firms to perform better and experience faster performance than older firms. This however contradicts the findings of Olutunla and Obamunyi (2008) in Nigeria who studied factors associated with the profitability of SMEs and found the relationship between the age of the firm and business performance to be negative. They found younger SMEs to perform better and grow faster than older enterprises. They attributed this phenomenon to the fact new firms are more innovative and more likely to easily adapt to the current business environment than older firms. This is in line with the findings of Glancey (2008) and Niskanen and Niskanen (2005) who found out that young enterprises have significantly higher profits and performance rates than old firms. They argued that the accumulation of experience by older firms does not give them a competitive advantage over new firms. Salman and Yazdanfa (2012) in Sweden found the influence of firm experience on SME performance to be negative but statistically insignificant.

h. Degree of Leverage

Leung and Yu (1996), Goddard *et al.* (2005) and Mateev and Anastasov (2012) identified the degree of leverage as an important factor in explaining SME performance. They however found out that the relationship between SME performance and degree of leverage is negative. Arguing that highly leveraged firms often find it hard to meet their debt obligations and in extreme cases resulting in the repossession of firm assets by lending institutions thus adversely affecting firm performance. However, Mateev and Anastasov (2010) and Honjo and Haranda (2006) found the relationship between SME performance and leverage to be positive. According to Mateev and Anastasov (2010), this result shows that SMEs in growing economies need to increase access to external capital to finance their assets performance but Honjo and Haranda (2006) argued that the positive relationship between SME performance and leverage holds only when the firm's profits exceed the loan cost.

i. Current Liquidity

Goddard *et al.* (2005) found current liquidity to be positively and strongly associated with SME performance which is in line with the findings of Nickell and Nicolitsas (1999) who studied the impact of financial pressure on SMEs and found the relationship between liquidity and firm performance to be positive, arguing that firms that can maintain high liquidity are not exposed to the risk of failing to meet their financial obligations. They pointed out that high liquidity enables the firm to respond quickly to changes in the business environment and this enhances the level of their performance. However, Deloof (2003) argued that even though current liquidity has a positive effect on firm performance, holding a high proportion of liquid assets may constrain the firm from taking advantage of long-term investment opportunities and hence compromise future performance. This line of thought was supported by Mateev and Anastasov (2010) who found the influence of the current ratio on firm performance to be negative. According to them, this result reflects that enterprises with better business investment opportunities will opt to maintain low levels of liquidity to finance future performance.

j. Ownership Structure

According to Garoma (2012), ownership structure affects SMEs performance and performance through the degree of risk-taking. He argues that sole proprietors are usually risk averse and more often prefer investing in low-risk projects which attract low rates of return. On the other hand, partnerships and joint ventures have a great appetite for risky projects which attract high rates of return. SMEs operating as partnerships or joint ventures are therefore more likely to grow faster than those operating as sole proprietorships. This assertion is upheld by Niskanen and Niskanen (2005) who found sole proprietorship to hurt SME performance, pointing out that the level of risk aversion is high among firms owned by individuals. Wiboonchutikula (2002) and Mateev and Anastasov (2012) assessed the performance rates of public-sector and private-sector SMEs. Wiboonchutikula (2002) found high SMEs' performance rates to be associated with

public sector companies. He argued that public sector SMEs have easier access to external funding and hence are more likely to grow at a faster rate than private SMEs. On the other hand, Mateev and Anastasov (2010) found no significant difference in the performance rates between public SMEs and private SMEs, concluding that ownership structure is not an important determinant of SMEs' performance.

2.2.2 Entrepreneurial Characteristics

This deals with the demography of the head of the enterprise and includes age of the entrepreneur, educational level of the entrepreneur, marital status of the entrepreneur and the gender of the entrepreneur.

a. Age of the Entrepreneur

The age of the entrepreneur has a positive and significant influence on the performance and performance of SMEs although there are divergent views on the actual age group that exerts a positive influence on the performance of these enterprises. According to Storey (1994), SMEs owned or managed by young and middle-aged individuals perform better than those managed by older entrepreneurs. The argument advanced is that young and middle-aged managers have the energy, motivation and commitment necessary to run any enterprise to higher levels. These entrepreneurs (young and middle-aged) are also usually not risk averse and hence they are more likely to invest in projects which bring forth high rates of return. This is buttressed by Chiliya (2012) in South Africa who found out that 'Profitability of Small Grocery Shops in South Africa' managed by young and middle-aged individuals experience faster performance than those managed by older entrepreneurs. This phenomenon, according to Chiliya (2012) is explained by the highly innovative minds of young and middle-aged entrepreneurs who often invest in defensible niche products and services. On the contrary, Akoten *et al.* (2006) and Woldie *et al.* (2008) in their respective studies found firms owned by middle-aged and older entrepreneurs to perform better and experience more performance than firms owned by young entrepreneurs. Akoten *et al.* (2006) measured SME performance by firm accessibility to credit and pointed out that lending institutions usually prefer to lend to older entrepreneurs because of their adverse attitude towards risky projects.

b. Education Level of the Entrepreneur

Carter and Jones-Evans (2002) asserted that basic education equips the entrepreneur with the necessary numeric and reading skills to operate a successful business. According to this study, there is a positive relationship between business performance and the education qualification held by the business owner or manager. High business performance and performance are common in firms owned by entrepreneurs with high educational qualifications. Woldie *et al.* (2008) in Nigeria found that the educational qualification of the owner has a significant and positive effect on the performance and performance of SMEs in Nigeria. They found SMEs owned by entrepreneurs who hold diplomas, degrees and postgraduate qualifications to attract large profits and experience

rapid performance than those owned by entrepreneurs whose highest education level is primary and secondary school. Akoten *et al.* (2006) and Chiliya (2012) also found a positive relationship between SME performance and the education qualification held by the SME entrepreneur. Garoma (2012), in Addis Ababa, studying factors influencing microenterprise success in the urban informal sector, found the influence of educational qualification of the SME owner to be positive but insignificant in influencing the performance and performance of SMEs. He therefore argued that a good educational background of the firm owner is necessary but not sufficient for business performance.

c. Marital Status of the Entrepreneur

Although the literature available on the influence of the marital status of the SME owner on the performance and performance of the firm is very limited, Akoten *et al.* (2006) in Kenya found out that SMEs owned by married entrepreneurs perform better and experience high-performance levels than those owned by unmarried entrepreneurs and have greater access to financial assistance from commercial banks than unmarried entrepreneurs.

d. Entrepreneur's Gender

Garoma (2012) and Mead and Liedholm (1998) in their studies found out that male-owned businesses tend to perform better than those owned by women reason been that women have limited access to financial assistance as compared to men. Carter and Jones-Evans (2002) attributed this to the fact that women have to split themselves between business and household duties and so this divided attention adversely affects the performance and performance of women-owned firms. Studies by Woldie *et al.*, (2008) found the gender of the entrepreneur to have an insignificant influence on the performance and performance of SMEs, arguing that both men and women have equal potential to run successful businesses.

2.2.3 Environmental Characteristics

This deals with the factors that affect the business operations. Subsumed under this heading are; government taxation, environmental characteristics, business registration and institutional factors.

a. Government Taxation

Hagen and Sannarnes (2007) found out that high government taxes discourage entrepreneurship increase the failure rate of existing firms and deter market entry of new firms. In the UK Employment Department Wren and Storey (2002) reviewed the impact of the 1980 tax cut on the UK economy and found that business investment grew as a result of the tax cut. The implication is that the high pre-1980 tax rates were impeding business investment. Davidson and Henrekson (2002) in Sweden found business performance to be negatively affected by business taxes, especially in sectors where tax rates are relatively high.

b. Business Registration

Davidson and Henrekson (2002) in Sweden using the occupational choice model found that bureaucratic business registration procedures impact negatively domestic entrepreneurship and the economy as a whole as it impede the entry of new firms into the market. This is buttressed by Djankov *et al.*, (2000) who in their study in Italy found out that the desire to start up firms and early-stage performance of firms is low in countries where business or company registration is characterized by arduous bureaucratic procedures. They observed that until recent times the process of starting a business in Italy involved more than sixteen procedures at a total cost of US$4000.00 and a waiting period of sixty-two days for the completion of the business permit and that explains why the business entry rate was low in Italy especially among SMEs as compared to countries like Canada where starting a business involves only two procedures at a total cost of US$280.

c. Institutional Factors

The institutional factors measure the impact of both public and private institutions on the performance and performance of SMEs. According to Davidson and Henrekson (2002), these are institutions whose mandate is to promote the development of SMEs through business funding, capacity building and business incubation. Davidson and Henrekson (2002) found that in Australia, private institutions have been found to be highly effective in promoting SMEs' development compared to public institutions because, until recent times, public institutions were not common in Australia with almost one-half of SMEs sourcing assistance from private accountants, banks and corporate lawyers. Robson *et al.* (2008) found the take-up rate of public institution support programs to be low among immigrants and minority ethnic groups who often survive on informal business activities. According to Bosma *et al.* (2004), both public and private institutions have a significant and positive impact on the survival and performance of SMEs. Wren and Storey (2002) assessed the impact of the British Enterprise Investment Scheme (a public scheme in Britain) on the performance and performance of SMEs and found it to be having a positive and significant impact on the performance and performance of medium-size firms but not on small firms.

While there are a number of studies on the determinants of the performance of SMEs and the professional training of SMEs is common among the theoretical determinants, previous studies treat this variable without considering whether the training is recent or not. This distinction is important because while professional training is important, where it has taken place for long it may not be important in creating performance differential among firms, especially where innovation becomes important. It is therefore important to distinguish the impact of the performance determinants before and during the pandemic, which can reveal the impact of the pandemic on the SMEs. This is because after the pandemic sources of economic recovery will be sought by all nations that were hit negatively. Previous studies did not take this into account on the

basis that they were not done in a global health crisis of this nature, where all economies have suffered the impact negatively at the macro level.

This study therefore extends the knowledge frontier on SME performance determinants from two fronts, which are:

1) Estimating the effect of capital and labour productivities on firms' performance and the firm-specific and demographic characteristics of SME heads in both a pre-COVID-19 and during covid 19 scenarios in the Western Area of Sierra Leone; and
2) Estimating the effect of not only the overall capacity building but also recent capacity building of SMEs' heads on SME performance in the Western Area of Sierra Leone.

3. Methodology

This section of the chapter deals with the methodology, which includes the model specification, sample design and sample size determination.

3.1 Model Specification

Pearce and Bah (2023) used an econometric model to investigate the determinants of SME performance in the Western Area of Sierra Leone from 2018 to 2020. This study leverages on this approach. This approach follows the work of Okurut *et al.* (2016) for SMEs in Botswana, Mateev and Anastasov (2012) for SMEs in fast-growing economies in Central and Eastern Europe, Oluntuola and Obamuyi (2008) for Nigeria and Mcpherson and Liedholm (1996) for Niger and Swaziland.

Previous studies did not take into consideration the effect of a global shock like the COVID-19 pandemic because it did not exist. This study diverges from previous empirical studies by estimating the SME performance model for both the pre-COVID-19 pandemic era and the COVID-19 pandemic era in the Western Area of Sierra Leone.

The COVID-19 pandemic, which started in late 2019, became a concern in Sierra Leone in early 2020. The index case was registered on 31st March 2020. The number of cases grew slowly and later became alarming. There were a series of government responses as well as international community responses. More importantly, the year 2020 was the start of COVID-19 in Sierra Leone while the crisis was still a concern on the globe.

We specify a pre-COVID-19 pandemic model of SMEs and a pandemic model of SMEs to account for the pre-COVID-19 and the COVID-19 periods effects differently. Here, 2018 and 2019 are the pre-pandemic period and 2020 is the pandemic period.

In this regard, we specify the pre-COVID-19 pandemic model as follows:

$$Y_{it} = \alpha + \beta X_{it} + \delta Z_{it} + \zeta_i + e_{it} \quad (3.1)$$

Where:
Y = firm size, which is given as the business earnings of the SME

X = vector of enterprise specific characteristics. These include firm capital productivity, firm labour productivity, short-term liquidity, the firm's degree of leverage, experience, sector of operation, ownership structure and location of the firm (rural or urban).
Z = vector of socio-economic characteristics of the SME head, which includes education level, professional training and gender of the SME head.
ζ_i = the idiosyncratic factor that is not captured in the model but can make firms have observed differences in size and are specific to firms.
e_{it} = the conventional error term which varies over time and firms.

The specification in equation (3.1) is consistent with panel data specification as we have two periods (T=2) and many firms (N=number of firms in the data set or survey). i and t in the equation are firm subscripts and time subscripts respectively.

3.2 COVID-19 on the Globe and Sierra Leone

The World Health Organization (WHO) on March 11, 2020, declared the outbreak of the viral disease COVID-19 and that it has reached a pandemic. In view of this governments of different countries were advised to take proactive measures to stop the spread of the virus. Although this will mean trampling on the fundamental human rights of people, the international human rights law guarantees everyone the right to the highest attainable standard of health and therefore obligates governments to take steps to prevent threats to public health and to provide medical care to those who need it. Human rights law also stipulates that in the case of serious public health threats and public emergencies threatening the life of a nation, restrictions can be placed on some of these rights when it is expedient that they: have a legal basis; strictly necessary; are based on specific evidence; are neither arbitrary nor discriminatory in application; are of limited duration; are respectful of human dignity; are subject to review; and proportionate to achieve the objective.

The COVID-19 pandemic clearly exhibits a serious public health threat that warrants restrictions on certain rights such as those that result from the imposition of quarantine or isolation limiting freedom of movement. At the same time, careful attention to human rights such as non-discrimination and human effective response amidst the turmoil and disruption that invariably results in times of crisis limits the harm that can come from the imposition of overly broad measures that do not meet the above criteria.

Given the exceptional situation and to preserve life, governments had no choice but to adopt extraordinary measures which include lockdowns and limitations of movement to slow transmission of the virus.

3.2.1 COVID-19 in Sierra Leone

On January 27 2020, Sierra Leone introduced its first directive to prevent the influx of COVID-19 following the WHO declaration of a global pandemic. These include:

- Mandatory 14 days quarantine for passengers from China;
- March 2020 Sierra Leone imposed restrictions on arriving travellers from countries with more than 50 confirmed cases of the virus;

- Banning of gatherings of more than 200 people and prohibited international travel for all government officials until further notice; and
- a 12-month state of emergency in the last week of March 2020 and closed borders with its neighbours Guinea and Liberia

This however had serious repercussions on the already depressed economy of the country and also affected the social life of the people. Businesses (except for essential commodities) came to a halt because of the restrictions imposed.

The economy of Sierra Leone is characterized by a large informal sector making some of the restrictions adopted against COVID-19 difficult to enforce and ineffective. On Wednesday 24th June 2020, restrictions were given concerning the operations of bars, restaurants, banks, shops, supermarkets, and public and private offices which severely affected SMEs. Customers of bars and restaurants were not allowed to sit in to eat or drink.

3.3 Model Variables and Expected Signs

The expected signs of the coefficients of model variables are discussed here. For variables with negative effects, the coefficient estimates are expected to be negative and those with positive effects are expected to have positive coefficient estimates.

3.3.1 Factor Productivity

The productivities of capital and labour are expected to have positive effects on the performance of firms. These variables capture the effect of efficiency on the performance of SMEs. The productivity of capital increases the performance of firms as in the case of the productivity of labour through an increase in efficiency. This is a transmission mechanism underscored in the endogenous performance model. Hence, the coefficients of capital and labour are expected to be positive.

3.3.2 Experience

The experience of a firm, measured as the age of the firm, is expected to have a positive effect on the performance of the firm. The basic tenet here is that the longer a firm operates the higher the chance for it to absorb shocks, given its experience. In addition, the better it can manage its business from the experiences of previous obstacles and opportunities. However, where younger firms are more innovative, they can easily adapt to the business skills and operations. In this case, experienced firms can underperform when compared with younger ones. Hence, experience may have a negative effect on performance in this sense.

3.3.3 Degree of Leverage

The degree of leverage gives the amount of debt used to finance the capital of SME (relative to owner's equity). Where debt exceeds equity, there is high leverage. In this case, it is difficult for the firm to meet its debt obligation, which decreases net earnings as the high debt has to be financed. The financing of the debt increases global expenditure

and net earnings decline. The fact that some assets of the SME may be seized by the creditors also reduces the performance of the firm. Hence, leverage has a negative effect on firm performance.

3.3.4 Current Liquidity

A high level of current liquidity (measured as the ratio of current assets to current liabilities), which indicates the capacity of the firm to maintain its short-term liquidity makes the SME to be able to adjust to the business environment with ease. In addition, firms have a higher ability to meet their financial obligations when current liquidity is high. In this regard, it is expected that current liquidity has a positive effect on the performance of SMEs. However, current liquidity may stagnate performance as the liquidity could have been used to support investment and performance. Thus, firms with low current assets could be the fast-growing firms. This has been emphasized in Mateev and Anastasov (2010). In this regard, current liquidity can have a negative effect on the performance of SMEs.

3.3.5 Location

Firms can differ in location in the sense that some can be located in urban areas while others can be in rural areas. As urban firms are normally located in the larger markets and are often in the reach of consumers with higher average income, relative to those in the rural areas, they are expected to grow faster than their rural counterparts. In this regard, the coefficient of location dummy that takes 1 for urban SMEs and 0 for rural SMEs is expected to be positive.

3.3.6 Ownership Structure

The structure of ownership affects businesses in general, which is the case for SMEs as well. In risk management, the sole proprietorship is considered to be more risk-averse than a partnership or limited liability company. The sole proprietor often invests in low-risk projects, which are often the ones with low returns. In addition, partnership firms and limited liability companies have higher access to external funds than sole proprietorships, which rely on their own savings. Hence, a dummy that uses sole proprietorship as the reference category is expected to have a positive effect on SME performance.

3.3.7 Sector of Firm Operation

The sector of firm operation matters for its performance. However, on theoretical grounds, the transmission is not clear. It may be the case that those in construction perform better than those in trade, real estate, education etc. In this regard the expected sign of dummies by sector are indeterminable.

3.3.8 Professional or Business Training

Professional or business training of SME managers or owners is expected to have a positive effect on SME performance. This rests on the basis that it equips the manager with the technical know-how to manage the SME business, including business accounts and record keeping. In addition, where the training is recent, modern business expansion strategies can be employed to beat the market ahead of competitors, in spite of a firm being an SME. In this regard, recent business training may be more useful in creating firm performance differential than the mere existence of business. Thus, business or professional training, especially a recent one, has a positive effect on SME performance.

3.3.9 Educational Level

Education is essential to the SME head as it enhances the ability to read and deal with numerals in order to manage a large SME firm by definition. Thus, SME heads with high levels of education are expected to have higher performance compared to those with heads with low levels of education, especially those without the basic education necessary to understand the numeric and reading aspects of the business.

3.3.10 Gender

The expected sign of a gender dummy defined as 1 for female and 0 for male-headed SMEs is expected to be negative. This means that female-headed SMEs are expected to do less on performance than male-headed SMEs. The idea is that women often have to make a trade-off between the business and the household activities. Hence, there is more distraction from monitoring the business. In addition, in some jurisdictions, especially rural communities, women have limited access to finance when compared to men. This can hinder business progress. Hence, male-headed entrepreneurs are expected to perform better than female-headed ones.

3.4 Variable Measurement

The measurement of the variables which are to be included in the model for the estimation of the determinants of SME performance are discussed here.

Table 3.1 presents the model variable measurement.

Table 3.1: Model Variables, Measurement and Expected Signs

Variable	Measurement	Expected Sign
Dependent Variable		
Earnings	Net Annual Business Earnings, taken as sales or total revenue minus expenditure	
Independent Variables		
Capital Productivity	Net Net Annual Business Earnings divided by tangible assets	Positive
Labour Productivity	Net Net Annual Business Earnings divided by the number of employees	Positive
Experience	Number of Years of Firm Existence	Positive/ Negative
Leverage	Total Debt divided by Total Asses	Negative
Liquidity	Current Asset divided by Current Liabilities (which is the current ratio, representing short term liquidity)	Positive/ Negative
Gender	Gender Dummy with 1 for Female Head and 0 for Male Head., representing gender of head of SME	Positive/ Negative
Location	Location Dummy with 1 for Urban and 0 for Rural	Positive
Training	Dummy with 1 for those with professional training in SME and 0 for those who do not have.	Positive
Ownership	Representing ownership structure of the SME. Separate dummies for, sole proprietorship, partnership and private limited but sole proprietorship is used as the reference category	Positive/ Negative
Sector	Representing the sector of operation of the SME. Separate dummies for different sectors but with trade as the reference category. Sectors used are trade, real estate, education, construction, medical, research and others	Positive/ Negative
Educational Level	Separate Dummies for different levels of education. The levels used are degrees, diplomas, secondary, primary and no formal education. The reference category is no level of education.	Positive/ Negative
Gender	Gender Dummy with 1 for Female Head and 0 for Male Head., representing gender of head of SME	Positive/ Negative

3.5 Estimation Procedure

As the period 2018 and 2019 are the pre-pandemic periods for Sierra Leone, the regression result was a panel data regression for 2018 and 2019. Both the OLS version and random effect model were estimated. In the OLS, the firms are considered homogenous while in the random effect regression, they are heterogeneous. The fixed effect is not investigated here because the model has dummy variables, which do not vary over time across firms and including them in a fixed effect model provides no coefficient for them.

The pandemic model refers to the model estimated for 2020, as 2020 was a COVID-19 pandemic period. Hence, the model is a model of a cross-section of firms for the year 2020 and not a panel data framework. Hence, a cross-section approach was considered here. This model was initially estimated using OLS, which considers all firms to be homogeneous, and then using the random effect model, where firms' specific characteristics are considered to be random, making firms heteroscedastic. The Breusch-

Pagan test for random effect versus pooled model (OLS regression) was used to determine whether the random effects model was preferred to the fixed effect model.

3.6 Data Issue

Pearce and Bah (2023) in the Western Area of Sierra Leone carried out a study on 450 randomly selected registered SMEs to find out the determinants of SMEs performance. This approach followed the World Bank (2011) survey of formal SMEs' financing and constraints for a number of countries and it has been repeated every three years on SMEs' performance. This study leveraged the Pearce and Bah (2023) study and the World Bank (2011) survey. A structured survey questionnaire was designed and administered to the selected SMEs. The information collected included among others: the main sector of operation/services provided, the ownership structure of the SME, the years of experience of the SME, the number of persons employed, the profit or loss of the SME, the gender of the SME head, the level of education of the SME head and the tangible assets of the SME.

3.6.1 Sample Design

A survey was conducted and analysis was done based on the survey data. We discuss the survey design here. The sampling of SMEs was done such that ownership structure and main structure of the operation of SMEs were considered, in addition to the geographical location (urban or rural) of the firm in the Western Area of Sierra Leone. A list of all SMEs was obtained from the register of the formal SMEs (that is, registered SMEs) from SMEDA[ii] which was used as the sample frame. A simple random sampling technique was applied to have the representative of the population, with the idea of capturing differences in the location of firms and the sector of operation of the firms. However, given the low activity of registered SMEs in Agriculture and Mining, these were not considered in the survey.

4. Empirical Results

To investigate the determinants of SME performance in the Western Area of Sierra Leone, we estimated two models, which are the pre-COVID-19 pandemic model and the COVID-19 pandemic model. The idea is to determine whether there are differences in the SME performance determinants before and during the COVID-19 pandemic. In this regard, as the data on SMEs were collected for 2018, 2019 and 2020, the data for 2020 was used for the COVID-19 estimation while the 2018 and 2019 data were used for the pre-COVID-19 pandemic regression. Thus, the pre-COVID-19 data is panel data of SMEs for 2018 and 2019 while the pandemic data is cross-section data of SMEs for 2020.

Moreover, we investigated the role of professional training, whether recent or not, separately from the role of recent professional training. Recent training was considered as training that took place less than three years before the survey. Thus, both the pre-pandemic and pandemic regression results are presented for two cases, which are (i) the

[ii] Small and Medium Enterprises Development Agency.

model with overall training and (ii) the model with recent training. Overall training was treated as the case where the firm head had received training on SME management, independent of whether it was recent or not. In the overall training model, a dummy indicating whether an SME head had received training in SME development was included in the model. In the recent training model, instead of using an overall training dummy, a dummy indicating whether SME head recently received training in SME development was included.

4.1 The Pre-Covid 19 Model Results

a. The SME Overall Professional Training Model

Table 3.2 shows the result of the Breusch-Pagan test for pooled versus random effect model of SME performance in the pre-COVID-19 pandemic with overall training model dummy variable in the pandemic regression. The table shows that the null hypothesis that the pooled model is valid is rejected at the 1 percent level of significance, as the p-value of the test is 0.0001. In this regard, the random effect model is the appropriate representation of the SME performance model for the pre-pandemic period. Hence, the firms are not homogenous.

Table 3.2: Breusch-Pagan Test Result for Pooled Model versus Random Effects Model

	Variance	Chi-Square	P-Value
Ln of Dependent Variable	1.15	218.91	0.001
Rho(ϱ)	0.06		
Mu(ϱ)	0.26		

Table 3.3 shows the SME performance model results with the overall training model dummy variable in the pre-pandemic regression. Model 1 and Model 2 respectively show the OLS result and the random effect model result. The result of the COVID-19 model of performance with overall SME professional training shows that capital productivity and labour productivity have positive effects on SME performance with coefficients of 0.20 and 0.64 respectively. In addition, leverage is found to have a negative effect on SME performance in the overall professional training model and is significant at the 1 percent level while liquidity is not significant. The negative sign on leverage suggests that highly indebted SMEs grow less.

The dummy variable capturing SME overall training experience shows that while the coefficient of the professional training dummy is positive, it is not significant at the conventional levels of significance of 1 percent and 5 percent.

The dummy for gender in the pre-COVID-19 Pandemic model shows that in the pre-COVID-19 period, the dummy has a negative coefficient of -0.127 and is significant at the 5 percent level of significance. Thus, male-headed firms grow less than female-headed ones as the urban dummy, which took one for SMEs located in Western Urban and zero in Western Rural has a negative coefficient but it is not significant, suggesting that location (urban or rural) does not explain firm performance in Western Area of Sierra Leone.

Table 3.3: Pre-COVID-19 SME Performance Regression with Overall SME Training

	(1)	(2)
Variables	**OLS**	**Random Effects**
Ln(Capital_P)	0.142***	0.204***
	(0.0234)	(0.0242)
Ln(Labour_P)	0.710***	0.638***
	(0.0218)	(0.0240)
Experience	-0.000625*	-0.000465
	(0.000337)	(0.000428)
Ln(leverage)	-6.98e-05	-0.0658***
	(0.0246)	(0.0228)
Ln(liquidity)	0.00641	-0.0126
	(0.0248)	(0.0231)
dummy_gender	-0.105**	-0.127**
	(0.0517)	(0.0640)
dummy_urban	-0.0129	0.0393
	(0.0538)	(0.0655)
Dummy_overall_training	0.106**	0.123*
	(0.0515)	(0.0660)
dummy_Private_limited	0.404***	0.249**
	(0.0917)	(0.117)
dummy_Parnership	0.375***	0.345***
	(0.0572)	(0.0738)
dummy_Real_Estate	0.120	0.198
	(0.311)	(0.423)
dummy_education	1.360***	1.372***
	(0.242)	(0.333)
dummy_transport	0.0110	0.0419
	(0.115)	(0.158)
dummy_construction	0.671***	0.525***
	(0.129)	(0.161)
dummy_medical	-0.0826	-0.00361
	(0.116)	(0.155)
dummy_research	-0.262	-0.263
	(0.248)	(0.341)
dummy_others	0.00587	-0.00233
	(0.210)	(0.289)
dummy_degree	0.877***	0.948***
	(0.105)	(0.133)
dummy_diploma	0.321***	0.401***
	(0.0960)	(0.120)
dummy_primary	-0.436***	-0.512***
	(0.126)	(0.166)
dummy_secondary	0.269***	0.310***
	(0.0908)	(0.116)
Constant	5.545***	6.488***
	(0.366)	(0.412)
Observations	731	731
R-squared	0.786	

rmse	0.574	0.254
F-stat	124.3	
Prob>F	0	
Wald		1967
Prob>chi2		0

Note: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

The effect of firm structure on SME performance is found to be significant in the pre-COVID-19 pandemic model with an overall training dummy for SMEs. The model shows that with reference to the reference group, which is sole proprietorship, partnership firms have higher performance and private limited companies also have higher performance as their coefficients are positive. Moreover, partnership firms have better performance than private limited companies, as the dummy for partnership has a coefficient of 0.35 while that for private limited companies has a coefficient of 0.25.

With regard to the dummy for the type of sector of operation of the SMEs, only education and construction dummies are significant and both have positive coefficients with higher coefficients from the education dummy. Hence, each of these services has higher performance than trade, which is the reference group used for the sector variable. Firms in education have higher performance than those in construction, since the education dummy has a coefficient of 1.37 and that for construction is 0.53. The coefficients of the other sector types are insignificant, implying they do not perform better than trade nor are they worse than trade. Hence, during the pre-pandemic period, education and construction are the strongest sectors in terms of the performance of SMEs with education SMEs leading on performance. This was also found to be the case in the pre-COVID-19 pandemic model with an overall professional training dummy.

With respect to education, all the dummies are significant. However, only the dummies for SME heads that are educated up to the levels of degree, diploma and secondary education have positive coefficients. The dummy for primary education has a negative coefficient. Hence, while SME heads that are educated up to the levels of degree, diploma and secondary education have better performance than those SMEs with no formal education, primary school level SME heads are lesser performers than those with no formal education as the dummy for primary education shows a negative and significant coefficient in the model. This suggests the importance of further education by SME heads, at least to the level of secondary school.

Table 3.4 gives a summary of the joint test for the significance of all the dummies. The table shows that while the gender of the SME head, SME structure, type of sector of operation of SME, educational level of the SME matter for SME performance in the Western Area of Sierra Leone, location of SME (urban or rural) and overall professional training of SME heads do not matter.

Table 3.4: Test of Significance of Regression Dummy Variables

Test for Significance of Variables	Chi2	P-Value	Conclusion
Significance of Gender Dummy	3.29	0.047	Gender matters for SMEs' performance
Significance of Location Dummy	0.36	0.548	SME location (urban or rural) does not matter.
Significance of Overall Professional Training Dummy	3.49	0.062	Overall training does not matter for SME performance.
Significance of SME structure dummies	21.94	0.001	SME structure matters for SME performance.
Significance of SME Service Type	28.15	0.001	The type of service provided by SMEs matters for performance differential among firms.
Significance of Education Dummies	104.93	0.001	Educational differences matter for firm performance.

b. The SME Recent Training Model

As in the case of the pre-pandemic model with overall training, the pre-pandemic model with a recent training dummy was estimated using both the OLS and random effects estimation consideration. Test of the appropriate version of the model was done using the Breusch-Pagan test. The OLS approach assumes firms are homogenous and hence a pooled model is appropriate while the random effect assumes firms are heterogeneous and the individual heterogeneity is random.

Table 3.5 shows the result of the Breusch Pagan test for the pooled versus random effect model of SME performance in the pre-COVID-19 pandemic period. The table shows that the null hypothesis that the pooled model is valid is rejected at the 1 percent level of significance, as the p-value of the test is 0.0001. In this regard, the random effect model is the appropriate representation of the SME performance model.

Table 3.5: Breusch-Pagan Test Result for Pooled Model versus Random Effects Model

	Variance	Chi-Square	P-Value
Ln of Dependent Variable	1.49	219.99	0.001
Rho(ϱ)	0.06		
Mu(ϱ)	0.26		

Table 3.6 shows the SME performance model results with the recent training model dummy variable in the pandemic regression. Model 1 and Model 2 respectively show the OLS result and the random effect model result. The result of the pre-COVID-19 SME performance model with recent SME professional training shows that capital productivity and labour productivity have elasticities of 0.20 and 0.64 respectively. Both elasticities are significant at the 1 percent level of significance. These elasticities are the same as in the overall training model.

Leverage has a negative effect on SME performance, as in the case of liquidity. However, while leverage is significant at the 1 percent level of significance, liquidity is not significant, which is the case also in the overall training model.

The dummy variable capturing SME training experience shows that the coefficient of the recent professional training dummy is positive and significant at the 5 percent level. The result is different from the overall training model, where the dummy has a positive coefficient but is insignificant. Hence, in the pre-COVID-19 era, professional training differences matter in explaining performance differences among SMEs in the Western Area of Sierra Leone when it is recent.

Table 3.6: Pre-COVID-19 Pandemic SME Performance Regression with Recent SME Training

	(1)	**(2)**
Variables	**OLS**	**Random Effects**
Ln(Capital_P)	0.141***	0.203***
	(0.0234)	(0.0242)
Ln(Labour_P)	0.709***	0.637***
	(0.0218)	(0.0240)
Expereince	-0.000572*	-0.000429
	(0.000334)	(0.000424)
Ln(leverage)	-0.00635	-0.0695***
	(0.0248)	(0.0228)
Ln(liquidity)	-0.00169	-0.0170
	(0.0249)	(0.0230)
dummy_gender	-0.101*	-0.119*
	(0.0518)	(0.0641)
dummy_urban	0.00465	0.0583
	(0.0550)	(0.0666)
dummy_recent_training	0.126**	0.161**
	(0.0545)	(0.0686)
dummy_Private_limited	0.448***	0.304***
	(0.0918)	(0.117)
dummy_Parnership	0.370***	0.333***
	(0.0573)	(0.0741)
dummy_Real_Estate	0.0701	0.119
	(0.313)	(0.425)
dummy_education	1.336***	1.338***
	(0.243)	(0.333)
dummy_transport	-0.00541	0.0208
	(0.115)	(0.158)
dummy_construction	0.627***	0.481***
	(0.131)	(0.162)
dummy_medical	-0.0738	0.000570
	(0.115)	(0.154)
dummy_research	-0.214	-0.202
	(0.248)	(0.341)
dummy_others	0.00969	0.00528
	(0.210)	(0.288)

dummy_degree	0.878***	0.943***
	(0.105)	(0.133)
dummy_diploma	0.318***	0.392***
	(0.0960)	(0.120)
dummy_primary	-0.452***	-0.529***
	(0.126)	(0.166)
dummy_secondary	0.267***	0.306***
	(0.0907)	(0.116)
Constant	5.558***	6.490***
	(0.366)	(0.411)
Observations	731	731
R-squared	0.787	
rmse	0.573	0.254
F-stat	124.6	
Prob>F	0	
Wald		1975
Prob>chi2		0

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The dummy for gender in the pre-COVID-19 pandemic model shows that male-headed firms grow less than female-headed ones but it is not significant though it was significant at the 5 percent level in the case of the pre-pandemic model with overall training. Thus, the gender of the SME head does not explain SME performance in the Western Area of Sierra Leone when we control for recent training.

The urban dummy, which took one for SMEs located in Western Urban and zero in Western Rural is not significant. Hence, the location of SMEs (urban or rural) does not explain SME performance in the Western Area of Sierra Leone in the pre-pandemic model.

The effect of firm structure on SME performance is found to be significant in the pre-COVID-19 pandemic model with a recent training dummy for SMEs. The model shows that concerning the reference group, which is sole proprietorship, partnership firms have higher performance and private limited companies also have higher performance. Moreover, the significance of both dummies shows that firm structure matters for SME performance. However, the sizes of the coefficients show that partnership SMEs are better performers than private limited companies, given that their coefficients are 0.33 and 0.30 respectively.

Concerning the dummy for the type of sector of operation of the SMEs, only education and construction dummies are significant. Moreover, as their coefficients are positive, both have higher performance than trade, which is the reference group used for the service variable. In addition, firms in education have higher performance than those not in education, as indicated by their coefficients, which are 1.34 for the former and 0.48 for the latter. The dummies for all the other sectors of operations of SMEs have insignificant coefficients, implying they do not perform better than trade nor are they worse than trade. Hence, education and construction are the strongest sectors in terms of

the performance of SMEs. This was also found to be the case in the pre-COVID-19 pandemic model with an overall training dummy.

Concerning education, all the dummies are significant. However, only the dummies for SME heads that are educated up to the levels of degree, diploma and secondary education have positive coefficients. The dummy for primary education has a negative coefficient. Hence, while SME heads that are educated up to the levels of degree, diploma and secondary education have better performance than those SMEs with no formal education, primary school level SME heads are lesser performers than those with no formal education as the dummy for primary education shows a negative and significant coefficient in the model. This suggests the importance of further education by SME heads, at least to the level of secondary school.

Table 3.7 gives a summary of the joint test for the significance of all the dummies. The table shows that while both gender and location (urban or rural) do not matter in explaining SME performance in the Western Area of Sierra Leone, SME structure, type of service provided by the SME, educational level of the SME and recent professional training of SME heads matter for the performance of SMEs.

Table 3.7: Test of Significance of Regression Dummy Variables

Test for Significance of the Dummies	**Test Statistic**	**P-Value**	**Conclusion for Firm Performance Model**
Significance of Gender Dummy	Chi2(1) = 3.44	0.063	Gender does not matter for SME performance.
Significance of Location Dummy	Chi2(1) = 0.77	0.381	SME location (urban or rural) does not matter for SME performance.
Significance of Recent Professional Training Dummy	Chi2(1) = 5.51	0.0189	Recent professional training of SME head matters for SME performance.
Significance of SME structure dummies	Chi2(2) = 21.38	0.0001	Firm structure matters for SME performance.
Significance of SME Service Type	Chi2(7) = 24.66	0.0009	The type of service provided by SMEs matters for performance.
Significance of Education Dummies	Chi2(4) = 109.57	0.0001	Educational differences matter for firm performance.

4.2. The COVID-19 Era Model Results

a. The SME Overall Professional Training Model

Table 3.8 shows the results of the estimated COVID-19 pandemic model of SME performance with overall professional training as the professional training variable, using the Ordinary Least Squares (OLS). The result shows that labour and capital have positive effects on firm performance with labour and capital elasticities of output being 0.67 and 0.10 respectively. However, it is important to determine whether the OLS assumptions are satisfied by the model.

To the extent that the presence of heteroscedasticity in the residuals of the model leads to inaccurate estimates of the standard errors of the parameters, the OLS model of SME performance was tested for heteroscedasticity. The Breusch-Pagan test for

heteroscedasticity and the White test were applied for the heteroscedasticity test. In addition, as the OLS assumes non-normally distributed error terms for the application of the standard t-test of significance to be valid, a test for residual normality was done following the estimation of the model with OLS. The Shapiro-Wilk-Francia, Shapiro-Wilk, Jarque-Bera and skewness kurtosis tests were applied for the test for normality. Table 3.9 shows the results of the Breusch-Pagan and White tests for heteroscedasticity and the results of the tests for normality.

Table 3.8: Pre-COVID-19 Pandemic SME Performance Regression with Overall SME Training Using Ordinary Least Squares (OLS)

Variables	**OLS**
LnCapital_P	0.0980***
	(0.0330)
LnLabour_P	0.665***
	(0.0327)
q2_age_months	-6.37e-05
	(0.000508)
Lnleverage	0.0371
	(0.0352)
Lnliquidity	-0.00505
	(0.0335)
dummy_gender	-0.0598
	(0.0779)
dummy_urban	-0.283***
	(0.0791)
Dummy_overall_training	0.144*
	(0.0791)
dummy_Private_limited	0.466***
	(0.135)
dummy_Parnership	0.256***
	(0.0872)
dummy_Real_Estate	-1.074**
	(0.471)
dummy_education	1.548***
	(0.359)
dummy_transport	0.0631
	(0.170)
dummy_construction	0.930***
	(0.212)
dummy_medical	0.0367
	(0.175)
dummy_research	-0.137
	(0.368)
dummy_others	0.285
	(0.311)
dummy_degree	0.556***
	(0.152)
dummy_diploma	-0.0806

	(0.140)
dummy_primary	-0.558***
	(0.183)
dummy_secondary	-0.0378
	(0.130)
Constant	6.834***
	(0.555)
Observations	350
R-squared	0.757
rmse	0.601
F-stat	48.78
R-Squared	0.757

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.9: Residual Diagnostic Tests on the COVID-19 Pre-Pandemic Overall Training Performance Model

Diagnostic Test	**Test Type**	**P-Value**	**Conclusion**
Panel A: Test for Heteroscedasticity			
Heteroscedasticity in residuals	Breush-Pagan	0.016	The null hypothesis of homoscedasticity is not rejected at the 1 percent level, though rejected at the 5 percent level.
	White	0.001	The null hypothesis of homoscedasticity is rejected at the 1 percent level and the 5 percent level.
Panel B: Test for Normality			
Normality of residuals	Shapiro-Francia Wilk	0.093	The residuals are normality distributed.
Normality of residuals	Shapiro-Wilk	0.067	The residuals are normality distributed.
Normality of residuals	Skewness Kurtosis	0.657	The residuals are normality distributed.
Normality of residuals	Jarque-Beru	0.693	The residuals are normality distributed.

Given the results of the Breusch-Pagan test with a p-value of 0.016, there is heteroscedasticity at the 5 percent level but no heteroscedasticity at the 1 percent level. The White test indicates that there is heteroscedasticity at the 1 percent level (as well as the 5 percent level). As these results are conflicting and the White test is a more recent test, we consider that there is heteroscedasticity in the model residuals. These results are in Panel A of Table 3.9. This implies the need for correcting for heteroscedasticity in the residuals of the model using a different estimation method. In this regard, the robust standard error option was applied as it adjusts standard errors appropriately to have accurate estimates of the standard errors.

Panel B of Table 3.9 shows the residual normality test results. The test results show that across all the tests statistics used, the null hypothesis of normally distributed errors is not rejected as the p-values are higher than 5 percent.

As the model residuals are normally distributed but there is evidence of heteroscedastic residuals, we re-estimated the model using robust standard errors. Table

3.10 shows the result of the pandemic model using an overall training dummy for both the robust standard error and the OLS estimates. The OLS estimate is presented only on a comparison basis.

Table 3.10: COVID-19 Pandemic SME Performance Regression with Overall SME Training, Correcting for Heteroscedasticity

	(1)	(2)
Variables	**OLS**	**Robust S.E**
Ln(Capital_P)	0.0980***	0.0980***
	(0.0330)	(0.0313)
Ln(Labour_P)	0.665***	0.665***
	(0.0327)	(0.0387)
Experience	-6.37e-05	-6.37e-05
	(0.000508)	(0.000572)
Ln(leverage)	0.0371	0.0371
	(0.0352)	(0.0388)
Lnl(iquidity)	-0.00505	-0.00505
	(0.0335)	(0.0354)
dummy_gender	-0.0598	-0.0598
	(0.0779)	(0.0727)
dummy_urban	-0.283***	-0.283***
	(0.0791)	(0.0968)
Dummy_overall_training	0.144*	0.144
	(0.0791)	(0.0928)
dummy_Private_limited	0.466***	0.466***
	(0.135)	(0.164)
dummy_Parnership	0.256***	0.256***
	(0.0872)	(0.0870)
dummy_Real_Estate	-1.074**	-1.074***
	(0.471)	(0.297)
dummy_education	1.548***	1.548***
	(0.359)	(0.172)
dummy_transport	0.0631	0.0631
	(0.170)	(0.206)
dummy_construction	0.930***	0.930***
	(0.212)	(0.170)
dummy_medical	0.0367	0.0367
	(0.175)	(0.188)
dummy_research	-0.137	-0.137
	(0.368)	(0.131)
dummy_others	0.285	0.285
	(0.311)	(0.217)
dummy_degree	0.556***	0.556***
	(0.152)	(0.188)
dummy_diploma	-0.0806	-0.0806
	(0.140)	(0.166)
dummy_primary	-0.558***	-0.558***
	(0.183)	(0.172)

dummy_secondary	-0.0378	-0.0378
	(0.130)	(0.156)
Constant	6.834***	6.834***
	(0.555)	(0.687)
Observations	350	350
R-squared	0.757	0.757
rmse	0.601	0.601
F-stat	48.78	
R-Squared	0.757	0.757

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The result of the COVID-19 pandemic model of performance shows that capital and labour have positive effects on the performance of SMEs with an elasticity of labour of 0.665 and that capital is 0.098. Both coefficients are significant. These coefficients are 0.7638 and 0.204 in the pre-pandemic model. This result implies that the effect of capital on firm performance was lower during the pandemic than before the pandemic while the effect of labour on SME performance was higher during the pandemic than before the pandemic. This suggests that capital productivity declined during the pandemic while labour productivity increased during the pandemic.

Both leverage and liquidity are not significant in the pandemic model, though leverage was significant with a negative coefficient in the pre-pandemic model. In addition, the age of the SME is not significant in the pandemic model, as in the pre-pandemic model. Hence, in the Western Area of Sierra Leone, firm age does not explain firm performance. The result is the same in both the pre-pandemic and pandemic models.

In the pandemic SME performance model, the dummy variable capturing SME training experience, as measured by overall training, whether recent or not, shows that professional training is not significant in determining SME firm performance, though it has a positive coefficient. The same result was found in the pre-pandemic model result.
The dummy for gender is not significant in the pandemic model, though it was found to have a negative and significant coefficient in the pre-pandemic model. Hence, both male and female-headed firms grew equally during the pandemic, which was not the case in the pre-pandemic period where male-headed firms grew less than female-headed firms. This therefore suggests that female-headed firms in the Western Area of Sierra Leone were more hit by the pandemic than male-headed firms.

The urban dummy, which took one for SMEs located in Western Urban and zero for those in Western Rural, has a negative coefficient and is significant. Hence, urban firms perform less than rural firms in the Western Area of Sierra Leone during the pandemic. This result is different from the pre-pandemic results, where the location dummy was not found to be significant. This suggests that urban firms were more hit by the pandemic than rural firms. This also suggests that urban firms were more compliant with COVID-19 restrictions than rural ones. Thus, they were more affected negatively by COVID-19 restrictions.

The effect of firm structure on SME performance is found to be significant in the COVID-19 pandemic model with an overall training dummy for SMEs. The model shows that with reference to the reference group, which is sole proprietorship, both private limited SMEs and partnership firms have higher performance, given that the coefficients of these dummies are positive and significant. Moreover, private-limited-firm dummy has a coefficient of 0.466, which is higher than the coefficient for partnership, which is 0.256. Hence, during the pandemic, private-limited-SMEs had higher performance than partnership firms. The reverse was the case in the pre-pandemic model, where partnership firms were found to have better performance than private-limited-firms. This suggests that relative to sole traders, the performance of private-limited firms improved during the pandemic, compared with the pre-pandemic scenario while the performance of partnership firms deteriorated.

With regard to the dummy for the type of service provided by the SMEs, real estate, education and construction are the only significant dummies. However, real estate had a negative coefficient, unlike education and construction. Hence education SMEs and construction SMEs have higher performance than firms in trade while those in real estate have lower performance than those in trade while the rest have the same performance as those in trade. That is, education and construction had a better performance than the reference group, which is trade, while real estate had a lesser performance than trade. Firms in all the other types of service (transport, medical, research and others) had no difference in performance in comparison with trade, as their coefficients are not significant. This is different from the outcome of the pre-pandemic model, where only education and construction were found to have better performance than trade. Hence, real estate firms observed deteriorating performance during the pandemic, firms in education also observed deteriorating performance as the coefficient of 1.37 is lower than in the pre-pandemic model (which was 1.548), firms in construction also deteriorated as the coefficient of 0.525 in the pandemic model was 0.93 in the pre-pandemic model. Moreover, trade, which is the reference group deteriorated in performance during the pandemic as intercept in the pandemic model is 6.488, which was 6.834 in the pre-pandemic model.

With respect to education, SME firms headed by those with degrees have better performance than the reference group firm, which is firms with heads under ‘no formal education’, as the coefficient of the dummy is positive (0.556) and significant. Beyond this, it is the coefficient of firms’ heads with primary education that is significant but the sign is negative. Hence, during the pandemic, firms with heads with primary level attainment perform less than their counterparts with ‘no formal education’, as the coefficient is negative (-0.558). All firms with other levels of education (diploma and secondary) have the same performance as firms in the reference group, ‘no formal education’.

In comparison with the pre-pandemic model estimated earlier, it is observed that in the pre-pandemic model, the coefficient of the degree dummy was positive (0.948) and higher than in the pandemic model (0.556). Thus, firms with degree heads observed a

decline in their performance relative to firms with no level of education. Moreover, for the primary school level, the pandemic model observed a higher negative value (-0.558) than in the pre-pandemic model (-0.512), suggesting a negative impact of the pandemic on firms' heads with this level of education. It is observed that while in this pandemic model firms with diploma heads and those heads with secondary school education do not statistically perform better than their counterparts with 'no formal education', the coefficients are however negative but in the pre-pandemic model, both groups of firms perform better than their counterparts with 'no formal education'. This implies that these firms observed deteriorating performance due to the pandemic.

Table 3.11 gives a summary of the joint test for the significance of all the dummies. The table shows that while the location of the SME (urban or rural), SME structure, type of service provided by the SME, and educational level of the SME head matter for the performance of SMEs in the Western Area of Sierra Leone during the COVID-19 pandemic, Gender, and overall professional training of SMEs do not matter for differences in performance of SMEs during the pandemic. This is unlike the pre-pandemic case when the gender of the SME head, SME structure, type of service provided by the SME, and educational level of the SME head matter for firm performance but the location of SME (urban or rural) and overall professional training of SME heads was not found to matter.

Table 3.11: Test of Significance of Regression Dummy Variables

Test for	F-Statistics	P-Value	Conclusion
Significance of Gender Dummy	F (1, 328) = 0.68	0.411	Gender does not matter for SMEs' performance.
Significance of Location Dummy	F (1, 328) = 8.55	0.004	SME location (urban or rural) matters for SME performance
Significance of Overall Professional Training Dummy	F (1, 328) = 2.41	0.122	Overall training of SME head does not matter for SME performance.
Significance of SME Structure Dummy	F (1, 328) = 6.93	0.001	SME structure matters for SME performance.
Significance of SME Service Type Dummies	F (7, 328) = 18.44	0.001	The type of service provided by SMEs matters for SME performance.
Significance of Education Dummies	F (4, 328) = 14.65	0.001	Educational attainment matters for SME performance.

b. The SME Recent Professional Training Model

Table 3.12 shows the results of the estimated COVID-19 pandemic model of SME performance with recent professional training as the professional training variable, using the Ordinary Least Squares (OLS). The result shows that labour and capital have positive effects on firm performance with labour and capital elasticities of output being 0.67 and 0.10 respectively. However, to the extent that the presence of heteroscedasticity in the residuals of the model leads to inaccurate estimates of the standard errors of the parameters, the OLS model of SME performance was tested for heteroscedasticity. The

Breusch-Pagan test for heteroscedasticity and the White test were applied for the heteroscedasticity test.

Also, as the OLS assumes non-normally distributed error terms for the application of the standard t-test of significance to be valid, a test for residual normality was done following the estimation of the model with OLS. The Shapiro-Wilk-Francia, Shapiro-Wilk, Jarque-Bera and skewness kurtosis tests were applied. Table 3.13 shows the results of the Breusch-Pagan and White tests for heteroscedasticity and the results of the tests for normality.

Table 3.12: COVID-19 Pandemic SME Performance Regression with Recent SME Training Using Ordinary Least Squares (OLS)

Variables	**OLS**
Ln(Capital_P)	0.0966***
	(0.0332)
Ln(Labour_P)	0.672***
	(0.0327)
Experience	2.04e-05
	(0.000508)
Ln(leverage)	0.0319
	(0.0354)
Ln(liquidity)	-0.0142
	(0.0338)
dummy_gender	-0.0673
	(0.0784)
dummy_urban	-0.282***
	(0.0812)
dummy_recent_training	0.0577
	(0.0830)
dummy_Private_limited	0.502***
	(0.135)
dummy_Parnership	0.271***
	(0.0880)
dummy_Real_Estate	-1.024**
	(0.474)
dummy_education	1.579***
	(0.362)
dummy_transport	0.0545
	(0.171)
dummy_construction	0.892***
	(0.214)
dummy_medical	0.0730
	(0.174)
dummy_research	-0.108
	(0.369)
dummy_others	0.301
	(0.312)
dummy_degree	0.593***

	(0.152)
dummy_diploma	-0.0663
	(0.141)
dummy_primary	-0.577***
	(0.184)
dummy_secondary	-0.0452
	(0.131)
Constant	6.753***
	(0.555)
Observations	350
R-squared	0.755
rmse	0.603
F-stat	48.23
R-Squared	0.755

Note: Standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 3.13: Residual Diagnostic Tests on the Pandemic Recent Training Performance Model

Diagnostic Test	**Test Type**	**P-Value**	**Conclusion**
Panel A: Test for Heteroscedasticity			
Heteroscedasticity in residuals	Breush-Pagan	0.005	The null hypothesis of homoscedasticity is not rejected at the 1 percent level and the 5 percent level.
	White	0.001	The null hypothesis of homoscedasticity is not rejected at the 1 percent level and the 5 percent level.
Panel B: Test for Normality			
Normality of residuals	Shapiro-Francia Wilk	0.024	The residuals are normality distributed.
Normality of residuals	Shapiro-Wilk	0.016	The residuals are normality distributed.
Normality of residuals	Skewness Kurtosis	0.724	The residuals are normality distributed.
Normality of residuals	Jarque-Beru	0.759	The residuals are normality distributed.

Given the results of the Breusch-Pagan test with a p-value of 0.005, there is heteroscedasticity at the 5 percent level as well as at the 1 percent level. The White test also indicates that there is heteroscedasticity at the 1 percent level (as well as the 5 percent level) with a p-value of 0.001. These results are in Panel A of Table 3.13. Thus, there is a need for correcting for heteroscedasticity in the residuals of the model using a different estimation method. In this regard, the robust standard error estimation was applied to adjust standard errors appropriately.

Panel B of Table 3.13 shows the residual normality test results. The test results show that across all the tests statistics used, the null hypothesis of normally distributed errors is not rejected as the p-values are higher than 5 percent.

As the model residuals are normally distributed but there is evidence of heteroscedastic residuals, we re-estimated the model using robust standard errors. Table 3.14 shows the result of the pandemic model using a recent training dummy for both the

robust standard error and the OLS estimates. The OLS estimate is presented here for comparison basis.

Table 3.14: COVID-19 Pandemic SME Performance Regression with Recent SME Training Correcting for Heteroscedasticity

	(1)	(2)
Variables	**OLS**	**Robust S.E**
LnCapital_P	0.0966***	0.0966***
	(0.0332)	(0.0317)
LnLabour_P	0.672***	0.672***
	(0.0327)	(0.0389)
q2_age_months	2.04e-05	2.04e-05
	(0.000508)	(0.000571)
Lnleverage	0.0319	0.0319
	(0.0354)	(0.0378)
Lnliquidity	-0.0142	-0.0142
	(0.0338)	(0.0357)
dummy_gender	-0.0673	-0.0673
	(0.0784)	(0.0733)
dummy_urban	-0.282***	-0.282***
	(0.0812)	(0.100)
dummy_recent_training	0.0577	0.0577
	(0.0830)	(0.109)
dummy_Private_limited	0.502***	0.502***
	(0.135)	(0.167)
dummy_Parnership	0.271***	0.271***
	(0.0880)	(0.0905)
dummy_Real_Estate	-1.024**	-1.024***
	(0.474)	(0.306)
dummy_education	1.579***	1.579***
	(0.362)	(0.182)
dummy_transport	0.0545	0.0545
	(0.171)	(0.204)
dummy_construction	0.892***	0.892***
	(0.214)	(0.173)
dummy_medical	0.0730	0.0730
	(0.174)	(0.187)
dummy_research	-0.108	-0.108
	(0.369)	(0.132)
dummy_others	0.301	0.301
	(0.312)	(0.232)
dummy_degree	0.593***	0.593***
	(0.152)	(0.189)
dummy_diploma	-0.0663	-0.0663
	(0.141)	(0.172)
dummy_primary	-0.577***	-0.577***
	(0.184)	(0.177)
dummy_secondary	-0.0452	-0.0452

	(0.131)	(0.160)
Constant	6.753***	6.753***
	(0.555)	(0.690)
Observations	350	350
R-squared	0.755	0.755
rmse	0.603	0.603
F-stat	48.23	
R-Squared	0.755	0.755

Note: Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

The result of the COVID-19 pandemic model of performance shows that capital and labour have positive effects on the performance of SMEs with the elasticity of labour of 0.672 and that for capital is 0.098. Both coefficients are significant. These coefficients are 0.64 and 0.20 in the pre-pandemic model with an overall training dummy. This result implies that the effect of capital on firm performance was lower during the pandemic than before the pandemic while the effect of labour on SME performance was higher during the pandemic than before the pandemic. This suggests that capital productivity declined during the pandemic while labour productivity increased during the pandemic.

Both leverage and liquidity are not significant in the pandemic model, though leverage was significant and negative in coefficient in the pre-pandemic model with a recent training dummy. In addition, the age of the SME is not significant in the pandemic model, as in the pre-pandemic model. Hence, in the Western Area of Sierra Leone, firm age does not explain firm performance.

In the pandemic SME performance model, the dummy variable capturing SME training experience, as measured by recent training is not significant though it has a positive effect on SME performance. Thus, as in the case of the overall training model of the pandemic regression, recent training is not significant in determining SME performance.

The dummy for gender is not significant in the pandemic model with recent training, as was the case in the overall training model of the pandemic era, though it was found to have a negative and significant coefficient in the pre-pandemic model. Thus, the gender of the SME head does not play a role in firm performance in the Western Area of Sierra Leone.

The urban dummy, which took one for SMEs located in Western Urban and zero for those in Western Rural, is not significant. Hence, in the pandemic model with the recent training dummy, the location of the firm (urban or rural) does not matter for SME performance.

The effect of firm structure on SME performance is found to be significant in the COVID-19 pandemic model with a recent training dummy for SMEs. The model shows that with reference to the reference group, which is sole proprietorship, both private limited SMEs and partnership firms have higher performance, given that the coefficients of these dummies are positive and significant. Moreover, private-limited-firm dummy has a coefficient of 0.502, which is higher than the coefficient for partnership, which is

0.271. Hence, during the pandemic, private-limited-SMEs have higher performance than partnership firms.

With regards to the dummy for the type of service provided by the SMEs, real estate, education and construction are the only significant dummies. However, real estate has a negative coefficient, unlike education and construction. Hence education SMEs and construction SMEs have higher performance than firms in trade while those in real estate have lower performance than those in trade while the rest have the same performance as those in trade. That is, education and construction have a better performance than the reference group, which is trade, while real estate had a lesser performance than trade. Firms in all the other types of service (transport, medical, research and others) have no difference in performance in comparison with trade, as their coefficients are not significant.

With respect to education, SME firms with degrees have better performance than the reference group firm, which is firms with heads under 'no formal education', as the coefficient of the dummy is positive (0.593) and significant. Beyond this, it is the coefficient of firms with primary education that is significant but the sign is negative. Hence, during the pandemic, firms with heads with primary level attainment perform less than their counterparts with 'no formal education', as the coefficient is negative (-0.577). All firms with other levels of education (diploma and secondary) have the same performance as firms in the reference group, 'no formal education'.

Table 3.15 gives a summary of the joint test for the significance of all the dummies. The table shows that while location of the SME (urban or rural), SME structure, type of service provided by the SME, and educational level of the SME matter for the performance of SMEs in the Western Area of Sierra Leone during the COVID-19 pandemic, Gender, and recent professional training of SMEs do not matter for differences in performance of SMEs during the pandemic. This is unlike the pre-pandemic case when the gender of the SME head, SME structure, type of service provided by the SME, and educational level of the SME matter for firm performance but both location of SME (urban or rural) and overall professional training of SME heads were not found to matter.

Table 3.15: Test of Significance of Regression Dummy Variables

Test for	F-Statistics	P-Value	Conclusion
Significance of Gender Dummy	F (1, 328) = 0.84	0.359	Gender does not matter for SMEs' performance.
Significance of Location Dummy	F (1, 328) =7.91	0.005	SME location (urban or rural) matters for SME performance.
Significance of Recent Professional Training Dummy	F (1, 328) =0.28	0.598	Recent training of SME head does not matter for SME performance.
Significance of SME Structure Dummy	F (1, 328) = 8.18	0.001	SME structure matters for SME performance.
Significance of SME Service Type Dummies	F (7, 328) =17.10	0.001	The type of service provided by SMEs matters for SME performance.
Significance of Education Dummies	F (4, 328) = 17.05	0.001	Educational attainment of SME head matters for SME performance.

4.5 Summary of Main Findings

Table 3.16 gives a summary of the main findings of the model estimates. The determinants of SME performance in the Western Area of Sierra Leone are capital, labour, leverage, company structure, the type of service offered by the SME and the level of education of the head of the firm. However, the gender of the SME head, liquidity and the receipt of overall professional training do not generally affect SMEs while recent professional normally makes a difference in performance in favour of those who receive it.

Comparing the pre-COVID-19 estimation with the COVID-19 estimation, generally, the coefficients of the dummies that are significant and positive in the pre-COVID-19 estimation were lower in the COVID-19 model. Thus, firm-specific characteristics that are good for SME performance could not insulate the SMEs during the COVID-19 pandemic.

The results of the estimation of the model of the performance of SMEs, show that whether overall training or recent training of the SME head is used as the professional training variable in the model, both capital and labour have positive and significant effects on firm performance. In addition, the elasticity of labour is more than three times the elasticity of capital in the pre-pandemic period and more than five times in the pandemic period. Essentially, while the elasticity of labour increased slightly by about 0.03 percentage points from the pre-pandemic to the pandemic period, that for capital declined by 0.1 percentage point, suggesting a decline in the impact of capital on performance and a marginal increase in the impact of labour during the pandemic. It is also found that in spite of which model type is used or estimated, the age of the firm does not matter in explaining its performance.

Table 3.16: Summary of SME Performance Regression Results

	Overall Training Model		**Recent Training Model**	
	Pre-COVID 19 Pandemic	**COVID 19 Pandemic**	**Pre-COVID 19 Pandemic**	**COVID 19 Pandemic**
Capital	0.204***	0.098**	0.203**	0.097***
Labour	0.638***	0.665***	0.637***	0.672***
Experience	-0.0005	0.00006	-0.0004	0.00002
Leverage	-0.066***	0.037	-0.0670***	0.032
Liquidity	-0.013	-0.005	-0.017	-0.014
Gender Dummy	-0.127**	-0.06	-0.119	-0.067
Urban Dummy	0.039	-0.283***	0.058	-0.282***
Training Dummy	0.123	0.144	0.161**	0.058
Private Limited Dummy	0.249**	0.466***	0.304***	0.502***
Partnership Dummy	0.345***	0.256***	0.333***	0.271***
Real Estate Dummy	0.198	-1.074***	0.119	-1.024***
Education Dummy	1.372***	1.548***	1.338***	1.579***
Transport Dummy	0.042	0.063	0.020	0.055
Construction Dummy	0.525***	0.930***	0.481***	0.892***
Medical Dummy	-0.004	0.037	0.001	0.073
Research Dummy	-0.263	-0.137	-0.202	-0.108
Other Activity Dummy	-0.002	0.285	0.005	0.301
Degree Dummy	0.948***	0.556***	0.943***	0.593***

Diploma Dummy	0.401***	-0.081	0.392***	-0.066
Primary Dummy	-0.512***	-0.0558***	-0.29***	-0.577***
Secondary Dummy	0.310***	-0.038	0.306***	-0.045
Constant	6.488***	6.834***	6.490***	6.753***

Note: *** means significant at 1 percent and ** means significant at 5 percent.

In addition, the short liquidity of a firm does not explain its performance, which is the case across all model versions estimated. However, its coefficient is negative, implying holding more liquidity detracts from SME investment potential, thus, reducing performance. Also, while leverage is found to have a negative effect on firm performance in the pre-pandemic model, it is not found to be significant during the pandemic. This is the case whether the professional training variable used is overall training or recent training. Hence, higher debt, which increases leverage reduced the performance of SMEs only in the pre-COVID era. Suggesting higher debt was not common in the COVID-era itself.

The gender of the firm head does not matter for SME performance during the pandemic. In the pre-pandemic, it is only when overall training is used that gender dummy is found to be significant, implying female-headed SMEs tend to have lesser performance than male-headed ones only when we control for overall training but when we control for recent training, the impact is insignificant. Suggesting further that in aggregate, male-headed firms have had more training than female-headed ones, which poses the need for more training for female-headed SMEs.

Location dummy is significant only during the pandemic, indicating that during the pandemic firms located in the urban area of the Western Area of Sierra Leone have lower performance than those in the rural area. However, before the pandemic, there were no differences in performance between those in urban and those in rural areas. Professional training of SMEs was found to be significant only before the pandemic and this is the case when it is measured as recent professional training. Hence, in the COVID-19 era, the positive effect recent training had on SME performance is not maintained.

Another observation is that the performance gaps between trade and education and between trade and construction widened during the COVID-19 pandemic as the coefficients on the education dummy and construction dummy are one in the pandemic regression than the pre-pandemic regressions. Hence education and construction sectors were more robust to the pandemic than the trade sub-sector of the economy.

With respect to the level of education, SMEs for which the heads have degrees have higher performance than those with no formal education and this is significant in all model versions. However, the performance gap declined during the pandemic, implying that in spite of the level of education, there was a drop in performance during the pandemic. For SMEs heads with diplomas, the performance gap was positive with respect to no formal education. However, this was the case only during the pre-pandemic period. During the pandemic, the performance of these SMEs was not different from those with no formal education. Hence, the pandemic could not make education make a difference in performance. The primary school dummy has a negative coefficient

implying SMEs with no formal education perform better than those with primary education. Moreover, while SME heads with secondary school education had better performance than those SMEs with no formal education, this was the case only before the pandemic. During the pandemic, there was no difference. Hence, secondary school education could also not isolate SMEs from the impact of the pandemic.

It is observed also that in all the model versions, during the pandemic or before the pandemic whether with an overall professional dummy or recent dummy, the following holds:

1) Private Limited Companies (SMEs) and partnership firms perform better than SMEs registered as sole proprietors. In addition, before the pandemic, partnership firms performed better than private limited companies while during the pandemic private limited companies performed better than partnership firms. Hence, private limited firms are more insolated against global pandemics than partnership firms.
2) The education dummy is found to be significant and has a coefficient higher than all other economic utility dummies, suggesting firms in education perform better than all others.
3) Construction dummy has a positive and significant effect on the performance of SMEs but the magnitude is lower than that of education. Hence, firms in construction perform better than all other firms except for those in education.
4) All the other economic activity dummies are not significant in all model versions, except the real estate dummy, which is significant but has a negative coefficient in the COVID-19 model estimates. This suggests that the real estate service sector was negatively impacted by the COVID-19 pandemic.

4.6 Robustness Check of Model Estimate

By way of a robustness check of the models estimated, we estimated the combined model where we considered the coefficients of the regressors to be the same in the pre-pandemic period (2018 and 2019) and the pandemic period (2020). However, as the data period is three years, we used the estimation with both firm homogeneity (OLS) and firm heterogeneity (random effect) and introduced a year dummy with the reference year being 2018. It is expected that if firms were generally negatively affected by the pandemic, the 2020 dummy will have a negative sign and will be significant and the 2019 dummy will be insignificant whatever its sign is.

Table 3.17 shows the model of firm performance for the surveyed firms. Model 1 of Table 3.17 is the OLS result where the overall training dummy is used, Model 2 is the random effects model where the overall training dummy is used, Model 3 is the OLS results with a recent training dummy and Model 4 is the random effect model where recent training dummy is used. Tests for poolability (OLS model) versus random effects were conducted for the overall training model and the recent training model. The test results, which are shown in Table 3.18, show that in both cases the random effect model is preferred to the pooled model. This is on the basis that the p-values for the null

hypothesis of the pooled model are very low (relative to 1 percent level) to wrong reject the null hypothesis. These p-values are 0.0001.

The results (Model 2 and Model 4) show that in both preferred models (random effect models) of the overall training model and the recent training model of SME performance, the 2020-year dummy has a negative coefficient and the coefficient is significant at the 1 percent level while the 2019 dummy also has a negative coefficient, it is not significant. This implies that SME firms observed lower performance in 2020, the year of the pandemic than the year 2018, the reference year. In addition, the negative sign and insignificance of the 2019 dummy implies that while firms generally had reduced performance in 2019 compared with 2018, the difference in performance with 2018 was not significant. As 2019 was also a non-pandemic year, like 2018, it can be attributed to the fact that both 2018 and 2019 were normal (non-COVID-19 pandemic) years in Sierra Leone.

The result shows that as observed in the model estimates, the elasticity of labour is more than that of capital and both are significant with capital and labour elasticities being 0.23 and 0.61 respectively. Both leverage and liquidity are not significant in the SME performance model. Male-headed SMEs perform less than female-headed SMEs. The reference group used in the model for variables with multiple categories as in the main model, which are trade for services/activity type, sole trader for SME structure, and no formal education for educational level of SME.

All the service type dummies are significant with positive coefficients, with the exception of real estate, transport, medical, research and other service/activity types. This is the case in the estimated models. Three education dummies are significant but while degree and diploma dummies have positive coefficients, primary school has a negative coefficient. A secondary dummy is not significant at the conventional 1 percent and 5 percent levels.

Table 3.17: The SME Performance Regression for 2018-2020

	(1)	(2)	(3)	(4)
Variables	**OLS**	**Random Effects**	**OLS**	**Random Effects**
Ln(Capital_P)	0.127***	0.229***	0.127***	0.229***
	(0.0192)	(0.0218)	(0.0192)	(0.0218)
Ln(Labour_P)	0.696***	0.612***	0.698***	0.612***
	(0.0183)	(0.0215)	(0.0183)	(0.0215)
Experience	-0.000454	-0.000194	-0.000392	-0.000133
	(0.000284)	(0.000428)	(0.000282)	(0.000425)
Ln(leverage)	0.0135	-0.0319	0.00839	-0.0336*
	(0.0203)	(0.0199)	(0.0204)	(0.0200)
Ln(liquidity)	0.00848	0.0110	0.000306	0.00773
	(0.0199)	(0.0192)	(0.0200)	(0.0192)
dummy_gender	-0.0920**	-0.131**	-0.0921**	-0.130**
	(0.0435)	(0.0626)	(0.0436)	(0.0628)
dummy_urban	-0.103**	-0.0908	-0.0921**	-0.0822
	(0.0449)	(0.0631)	(0.0459)	(0.0642)
dummy_Overall_training	0.113***	0.116*		

	(0.0436)	(0.0650)		
dummy_recent_training			0.0999**	0.109
			(0.0460)	(0.0675)
dummy_Private_limited	0.430***	0.278**	0.469***	0.320***
	(0.0765)	(0.114)	(0.0766)	(0.114)
dummy_Parnership	0.335***	0.277***	0.335***	0.272***
	(0.0483)	(0.0724)	(0.0485)	(0.0730)
dummy_Real_Estate	-0.265	-0.266	-0.284	-0.303
	(0.262)	(0.417)	(0.264)	(0.420)
dummy_education	1.419***	1.492***	1.414***	1.484***
	(0.203)	(0.327)	(0.204)	(0.328)
dummy_transport	0.0191	0.0523	0.00657	0.0382
	(0.0961)	(0.155)	(0.0963)	(0.155)
dummy_construction	0.733***	0.657***	0.696***	0.625***
	(0.111)	(0.163)	(0.112)	(0.164)
dummy_medical	-0.0473	0.0644	-0.0302	0.0791
	(0.0974)	(0.153)	(0.0969)	(0.152)
dummy_research	-0.234	-0.277	-0.195	-0.232
	(0.207)	(0.335)	(0.208)	(0.336)
dummy_others	0.0978	0.140	0.106	0.152
	(0.176)	(0.284)	(0.176)	(0.284)
dummy_degree	0.771***	0.821***	0.782***	0.830***
	(0.0872)	(0.125)	(0.0869)	(0.125)
dummy_diploma	0.195**	0.280**	0.195**	0.280**
	(0.0798)	(0.112)	(0.0800)	(0.112)
dummy_primary	-0.469***	-0.554***	-0.487***	-0.569***
	(0.105)	(0.159)	(0.105)	(0.160)
dummy_secondary	0.166**	0.202*	0.161**	0.197*
	(0.0751)	(0.106)	(0.0751)	(0.106)
2019.year	-0.0322	-0.0359	-0.0324	-0.0365
	(0.0437)	(0.0225)	(0.0437)	(0.0225)
2020.year	-0.0662	-0.0741***	-0.0670	-0.0754***
	(0.0446)	(0.0245)	(0.0446)	(0.0245)
Constant	5.985***	7.142***	5.973***	7.141***
	(0.310)	(0.371)	(0.310)	(0.371)
Observations	1,081	1,081	1,081	1,081
R-squared	0.770		0.769	
F-stat	153.8		153.4	
Prob>F	0		0	
Number of id		383		383
Wald		2806		2804
Prob>chi2		0		0

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.18: Breusch-Pagan Test Result for Pooled Model versus Random Effects Model is the common coefficient Model

		Variance	Chi-Square	P-Value
Overall Training Model	Ln of Dependent Variable	1.49	572.08	0.001
	Rho(ϱ)	0.08		
	Mu(ϱ)	0.26		
		Variance	**Chi-Square**	**P-Value**
Recent Training Model	Ln of Dependent Variable	1.47	574.18	0.001
	Rho(ϱ)	0.08		
	Mu(ϱ)	0.26		

Table 3.19 shows the joint test results for the significance of all dummies in the overall training model and Table 3.20 shows the joint test results for the significance of all dummies in the recent training model. Table 3.19 shows that while both location and overall professional training do not matter for SME performance, gender, structure, type of service and educational level of the SME head matter for performance of the SME. Table 3.20 shows that as in the overall training model, while both location and overall professional training do not matter for SME performance, gender, structure, type of service and educational level of the SME head matter for performance of the SME.

Table 3.19: Test of Significance of Regression Dummy Variables in the Overall Training Model

Test for Significance of the Dummies	Test Statistic	P-Value	Conclusion for Firm Performance Model
Significance of Gender Dummy	Chi2(1)=4.34	0.037	Gender matters for SME performance.
Significance of Location Dummy	Chi2(1)=2.07	0.150	SME location (urban or rural) does not matter for SME performance.
Significance of overall Professional Training Dummy	Chi2(1)=3.16	0.075	Overall professional training of SME heads does not matter for SME performance.
Significance of SME structure dummies	Chi2(2)=15.69	0.0001	Firm structure matters for SME performance.
Significance of SME Service Type	Chi2(7)=37.53	0.0001	The type of service provided by SMEs matters for performance.
Significance of Education Dummies	Chi2(4)=96.77	0.0001	Educational differences matter for firm performance.

Table 3.20: Test of Significance of Regression Dummy Variables in the Recent Training Model

Test for Significance of the Dummies	Test Statistic	P-Value	Conclusion for Firm Performance Model
Significance of Gender Dummy	Chi2(1)=4.27	0.039	Gender matters for SME performance.
Significance of Location Dummy	Chi2(1)=1.64	0.200	SME location (urban or rural) does not matter for SME performance.
Significance of Recent Professional Training Dummy	Chi2(1)=2.62	0.106	Recent professional training of SME head does not matter for SME performance.

Significance of SME structure dummies	Chi2(2)=16.35	0.0001	Firm structure matters for SME performance.
Significance of SME Service Type	Chi2(7)=334.87	0.0001	The type of service provided by SMEs matters for performance.
Significance of Education Dummies	Chi2(4)=103.26	0.0001	Educational differences matter for firm performance.

4.7 Synthesis of Objective with the Main Findings

4.7.1 Overall objectives of the study

The overall objective of the study was to investigate the factors that affect the performance of SMEs in the Western Area of Sierra Leone. In doing this investigation, three specific objectives were set. We present the main results obtained under each specific objective in this sub-section of the chapter.

4.7.2 Main Findings

Specific Objective i: to investigate the quantitative impact of COVID-19 on the productivities of capital and labour on SME performance in the Western Area of Sierra Leone.

The findings are:

- Capital productivity and labour productivity have positive effects on SME performance in the Western Area of Sierra Leone with the productivity of capital having an elasticity of 0.20 in the pre-COVID-19 pandemic and that of labour being 0.64 in the pre-COVID-19 pandemic.
- During the pandemic, the elasticity of capital productivity declined to 0.1 and that for labour increased to 0.67 from 0.20 and 0.64 respectively before the pandemic.

Specific Objective ii: to investigate the effect of COVID-19 on the firm specific determinants of SME performance in the Western Area of Sierra Leone.

The findings are:

- Leverage, which is the level of debt relative to own resources, has negative effect on firm performance in the pre-COVID-19 pandemic but it has no impact during the COVID-19 pandemic.
- Short term liquidity holdings of SMEs do not have impact on SMEs both in the pre-pandemic and the pandemic periods.
- Experience, measured by the age of the firm, has no impact on SME performance in both the pre-COVID-19 and the pandemic era.
- SMEs in the urban areas and those in the rural areas of Western Sierra Leone perform equally in the pre-COVID-19 era but during the COVID-19 era, those in rural areas perform better.
- SME structure matters for its performance. Specifically, before the COVID-19 pandemic, partnership firms perform better than Private Limited firms while both perform better than sole proprietorship firms. In the COVID-19 pandemic, private Limited SMEs perform better than partnership firms and both performed better than sole proprietorship firms.

- Before the COVID-19 pandemic, SMEs in construction perform better than trade firms, which was followed by firms in education. All other firms had the same performance as those in trade, which is the model reference group. These other firms are those in real estate, medical, transport, research and others. During the pandemic, real estate performs lesser than trade did while the divergence in the performance of those in construction and education compared to those in trade widened, with construction SMEs improving their performance gap as in the case of those in education. All the other sectors performed like trade.

Specific Objective iii: to investigate the impact of COVID-19 on the demographic characteristics of SME managers on their performance of SMEs in the Western Area of Sierra Leone.

The findings are:

- Female headed SMEs performed lesser than male headed SMEs before the pandemic, implying gender of head of SME matters for SME performance. But during the pandemic, the gap in performance was not significant. Thus, gender difference does not matter during the pandemic.
- Professional training of SME head without distinguishing recent or old did not matter for SME performance both before and during the pandemic. However, recent training had positive significant influence on SME performance before the pandemic but no significant effect during the pandemic. Thus, during the pandemic, recent training could not insulate SMEs that had received it.
- Educational status of SME heads matters for robust SME performance but its impact is stronger during the pre-pandemic era than the pandemic era. Before the pandemic, firms whose managers have degrees were the best performers, which was also the case in the pandemic era. However, for firms with diploma, while they are the next best performers, this was the case only in the pre-COVID-19 period. In the COVID-19 period, their performance was not different from those whose heads had no formal education. The same holds for firms headed by secondary school leavers, which is the next best performing category after those with diplomas. Firms with primary school leaver heads are however found to perform lesser than those with no formal education.

5. Conclusion and Recommendation

5.1 Conclusion

SMEs are critical in national economies around the world, generating employment and value addition and also contributing to innovation and development. Nonetheless, these contributions vary widely across firms, sectors and countries. They are key players in any economy and the wider ecosystem of firms. Enabling them to adapt and thrive in a more open environment and participate more actively in digital transformation is essential for boosting economic performance and delivering a more inclusive globalisation. Across countries and at all levels of development, SMEs have an important role to play in

achieving the Sustainable Development Goals (SDGs), by promoting inclusive and sustainable economic performance fostering innovation, and reducing income inequalities.

Countries all over the world including Sierra Leone are increasingly setting up business development and support institutions to address the management and environmental capability challenges experienced by SMEs. This rests on the recognition of the role of SMEs in growth and development. Differences in the performance of SMEs are theoretically among others, driven by their specific firm characteristics, firm head demographic features and differences in capital and labour sizes, as well as their degree of leverage and liquidity. As the Western Area of Sierra Leone accounts for the major part of economic activities in Sierra Leone, the overall objective of this chapter was to investigate the factors that affect the performance of SMEs in the Western Area of Sierra Leone. The specific objectives were to investigate in the Western Area of Sierra Leone, (i) the quantitative impact of the productivity of capital and the productivity of labour on SME performance (ii) the firm-specific determinants of the performance of SMEs and (iii) the impact of demographic characteristics of SME managers on the performance of SMEs.

As the global economy experiences the COVID-19 pandemic and all countries are affected in diverse ways, we investigated the performance determinants of SMEs by clearly considering two regimes, which are the pre-COVID-19 pandemic regime and the COVID-19 regime, an investigation that does not show up in previous studies. In addition, while professional training is acknowledged to contribute to SME performance, where it is recent and where it is not recent, the impact may be different as a more recent one tends to cover the role of innovation to have high market power. Hence the effect of professional training by SME managers was investigated from both the role of recent training and the role of training in general, a treatment that we have not observed in the literature.

Survey data of SME firms were obtained using random sampling of registered SME firms in the Western Area with data recorded for the period 2018, 2019 and 2020. The periods 2018 and 2019 were treated as the pre-COVID-19 periods and that for 2020 was taken as the COVID-19 period. A model of SME earnings was estimated using random effects specification for panel data for the 2018 and 2019 data for the selected firms and a cross- section regression approach using OLS with robust standard errors to correct for heteroscedasticity was used for the COVID-19 model.

The results reveal the following:

- Capital productivity and labour productivity have positive effects on SME performance in the Western Area of Sierra Leone with the productivity of capital having an elasticity of 0.20 in the pre-COVID-19 pandemic and that of labour being 0.64 in the pre-COVID-19 pandemic. In addition, during the pandemic, the elasticity of capital productivity declined to 0.1 and that for labour increased to 0.67 from 0.20 and 0.64 respectively before the pandemic.
- Leverage, which is the level of debt relative to own resources, has a negative effect on firm performance in the pre-COVID-19 pandemic but it has no impact during

the COVID-19 pandemic; Short term liquidity holdings of SMEs do not have an impact on SMEs both in the pre-pandemic and the pandemic periods; Experience, measured by the age of the firm, has no impact on SME performance in both the pre-COVID-19 and the pandemic era; SMEs in the urban areas and those in the rural areas of Western Sierra Leone perform equally in the pre-COVID-19 era but during the COVID-19 era, those in rural areas perform better; SME structure matters for its performance. Specifically, before the COVID-19 pandemic, partnership firms performed better than Private Limited firms while both performed better than sole proprietorship firms. During the COVID-19 pandemic, private Limited SMEs performed better than partnership firms and both performed better than sole proprietorship firms; before the COVID-19 pandemic, SMEs in construction performed better than trade firms, which was followed by firms in education and all other firms (real estate, medical, transport, research and others) had the same performance as those in trade, which is the model reference group. In addition, during the pandemic, real estate performed less than trade did while the divergence in the performance of those in construction and education compared to those in trade widened, with construction SMEs improving their performance gap as in the case of those in education. All the other sectors performed like trade.

- Female-headed SMEs performed less than male-headed SMEs before the pandemic, implying gender of the head of an SME matters for SME performance. However, during the pandemic, the performance gap was not significant. Thus, gender difference did not matter during the pandemic; professional training of SME heads without distinguishing recent or old did not matter for SME performance both before and during the pandemic but recent training had a positive significant influence on SME performance before the pandemic but no significant effect during the pandemic, suggesting that during the pandemic, recent training could not insulate SMEs that had received it.
- Educational status of SME heads matters for robust SME performance but its impact is stronger during the pre-pandemic than the pandemic era. Before the pandemic, firms whose managers have degrees were the best performers, which was also the case in the pandemic era. However, for firms with diplomas, while they are the next best performers, this was the case only in the pre-COVID-19 period. In the COVID-19 period, their performance was not different from those whose heads had no formal education. The same holds for firms headed by secondary school leavers, which is the next best-performing category after those with diplomas. Firms with primary school leaver heads are however found to perform less than those with no formal education.

5.2 Recommendations

Based on the findings of the study, a number of recommendations that can make SMEs thrive in the Western Area of Sierra Leone are presented here. These recommendations are given in what follows with a direct discussion of the findings each is linked to.

- Both the productivity of capital and the productivity of labour have positive effects on the performance (net earnings) of SMEs in the Western Area of Sierra Leone with the impact of the productivity of labour being more than three times that of capital. Thus, SMEs in the Western Area of Sierra Leone should generally invest more in building capital productivity than labour productivity. Government and donor support should also focus on this direction. This requires more spending on building the business environment and infrastructure including energy.
- The impact of capital productivity on the performance of SMEs declined by 100percent (from 0.2 to 0.1) compared to the pre-pandemic period while that of labour increased only by 4.5percent (from 0.64 in the pre-pandemic period to 0.67during the pandemic). In this regard, it is useful for all international and national medical and research efforts to end the COVID-19 pandemic to be boosted in order to bring the pandemic to an end so SMEs' efforts in building capital productivity can have a strong desired effect.
- While external capital is important to driving SME growth, SME leverage which is its debt relative to its total assets, it is important that SMEs take a good balance in what debt level is useful for their businesses. This is because leverage is found to have a negative effect on SMEs' performance, which is the case under high leverage.
- SMEs that are Private Limited Companies and those that are partnership firms have higher performance than sole proprietorship SMEs. This is the case before and during the pandemic. SMEs put efforts to shift away from sole proprietorship firms, though sole proprietors have their own theoretical reasons to operate it.
- Construction and education firms perform better than all others before the pandemic. It is therefore useful for SMEs that have the capital to operate construction companies and education companies (for example schools). Otherwise, SME investors should be indifferent when it comes to deciding which sectors, real estate, medical, transport, research and others to invest in. However, real estate firms performed less than all firms during the pandemic while construction and education firms improved their performance gap relative to trade and others. In this regard, government and other stakeholder support during the pandemic should focus weight on real estate firms and have less weight on construction and education firms, where the idea is to reduce vulnerability and increase equity.
- It was found out that during the pandemic, gender difference does not matter for firm performance while before the pandemic, female-headed SMEs performed less than male-headed SMEs. In this regard, during the pandemic, government support and other stakeholders' support to SMEs should target men and women

equally but following recovery, female-headed SMEs need more support to reduce the inequality in a non-pandemic environment.

- As differences in education matter for differences in performance, with a bias for the more educated SME heads, support to SMEs should first target those SMEs whose heads have lower levels of education. In addition, SME heads should be encouraged to have further education and learning institutions should have favourable fees for individuals with evidence of operating SMEs.
- It was found that recent training but not just training, matters for SME performance difference before the pandemic but during the pandemic neither recent nor old training matters. In this regard, during Sierra Leone's recovery period of the post-pandemic period, efforts at empowering SME heads with professional SME training will be imperative. However, during the pandemic, this effort does not create a performance difference.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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References

Akoten, J.E., Yasuyuki, S., and Keijiro, O. (2006). The Determinants of Credit Access and Its Impacts on Micro and Small Enterprises: The Case of Garment Producers in Kenya. Economic Development and Cultural Change. *Chicago Journals*, Vol. 54, No. 4 (July 2006).

Atlanta Consult and Development Associated Ltd. (1991). The ATLANTA Small-Scale Industries Survey Germany 1991 Policy Frame Work Paper (PFP) – Sierra Leone, (July) 1990.

Bosman, N., Praag, M.V., Thurik, R. and De Wit, G. (2004). The Value of Social and Capital Investments for Business Performance Startups. *Journal of Small Business Economics*. Vol 23.

Baum, J.R., Locke, E.A., and Smith, K.G.A (2001). Multidimensional Model of Venture Growth, *Academy of Management Journal*, 44(2).

Carter, S., and Jones-Evans. D. (2000). *Enterprise and Small Business: Principles, Practice and Policy*. Harlow: FT Prentice Hall.

Cassia, L. and Maniola, T. (2012). Hyper-Growth of SMEs: Toward a Reconciliation of Entrepreneurial Orientation and Strategic Resources. *International Journal of Entrepreneurial Behaviour and Research Vol. 18 No. 2, 2012 pp. 179-197*

CBS, ICEG, and K-Rep (1999). National Micro and Small Firms report. Kenya.

Chatterji, M., Seaman, P. T, and Singell J.R. (2003). A test of the signaling hypothesis. *Oxford Economic Papers*, 55.

Chiliya, N. (2012). Impact of Level of Education and Experience on Profitability of Small Grocery Shops in South Africa. *Int.J.Buss.Mgt.Eco.Res.,* Vol 3(1).

Chuta, E; Liedholm C; Roberts, O. and Tommy, J. (1981). *Employment Growth and Changes in "Sierra Leone and Small-Scale Industry"*. Njala University College, in collaboration with Michigan State University, USA

Cosh, A., Hughes, A. and Weeks, M. (2000). *The Relationship between Training and Employment Growth in Small and Medium-Sized Enterprises*. Working Paper 188. Cambridge University, Centre for Business Research, Cambridge.

Davidson, P. and Henrekson, M. (2002). Determinants of the Prevalence of Start-ups and High-Growth Firms: Small Business Economics, 19 https://doi.org/10.1023/A:1016264116508

Delmar, F., Davidson and Garner, W. (2003). Arriving at the High Growth Firm, *Journal of Business Venturing*, 18. https://doi.org/10.1016/S0883-9026(02)00080-0

Deloof, M. (2003). Does working capital management affect the profitability of Belgian firms? *Journal of Business Finance and Accounting*. https://doi.org/10.1111/1468-5957.00008

Demsetz, H. (1973). Industry Structure, Market Rivalry and Public Policy. *Journal of Law and Economics*. Vol 16, Number 1

Djankov Simeon, Rafael La Porta, Florencio Lopezde- Silanes and Andrei Shleiler (2000). *The regulation of entry*, Harvard Institute of Economic Research.

Foreman-Peck, J., Makepeace. G. and Morgan, B. (2006). Growth and profitability of small and medium-sized enterprises; Some Welsh evidence. *Regional Studies, 40*(4).

Garoma, B. F. (2012). Determinants of microenterprise success in the urban informal sector of Addis Ababa: a multidimensional analysis. Retrieved from https://repub.eur.nl/pub/37927/BelayAbstractEng.pdf

Glancey, K. (2008). Determinants of growth and profitability in small entrepreneurial firms. *International Journal of Entrepreneurial Behaviour and Research*, Vol. 4 No. 1.

Goddard, J., Tavakoli, M. and Wilson, J. (2005). Determinants of profitability in European manufacturing and services: evidence from a dynamic panel model. *Applied Financial Economics, 15*(18).

Hagen, K.P. and Sannarnes, J.G. (2007). Network ownership and Optimal Tariffs of Natural Gas Transport. *Accessing Pricing: Theory and Practice* 4(8)

Hallberg, K. (2000). *A Market-Oriented Strategy for Small and Medium Enterprises*. In IFC Discussion Paper no. 40, The World Bank: Washington DC.

Joshi, P.K. and Rao, P. (2017). *Global Pulse Report. Global Pulses Scenario: Status and Outlook*. Annals of the New York Academy of Sciences

Jovanovic, B. (1083). Selection and th Evolution pf industry. The theory and evidence on the growth and survival of firms. *Econometrica* Vol.50, No.3.

Kalleberg, L. and Leicht, K. (1991). Gender and Organizational Performance: Determinants of Small Business Survival and Success. *Academy of Management Journal*, 34.

Kanu, S. and Conteh B.K. (2017). Small and Medium Scale Enterprises (SMEs) as Agent of National Development in Sierra Leone. *International Journal of Science and Research (IJSR)* Volume 6 Issue 3.

Kapunda, S.M., Magembe B.A.S. and Shunda, J. (2007). SME Finance, Development and Trade in Botswana: A Gender Perspective. *Business Management Review*, Vol 11(1).

Keith Glancey (1998). "Determinants of Growth and Profitability in Small Entrepreneurial Firms", *Journal of Entrepreneurial Behaviour and Research, 4*(1).

Kira, A.R. and He, Z. (2012). The Impact of Firm Characteristics in Access of Financing by Small and Medium-sized Enterprises in Tanzania. *International Journal of Business and Management*; Vol. 7, No. 24.

Lee, J. Williams, P. Domeisen, N. (2007). New Trade and Investment Agency in Sierra Leone. *International Trade Forum Geneva, Iss.2* : 33. Retrieved from https://www.proquest.com/openview/c08e7ca61922dbf1c56e55e991fdfebc/1?pq-origsite=gscholar&cbl=47429

Leung. S.F. and Yu, S. (1996). Collinearity and Two-Step Estimation of Sample Selection Models: Problems, Origins and Remedies. RCER Working Papers, 419, University of Rochester.

Mateev, M., and Anastasov, Y. (2010). Determinants of Small and Medium Sized Fast-Growing Enterprises in Central and Eastern Europe: A Panel Data Analysis. *Financial Theory and Practice, 34*(3).

Mead D. C., and Liedholm C. (1998). The Dynamics of Micro and Small Enterprises in Developing Countries. *World Development Paper*, Vol. 26, No. 1.

Nickell,S. and Nicolitsas, D. (1999). How does financial pressure affect firms? *European Economic Review*. Volume 43, Issue 8.

Okurut, F.N., Yinusa D.O. and Mangadi K. (2011), Credit rationing and SME development in Botswana: Implications for economic diversification. *Botswana Journal of Economics*. Vol. 8 No.12

Olutunla, G.T and Obamuyi, T.M. (2008). An empirical analysis of factors associated with the profitability of Small and medium - enterprises in Nigeria. *African Journal of Business Management*, Vol. 2 (x).

Pasanen, M. (2021). SME Growth Strategies: Organic or Non-Organic? *Journal of Enterprising Culture* Vol. 15, No. 04. 2007

Pearce, R. and Bah, A. (2023). Performance determinants of Small and Medium Enterprises in the Western Area of Sierra Leone, *International Journal of Scientific Development and Research* Vol. 8, No. 11. 2023.

Rafiki, A. (2019) Determinants of SME growth: an empirical study in Saudi Arabia. *International Journal of Organizational Analysis,* September.

Robson, P.J.A., Haugh, M., and Obeng, B. (2008). Entrepreneurship and Innovation in Ghana: Enterprising Africa. *Small Business Economics, 32* (3).

Salman, A.K., and Yazdanfar, D. (2012). Profitability in Swedish Micro Firms: A Quantile Regression Approach. *International Business Research,* Vol. 5, No. 8.

Sandy, D.S. (2003). Small and Medium Scale Enterprises Development. A Strategy for Poverty Alleviation in Sierra Leone. Berichte aus der Volkswirtschaft D 46 (Diss. Universitat Bremen) Shaker Verlag Aachen 2003.

Sarwoko, E. (2013) Determining Factors of Entrepreneurial Competency. *Journal of Economics, Business and Accountancy 19* (2), 219-226

Sarwoko, E. and Frisdiantara, C., (2016). Growth Determinants of Small Medium Enterprises (SMEs). *Universal Journal of Management* 4(1).

Storey, D.J. (1994). *Understanding the Small Business Sector*. London: International Thomson Business Press

Tefera, H., Gebremichael, A. and Abera, N (2013). Growth Determinants of Micro and Small Enterprises: Evidence from Northern Ethiopia. *Journal of Economics and Sustainable Development.* Vol.4, No.9.

Temtime, Z.T., and Pansiri, J. (2004). Small Business Critical Success/ Failure Factors in Developing Economies: Some Evidence from Botswana. *American Journal of Applied Sciences*, 1(1): 18-25.

Wang, Y (2016). What are the biggest obstacles to growth of SMEs in developing countries? An empirical evidence from an enterprise survey. *Borsa Istanbul Review*. Volume 16, Issue 3, September 2016.

Wiboonchutikula, P. (2002). Small and medium enterprises in Thailand: recent trends. *Small Business Economics, 18* (1-3).

Woldie, A., Leighton, P., and Adesua, A. (2008), Factors influencing small and medium enterprises (SMEs): an exploratory study of owner/manager and firm characteristics. *Banks and Bank Systems*, Volume 3, Issue 3.

World Bank (2020). *Sierra Leone: $40 million to support SME Investments and Economic diversification*, Washington, DC: World Bank.

Wren, C.M., and Storey, D.J. (2002). Evaluating the Effect of Soft Business Support upon Small Firm's Performance. *Oxford Economic Papers*, Vol. 54.

Yeboah, M. A. (2015). Determinants of SME Growth: An Empirical Perspective of SMEs in the Cape Coast Metropolis, Ghana. *The Journal of Business in Developing Nations*, *14*, 1-31.