



Effect of Supply chain management practices on operational performance of Obuasi Goldfields during the Covid 19 Era

Esther Ntummy Lartey*

Department of Operations Management and Information Systems
Wisconsin International University College
Ghana
esther.bekoe@wiuc-ghana.edu.gh

Charles Edem Gidi

EGAS Capital Ltd
Ghana
cgidi@egascapitaltd.com

Mavis Offeibea

Department of Operations Management and Information Systems
Wisconsin International University College
Ghana
ofeibeaasamoah@yahoo.com

***Corresponding author**

Abstract:

The study investigated the impact of supply chain management practices on the operational performance of Obuasi Goldfields during the COVID-19 pandemic era. A descriptive cross-sectional survey was adopted for the study. A total of 108 staff were randomly selected from the total staff Obuasi Goldfields representing: Senior Managers, Managers, and Assistant Managers. The study purposively sampled staff who were present at the time of the COVID-19 pandemic. A questionnaire was used for collecting data for the study. The results of the study revealed that information sharing level was the most practice, followed by strategic supplier, and customer relationship in terms of supply chain management practices in Obuasi Goldfields during covid-19 era. The study further discovered that supply chain management practices had an impact on operational performance at Obuasi Goldfields during covid-19 era. Based on the results it was concluded that information sharing level, strategic supplier partnership, and customer relationship were practiced as supply management practices at Obuasi Goldfields during Covid-19 era.

Keywords:

Management Practices; Operational Performance; Supply Chain; Covid-19 Pandemic and Optimal Performance.

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1. Introduction

The emergence of the Coronavirus Disease (COVID-19 pandemic) in Wuhan, China, and its subsequent spread globally caused widespread panic across all spheres of human life (Aksoy & Koçak, 2020). This unprecedented event highlighted the unpreparedness of the modernized world, with its sophisticated systems, for any pandemic. The rapid spread of the highly infectious and deadly virus led to numerous governmental decisions aimed at curbing its spread. Almost every country imposed temporary restrictions on movement within its territorial boundaries, and some even implemented travel bans during peak periods in 2020. Gałaś et al. (2021) posited that the COVID-19 pandemic wreaked havoc on the world's political, economic, financial, and social structures. Over the past year, the pandemic's effects have been far-reaching; it has hampered communication, trade, and access to a wide range of goods, and it has nearly halted tourism and services (Gałaś et al., 2021). Furthermore, it has reduced product demand and sales, and halted many economic activities, including mining, which is the subject of our research.

The supply chain management practices of numerous firms have been greatly disrupted due to the pandemic (Meyer et al., 2021). Many firms have had to adapt to the new situation, facing changes that will likely persist long after the pandemic has passed. Since the inception of the pandemic in 2020, the supply chain management of many firms has been significantly impacted (Meyer et al., 2021). Mentzer et al. (2001) defined a supply chain as a “set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer.” Singh and Verma (2017) described a supply chain as a web of businesses, people, activities, information, and resources connecting the point of origin of a product or service to the final customer. Essential activities of a firm, such as inventory planning and purchasing, are encompassed within supply chain management, necessitating efficient procedures to achieve objectives. Effective supply chain procedures enable a company to cut costs, ensure quality, and manage risks within its supply chain (Ogunyemi et al., 2016). Essentially, supply chain management ensures that a firm plans, sources, makes, delivers, and returns products.

Organizational performance, defined as the actual output or outcomes of an institution compared to its intended outputs or goals (Upadhaya et al., 2014), can be measured through cost reduction, quality of goods/services, productivity, and lead time (Mchopa et al., 2014; Richard et al., 2009). Hamon (2003) emphasized that performance measurement is critical for effective management and that identifying and measuring the influence of supply chain management (SCM) on performance enhances organizational outcomes. However, performance does not receive sufficient attention in supply chain management research. Organizational performance indicators include financial targets and labor force satisfaction. Additionally, Ho (2008) observed that organizational performance could be estimated based on institutional effectiveness and efficiency.

Wincewicz-Bosy et al. (2021) noted that mining involves extracting raw materials from the Earth's crust and entails a full life cycle from exploration to production to closure, with provisions for potential post-mining land use. These activities indicate multiple players within the supply chain system in the mining sector. This study aims to examine the major supply chain practices within the mining sector in Ghana since the COVID-19 pandemic. Despite improved information and communication systems and technologies providing more opportunities for coordinating supply chain activities across the mining sector, bottlenecks remain within the Ghanaian mining sector's supply chain management system (Wincewicz-Bosy et al., 2021).

Scholars have identified effective supply chain management practices during the COVID-19 era (Raj et al., 2022; Butt, 2021; Heidary, 2022). However, these studies were conducted in other sectors, not in mining. Additionally, researchers have found relationships between supply chain management practices and operational performance (Siagian & Johono, 2022; Afrifa et al., 2021; Pono & Munizu, 2021). These studies primarily focus on the effectiveness of supply chain management practices on operational performance during the post-COVID-19 era.



Therefore, the current study addresses the impact of supply chain management practices on operational performance during the COVID-19 era, specifically focusing on the following objectives:

1. Assess the supply chain management practices at Obuasi Goldfields during the COVID-19 era.
2. Evaluate the impact of supply chain management practices on the operational performance of Obuasi Goldfields during the COVID-19 era.

2. Literature Review

2.1 Supply Chain Management and the COVID 19 Pandemic

The COVID-19 pandemic began in Wuhan, China, on December 31, 2019. As of August 17, 2020, there were approximately 22.1 million documented cases worldwide. The pandemic's emergence in China, one of the world's main manufacturing and distribution centres, significantly impacted the supply of finished and semi-finished products to nations reliant on China for trade. The COVID-19 pandemic has underscored the fragility of global supply networks due to raw material shortages, disruptions in manufacturing and transportation, and the effects of social distancing (Paul et al., 2021). The network of enterprises involved in transactions of intermediate products and services was severely disrupted as supply and demand for goods and services plummeted due to 'lockdown' policies that restricted on-site labour and consumer purchasing activities. Paul et al. (2021) noted that "the interruptions in the supply chain were mostly the result of lockdown measures developed and implemented by various governments throughout the world as a health plan to reduce the impact of the pandemic's spread on the human population." These lockdown measures led to border closures, production halts, restrictions on the movement of people and goods, and logistical challenges. This had a significant impact on the success and overall performance of many supply chain management businesses.

Raj et al. (2022) examined how the COVID-19 pandemic affected global supply chains at an unprecedented speed and scale. Their results suggest that the inconsistency of supply (PIS) is the challenge that correlates most strongly with other factors. Butt (2021) explored the countermeasures taken by buying and distributing firms to address supply chain disruptions caused by COVID-19. The findings reveal that buying firms are adopting agile production methods, focusing on tier-1 supplier risk, enhancing inbound material visibility, and temporarily closing production facilities to respond to the challenges posed by the pandemic. Furthermore, distribution centres are modifying their inventory policies, evaluating alternative outbound routes, and sourcing supplies to manage disruptions in their business operations amid the COVID-19 outbreak. Heidary (2022) examined the effect of the COVID-19 pandemic on global supply chain operations using a system dynamics approach. The results showed that global supply chains need more effective strategies to cope with global disruptions, with improving the flexibility of production capacity being one of the key strategies that global supply chain managers should pursue.

2.2 Operational Performance

Operational performance is defined as the achievement of a company's operations in terms of quality and productivity (Kafetzopoulos & Psomas, 2015). It encompasses the company's operational concepts, management practices, and the strengths and weaknesses of its activities (Tseng & Liao, 2015). Essentially, operational performance measures the output and productivity of a process (Hussein Zolait et al., 2010). This measurement aims to determine whether a process is effective or needs improvement to maximize profit (Saunila et al., 2014).



Achieving superior operational performance is a gradual process. It is indirectly related to the financial performance of an organization (Zhang & Xia, 2013; Radnor & Barnes, 2007). Operational performance is assessed across four dimensions: quality, cost, delivery, and flexibility (Nabass & Abdallah, 2018; Chavez et al., 2013). The main objective of operations is to reduce costs and enhance efficiency in day-to-day activities. Operational performance also indicates how efficiently an organization can convert large amounts of raw materials into innovative and high-quality finished goods on time, with minimal waste (Prajogo et al., 2012; Green et al., 2011; Zhu et al., 2008).

Previous studies have mentioned that quality management programs and just-in-time processes act as moderators that influence the supply chain, subsequently impacting operational performance (Baird et al., 2011; Kannan & Tan, 2005). Other studies have highlighted the importance of operational performance in various aspects. For instance, Prajogo et al. (2014) emphasized the role of green products in achieving operational performance. Additionally, reducing defects and energy/waste (Petkova & Dam, 2014; Blome et al., 2014) and increasing productivity positively affect operational performance (Huq et al., 2014).

2.3 Supply Chain Management and Operational Performance

Supply chain management positively influences performance outcomes (Hussein Zolait et al., 2010). Effective supply chain integration regulates the efficient flow of goods by minimizing the time interval between customer demand and delivery. Supply chains where partners share relevant and accurate information are more effective than those lacking these characteristics (Siagian et al., 2021; Tseng & Liao, 2015; Vafaei-Zadeh et al., 2020). The ability to respond to changing customer needs and competitor actions is crucial (Fayezi & Zomorodi, 2015). Organizations that effectively manage their supply chains can compete more effectively and increase their competitive advantage (Kim & Cavusgil, 2009). Collaboration with supply chain partners allows companies to respond rapidly to market changes, enhancing operational profits (Yu et al., 2019). Optimizing the use of internal resources through effective supply chain management helps maintain competitiveness and improve operational performance (Siagian et al., 2021).

Siagian and Johono (2022) investigated the influence of supply chain integration on operational performance through supply chain responsiveness and innovation capability during the COVID-19 era. They found that supply chain responsiveness and innovation capability positively affect operational performance. Afrifa, Amoah, Fianko, and Dzogbewu (2021) also examined the impact of supply chain management on operational performance in health institutions. Their results showed a direct positive relationship between internal integration and operational performance, as well as between supplier integration and operational performance. Pono and Munizu (2021) aimed to examine the role of supply chain practices on operational performance and company competitiveness. Their study reported that supply chain practices positively impact operational performance. Additionally, supply chain practices also positively impact operational performance indirectly through the role of company competitiveness as a mediating variable.

3. Research Methodology

This study adopted a descriptive survey design to collect data from a sample selected from a larger population, describing the situation as it was at the time of the study. A cross-sectional survey of Obuasi Goldfields in the Obuasi Municipality, Ghana, was conducted to establish the relationship between supply chain management practices and their effect on operational performance.

Burns and Grove (2003) define sampling as the process of selecting a group of people, events, or behaviors with which to conduct a study. A total of 108 staff members were randomly selected from Obuasi Goldfields, including



senior managers, managers, and assistant managers. The study purposively sampled staff who were present during the COVID-19 pandemic.

An adapted questionnaire was used for data collection. The Supply Chain Management Scale (SCMS) and Operational Performance Scales (OPS) were adapted from Nawaz (2019). The SCMS ($\alpha = 0.73$) comprised three dimensions: strategic supplier partnership, customer relationship, and information sharing, with reliabilities of 0.73, 0.71, and 0.76, respectively. The SCMS is a five-point Likert scale ranging from strongly agree to strongly disagree. The operational performance scale ($\alpha = 0.83$) was also a five-point Likert scale ranging from strongly agree to strongly disagree.

Data on the demographic characteristics of respondents were analyzed using frequencies and percentages. Data for the first research objective were analyzed using means and standard deviations. Data for the second research objective were analyzed using SEM path analysis with 1000 bootstrap samples. The data were processed and analyzed using SPSS version 25 and JAMOVI software version 23.

4. Analysis of results

4.1 Demographic Characteristics of Respondents

The results in Table 1 showed that a total of 108 managers of different ranks participated in the study, which was conducted at Goldfields Mining Company. In terms of gender majority ($n = 67, 62\%$) were males. The position of participants in the company includes Senior Managers, Managers, and Assistant managers involved in procurement and supply chain management in the institution. Majority of participants were managers ($n = 41, 38.0\%$). In terms of years of service, the highest proportion of participants had worked in the organization for a period ranging from “3 – 6 years”. Details are presented in Table 1.

Table 1 – Demographic Characteristics of Respondents

Variable	Sub-scale	Frequencies	Percentage%
Gender	Male	67	62.0
	Female	41	38.0
Job-Title	Senior Managers	31	28.7
	Managers	41	38.0
	Assistant Managers	36	33.4
Years In Service	Under 2 years	1	9.0
	3 – 6 years	43	39.8
	7 – 10 years	37	34.3
	Above 10 years	27	25.0

Source: Field Survey (2024)

4.2 Supply Chain Management Practices at Obuasi Goldfields During The Covid-19 Era

This research objective aimed to assess the supply chain management practices in Obuasi Goldfields during the COVID-19 era. Respondents were required to express the extent they agree or disagree with supply chain management practices on a 5-point Likert scale. For the purpose of the analysis, the mean scores of all items under each dimension were summed up and divided by the number of items under each dimension to get the

mean of means. The overall mean of means was calculated by adding the mean scores of all items together and then dividing the sum by the total number of items. The mean score of the responses was compared with the average mean of 3.0 (thus $[1+2+3+4+5]/5 = 3.0$). A mean score less than 3.0 indicates that respondents agreed with the statement, whereas a mean score of more than 3.0 indicates that respondents disagreed with the statement. Details are found in Table 2.

Table 2: Supply Chain Management Practices of Goldfields Mining Company During Covid-19 Era

<i>Items</i>	<i>M</i>	<i>SD</i>
<i>Strategic Supplier Partnership</i>		
We consider quality as our number one criterion in selecting suppliers	4.11	.460
We regularly solve problems jointly with suppliers	3.96	.546
We have helped our suppliers to improve their product quality	4.05	.741
We have continuous improvement programs that include our key suppliers	4.10	.785
We include our suppliers in our planning and settings activities	4.00	.761
We actively involve our key suppliers in new product development processes	4.03	.716
<i>Mean of means</i>	<i>4.04</i>	<i>.668</i>
<i>Customer Relationship</i>		
We frequently interact with customers to set reliability, responsiveness, and other standards for us	4.18	.577
We frequently measure and evaluate customer satisfaction	2.93	.846
We frequently determine future customer expectations.	4.22	.703
We facilitate customers' ability to seek assistance from us.	4.18	.624
We periodically evaluate the importance of our relationship with our customers.	1.87	.917
<i>Mean of means</i>	<i>3.48</i>	<i>.733</i>
<i>Information Sharing Level</i>		
We inform trading partners in advance of changing needs.	4.18	.490
Our trading partners share proprietary information with us.	4.13	.657
Our trading partners keep us fully informed about issues that affect our business	4.05	.702
Our trading partners share business knowledge of core business process with us	4.05	.661
We and our trading partners exchange information that helps establishment of business planning	4.18	.624
We and our trading partners keep each other informed about events or changes that may affect the other partners	4.21	.698
<i>Mean of means</i>	<i>4.13</i>	<i>.639</i>

Source: Field Survey (2024)

From Table 2, the results indicate that respondents agreed to strategic supplier partnership (M = 4.04, SD = 0.668). For instance, respondents agreed to consider quality as their number one criterion in selecting suppliers (M = 4.11, SD = 0.460), and continuous improvement programs that include their key suppliers (M = 4.10, SD = 0.785). Moreover, respondents generally agreed to customer relationship (M = 3.48, SD = 0.733). Thus,

respondents frequently determine future customer expectations (M = 4.22, SD = 0.703). However, respondents disagreed to periodically evaluate the importance of their relationship with their customers (M = 1.87, SD = 0.917). Additionally, respondents agreed to information sharing level (M = 4.13, SD = 0.639). For example, respondents agreed to the statement “we and our trading partners keep each other informed about events or changes that may affect the other partners” (M = 4.21, SD = 0.698), and “we inform trading partners in advance of changing needs” (M = 4.18, SD = 0.490).

Among the dimensions of supply management practices, respondents scored high on information sharing level (M = 4.13, SD = 0.639), followed by strategic supplier partnership (M = 4.04, SD = 0.668), and customer relationship (M = 3.48, SD = 0.733) which was had the least score among the dimensions.

4.3 Impact of Supply Chain Management Practices on Operational Performance

This objective sought to determine whether supply chain management practices will have an impact on organisational performance. The SEM path analysis with 1000 bootstrap samples, with bias corrected confident intervals. The exogenous (predictor) variables were the sub-dimensions of supply chain management practices (information sharing level, strategic supplier partnership, and customer relationship) which were measured on a continuous basis. The criterion variable was organisational performance which was also measured on a continuous basis. Details of the results are presented in Table 3 and Figure 1

Table 3: Regression Model for Operational Performance

Model	B	SE	CR	P	95% Confidence Intervals	
					Lower	Upper
(Contant)	0.891	0.134	6.654	<.001	0.629	1.154
Information Sharing	0.298	0.0406	7.33	<.001	0.218	0.378
Strategic Supplier	0.288	0.0492	5.85	<.001	0.191	0.384
Customer Relationship	0.201	0.0600	3.35	<.001	0.083	0.318

Significant, $p < .05$; $R^2 = .53$. Criterion: Operational Performance

The results from Table 3 revealed that information sharing level, strategic supplier partnership, and customer relationship together explained 53% of the variance in operational performance. The results further showed that information sharing level B = 0.298, *Boot 95%CI* (0.218, 0.378), strategic supplier partnership B = 0.288, *Boot 95%CI* (0.191, 0.384), and customer relationship B = 0.201, *Boot 95%CI* (0.083, 0.318) were significant predictors of operational performance. All the predictors were positive predictors of operational performance. Moreover, information sharing has the highest prediction, followed by strategic supplier and customer relationship. The results imply, information sharing level, strategic supplier partnership, and customer relationship have an impact on operational performance. This suggests that supply chain management practices have an impact on operational performance at Obuasi goldfields during COVID-19 era. Figure 1 presents the structure path model.

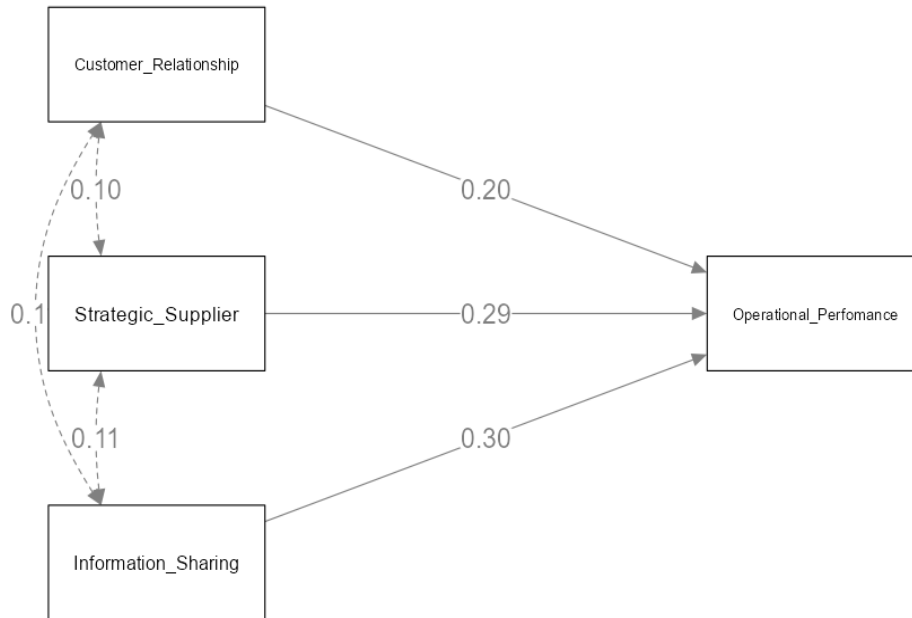


Figure 1: Path Model for Operational Performance

5. Discussion of findings

The results of the study revealed that information sharing was the most practiced aspect of supply chain management at Obuasi Goldfields during the COVID-19 era, followed by strategic supplier partnerships and customer relationships. These findings are consistent with previous literature (Raj, Mukherjee, de Sousa Jabbour & Srivastava, 2022; Butt, 2021; Heidary, 2022). For instance, Raj et al. (2022) examined how the COVID-19 pandemic affected global supply chains at an unprecedented speed and scale. Their results suggest that inconsistency of supply (PIS) is the challenge that correlates the most with other factors. Butt (2021) explored the steps and countermeasures taken by buying and distributing firms to address supply chain disruptions caused by COVID-19. The results reveal that buying firms are moving to agile production, focusing on tier-1 supplier risk, enhancing inbound material visibility, and temporarily closing production facilities to respond to the challenges posed by COVID-19. Furthermore, distribution centres are modifying their inventory policies, evaluating alternative outbound routes, and sourcing supplies to manage disruptions caused by the COVID-19 outbreak. Heidary (2022) examined the effect of the COVID-19 pandemic on global supply chain operations using a system dynamics approach. The results showed that global supply chains need more effective strategies to cope with global disruptions, with improving the flexibility of production capacity being one of the important strategies that global supply chain managers should pursue.

The findings of the study revealed that supply chain management practices significantly impact operational performance at Obuasi Goldfields during the COVID-19 era. Information sharing had the highest impact on operational performance, followed by strategic supplier partnerships, while customer relationships had a minimal impact. These results align with existing literature (Siagian & Johono, 2022; Afrifa et al., 2021; Pono & Munizu, 2021). For example, Siagian and Johono (2022) investigated the influence of supply chain integration on operational performance through supply chain responsiveness and innovation capability during the COVID-19 era. They found that supply chain responsiveness and innovation capability positively affect operational



performance. Afrifa et al. (2021) examined the impact of supply chain management on operational performance among health institutions, finding a direct positive relationship between internal integration and operational performance, as well as between supplier integration and operational performance. Pono and Munizu (2021) aimed to examine the role of supply chain practices on operational performance and company competitiveness, analysing the impact of company competitiveness on operational performance. Their study reported that supply chain practices positively impact operational performance and that this impact is also mediated by company competitiveness.

6. Conclusion and Recommendations

Based on the results it was concluded that information sharing level, strategic supplier partnership, and customer relationship were practiced as supply management practices at Obuasi Goldfields during COVID-19 era. Among these practices, the most practice of the supply management practices was information sharing level and the least practice was customer relationship. More so, the study further concluded that supply chain management practices (information sharing level, strategic supplier partnership, and customer relationship) have an impact on operational performance at Obuasi Goldfields during COVID-19 era. Information sharing had a greater impact on operational performance, while strategic supplier partnership, and customer relationship had a significant impact on operational performance.

6.1 Recommendations

Based on the findings of this study, several recommendations can be made to enhance supply chain management practices and operational performance at Obuasi Goldfields and similar organizations.

First, it is essential to enhance information-sharing practices. Developing robust communication systems that facilitate real-time data exchange among all stakeholders will improve forecasting, planning, and response to supply chain disruptions. Regular training sessions for staff should emphasize the importance of information sharing and equip them with the necessary skills to use information systems effectively.

Strengthening strategic supplier partnerships is another critical area. Implementing a formal Supplier Relationship Management (SRM) program will foster closer relationships with key suppliers, including regular performance reviews and joint improvement initiatives. Additionally, collaborating with suppliers to develop and implement risk management plans will help address potential disruptions in the supply chain.

Improving customer relationship management is equally important. Establishing robust feedback mechanisms to gather customer insights and adapt services and products accordingly will enhance customer satisfaction. Utilizing customer data analytics to offer personalized services can further strengthen customer relationships.

Increasing supply chain flexibility is vital to adapt to changing conditions. Investing in flexible manufacturing systems will allow quick adjustments to demand and supply chain conditions. Diversifying the supplier base can also reduce over-reliance on a single supplier, providing more options in case of disruptions.

Finally, monitoring and evaluating supply chain performance is essential. Establishing clear metrics to regularly assess the performance of supply chain practices will ensure ongoing effectiveness. Benchmarking against industry standards can identify areas for improvement and help maintain a competitive edge.

By implementing these recommendations, Obuasi Goldfields can enhance its supply chain management practices, leading to improved operational performance and a stronger competitive position in the market.



Conflict of interest

The authors declare no conflicting interest in the conduct of the study.

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Biographical notes



Esther Ntummy Lartey

Esther Ntummy Lartey is a Lecturer in the disciplines of Logistics, Procurement and Supply Chain Management at Wisconsin International University College, Graduate Level. She specializes in Logistics and Supply Chain Management. She is the Logistics Director at Senama Logistics (Part Time). She is also a consultant and owns Esmarkesbe Consult, a Supply Chain consulting firm. She has been a speaker in her discipline and has made presentations at many conferences and programs including international conferences in Africa and Asia. Having developed a keen interest in research and development, she has introduced and helped promote a number of business development exercises in the Institutions like Central University and Wisconsin International University College.



Charles Edem Gidi

Charles Edem Gidi has over three decades of experience in banking and investment banking, with specialty in corporate finance, accounting and business strategy, having worked as the Managing Director of EGAS Capital Limited and Renaissance Africa Group (Gh) Ltd (licensed investment banks). He is currently the Board Chairman for Serene Insurance Company and Frerol Rural Bank. He chairs the Renal Transplant Centre Implementation Committee (a collaboration between the First Sky Group and the Korle Bu Teaching Hospital) and the First Sky Energy Project Implementation Committee (A 50 MWp Solar Farm in the northern part of Ghana). He is also a member of the Board of Volta Serene Hotel Ltd. Charles holds an MBA in Finance from the University of Ghana Business School, a B.Com and Dip.Ed. from the University of Cape Coast, and is a member of the Institute of Chartered Accountants (Ghana).



Mavis Ofeibea Asamoah

Mavis Ofeibea Asamoah is a dynamic professional with a solid educational background in Logistics and Supply Chain and Human Resource Management. She is currently working with state housing company limited, Ghana, as a marketing executive. She combines her expertise in logistics with her passion for client engagement to deliver her activities with exception. Mavis thrives on engaging with clients by understanding their needs and ensuring they receive premium services. She has an MSc. in Logistics and Supply Chain Management from Wisconsin International University College, Ghana.