

# INFLUENCE OF COST LEADERSHIP STRATEGY ON PERFORMANCE OF MEDIUM-SCALE MINERS IN TAITA TAVETA COUNTY, KENYA

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## **Abstract**

Mining is an expensive business and firms have to be cost sensitive in their operations to ensure high performance. Consequently, mining firms such as medium scale miners (MSMs) in Taita Taveta County, Kenya have embarked on competitive strategies such as cost leadership to improve their performance. However, the impact of this strategy on the performance of these firms in the area had not been evaluated. Therefore, the study sought to establish the influence of cost leadership strategy on performance of medium-scale miners in Taita Taveta County. Porter's Generic Strategies guided the study which adopted a descriptive survey research design targeting 502 miners from 22 registered groups and 13 companies operating as medium scale miners in the region. From these a sample of 222 was selected for the study using simple random sampling. Data was collected using copies of questionnaire and was analyzed using descriptive statistics involving frequencies and percentages. The findings revealed that application of cost leadership strategy by MSMs in the area led to reduced costs of operation, increased production outputs and profitability. It is, therefore, recommended that the MSMs pursue the more competitive cost per unit of input technique which is more sustainable than just cost reduction.

**Keywords:** Cost leadership, Medium scale miners, Performance, Kenya

## **1.0 Introduction**

### **1.1 Background**

In the recent years, there has been an influx of firms joining the earth robbery industry in Kenya owing to the fact that a number of minerals have been discovered across the country and the changes in licensing regime that have made it easier for firms to operate in the country (Republic of Kenya, 2015). This has seen big companies like Tulow Oil, Base Titanium among others invest heavily in the mining industry although a great number of these big companies are foreign owned. Equally, medium sized companies (most of which are owned by local Kenyans) have entered into the extraction of the precious minerals. Studies have shown that, unlike the artisan miners, the medium scale miners are somewhat well structured with operating licenses, have permanent areas of operations, have employed some experts; though not as much as the big

companies, have a relatively greater knowledge on environmental management and control, have relatively large amounts of capital, can access credit and have structured leadership to spur their businesses (Republic of Kenya, 2015; Hilson & Garforth, 2013; Hilson, Hilson & Adu-Darko, 2014).

In gold mining areas in Kenya like Migori and Kakamega for example, OECD report of (2014) has shown that there are medium scale miners who, in most cases, have companies made up of 2 to 15 people. These miners have adopted a number of strategies that seemingly make them more competitive than their counterparts - artisan miners. Some of the strategies adopted include: financial resources mobilization through savings in cooperatives and borrowing loans (Republic of Kenya, 2014b), employment of some individuals (human resource) who are experts in the mining industry (Sheldon, 2014), structuring the communication networks within their organizations to easy flow of information, registration of the companies and mining firms (UNEP and Artisanal Gold Council, 2014), employment of modern technology and cost leadership strategy whereby the organizations have shared leadership to reduce operational costs etc (UNIDO, 2013a). Another study by UNDP (2015) indicates that, there is a need in Kenya to have all the miners to be involved in the adoption, implementation and continuous review of strategies that can help them utilize the mineral resources sustainably.

Strategic practices adopted by medium scale mining firms across the globe negatively or positively impact their performance at all levels (Ekow, 2015). Medium scale miners have been in stiff competition with large scale mining companies and artisan miner in the area of managing growth of mining activities and remaining strategically correct. This is owing to the fact that all of these miners are competing for the same resources (World Bank Group, 2015). This has forced the medium scale miners like any other firm that needs to enhance its operations come up with strategies that can enhance their improved performance. One role well outlined and an implemented strategic practice to an organization is enabling the organization's better performance and future sustainability (ITC & ITDG, 2014). In the mining industry, better performance can be measured by indicators like: increased mines out- put, increased sales, increased financial resources/capital base, reduced operations costs, easy access to credit, better environmental control, management and control and many more (Raphael & Terrence, 2014). In Guyana, the government information agency have shown that medium scale mining organizations that have adopted some strategies like cost leadership, modern extraction and processing technology, community involvement strategy, and credit and finance strategy have achieved up to 20% increased production and sales rates between 2012 and 2016 (UNDP, 2016).

### **1.1.1 Medium Scale Mining in Taita Taveta County**

Taita-Taveta County lies in the South-Eastern part of Kenya in the coastal region. It is bounded between longitudes 37° 30' 00" and 39° 30'00" East and latitudes 20° 30'00" and 40° 30'00" South. It is approximately 200 km northwest of Mombasa and 360 km southeast of Nairobi. It borders Makueni, Kitui and Tana River Counties to the North; Kilifi and Kwale counties to the east; Kajiado County to the Northwest and the Republic of Tanzania to the Southwest. The County covers an area of 17,083.9 km<sup>2</sup> (6,596.1 sq mi) of which a bulk 62% or 11,100 km<sup>2</sup> is within Tsavo East and Tsavo West National Parks.

Many small mining operations are located along a fault system extending from the Taita Hills of Kenya to the Umba Valley in northern Tanzania, passing through the Tsavo, Kasigau and Kuraze areas. Taita Taveta County is therefore endowed with one of the richest minerals deposits in Kenya and the Eastern Africa region (Keller, 1992; Central Bank, 1991). These

include both industrial minerals and gemstones, which have the potential of generating considerable wealth to various mining prospectors and investors (Bancroft, 1984). Horkel, Neubauer, Niedermayr, Okelo, Wachira and Werneck (1984) show that parts of Taita Taveta County have high and middle value gemstones including: Tsavorite (green garnets), red garnets, ruby, blue sapphire, pink sapphire, green tourmalines, yellow tourmalines, rhodolites and kyanites. The main gemstone mining area in the county is in the Tsavo region, which derived its name from tsavorite (Bridges, 1974; 2007).

Mining in the county has for a long time been often carried out without clear government regulations and control mostly by artisan miners (Taita - Taveta Professionals Forum, 2008). However, the establishment of the Mining Bill of Kenya (2012) that was also revised and published in 2014 enabled the government and other bodies to differentiate the middle scale miners from the artisan miners. The medium scale miners are local group of individuals or local registered companies who have formal operating licenses and operate in an area that is between 7.2 acres of land to 20.1 acres of land. A report by the Ministry of Mining of Kenya (2017) has shown that there are 22 registered groups and other 13 small companies owned by between one to 10 individuals who are operating as medium scale miners in the region.

Being resource demanding ventures and with increasing competition for precious stones globally, it is imperative that the mining firms in the area adopt a competitive strategy such as the cost leadership strategy. However, the operations of these mining businesses with respect to competitive strategies such as the cost leadership strategy have not received significant research attention in the past.

## **1.2 Statement of the Problem**

The role of MSMs in the mining industry cannot be underrated since they act as a bridge between the artisan miners and large scale mining companies. This means that these miners have heavily contributed to economies' revenue (World Bank, 2015), creation of employment (UNDP, 2016), have acted as substitutes in the supply and circulation of some specific minerals in the countries where they operate (UNDP, 2015) among others. However, mining is an expensive business and with the growing competition in the world, mining firms have embarked on various strategies in order to improve their performance. Consequently, the relationship between strategic practices and performance of medium-scale miners has been the subject of discussion and debate in the recent past (Nyanchoka, 2013; GNA, 2014; World Bank Group, 2015; Ekow, 2015). In Taita Taveta County, for example, cost leadership is among the several strategies that have been implemented by medium scale miners in the area. However, impact of this strategy on the performance of MSMs in the area has not been assessed. With the economic climate both locally and globally being in a state of constant flux, firms have to be cost sensitive in their operations and pricing models in order to ensure high performance, and this requires cost leadership. Hence, the present study sought to establish the influence of cost leadership strategy on performance of medium-scale miners in Taita Taveta County.

## **1.3 Objective of the Study**

The general objective of this study was to examine the extent to which cost leadership strategy influences the performance of medium-scale miners in Taita Taveta County, Kenya.

## **2.0 Literature Review**

### **2.1 Porter's Generic Strategies Model**

Michael Porter (1980) was the first person who introduced generic strategies and proposed that by using them organization can achieve competitive advantages. These were overall cost leadership, differentiation, and market niche (or focus). According to Porter (1985), firms pursuing any of the three generic strategies namely: cost leadership strategy, differentiation and focus strategy could achieve better organizational performance and competitive advantage. Powell (1995) acknowledges that Porter's framework of generic strategies is inherently tied to firm performance. When throwing a focus on cost leadership, Porter shows that, organizations that attempt to become the lowest-cost producers in an industry can be referred to as those following a cost leadership strategy. Cost leadership enables a firm to become the low cost producer in its industry. Porter (1980) posits that a firm that successfully pursues cost leadership strategy emphasizes vigorous pursuit of cost reduction, tight cost and overhead control, research and development and advertisement among others to achieve a low cost position. He further theorizes that low-cost position gives a firm defense against rivalry from competitors, because its lower costs mean that it can still earn returns after its competitors have competed away their profits through rivalry. Firms adopting cost leadership strategy try to be the low-cost producers in the markets. If a firm can achieve and sustain overall cost leadership, then it will be an above average performer in its industry. However, the sources of cost advantage are varied and depend on the structure of the industry. They may include the pursuit of economies of scale, proprietary technology, preferential access to raw materials and other factors. A low cost producer must find and exploit all sources of cost advantage. Since medium scale mining is a resource intensive activity, cost leadership strategy can be instrumental in enabling the mining firms to obtain competitive advantage through their costing techniques.

### **2.2 General Literature on Cost Leadership**

Porter (1985) defines strategy of cost leadership as trading standard products combined with aggressive pricing (Porter, 1980). Cost leadership strategy is an integrated set of action taken to produce goods or services with features that are acceptable to customers at the lowest cost, relative to that of competitors (Sirmon, Hitt, Ireland & Gilbert, 2011). However, Calthrop (2010) sees cost leadership as being about cost per unit of input, not lowest cost *per se*. Porter (1985) adds that cost leadership strategy is a successful way to achieve sustainable competitive advantage by reducing and controlling the costs. Porter (1980), posit that a firm that successfully pursues cost leadership strategy emphasizes vigorous pursuit of cost reduction, tight cost and overhead control, research and development and advertisement among others to achieve a low cost position. Thus, firms that pursue a cost leadership strategy are expected to be associated with higher production efficiency.

Some of the ways to realize low cost strategy and achieve the required performance are: economies of scale, control and reduction of administrative costs, the curve of experience, and technology. Cost leadership strategy takes place through experience, investment in production facilities, conservation and careful monitoring on the total operating costs (through programmes such as reducing the size and quality management) and the reason for applying the strategy of cost leadership is to obtain the advantage by reducing the economic costs among its competitors (Barney, 2002).

According to Frambach et. al, (2003), cost leadership also tends to be more competitor oriented rather than customer oriented. Indeed, Christopher (2011) posits that the most profitable competitor in any industry sector tends to be the lowest-cost producer or the supplier providing a product with the greatest perceived differentiated values. This strategy involves the process through which the company is able to produce or distribute goods and services at a lower cost than competitors within the industry. Aryee, Ntibery and Atorkui (2014) emphasize that the use of this strategy is primarily to gain an advantage over business competitors by reducing operation costs below that of others in the same industry. Porter (1985) said that, by applying the business strategy of cost-leadership may help a firm to gain “a low cost position” which offers a firm a defense against competitors. The lower costs indicate that the firm can still earn returns while its competitors may break down the profit margin. Moreover, the low-cost position helping the firm against powerful buyers who usually are in low-cost position defends the firm against powerful buyers because buyers can exert power only to drive down prices to the level of the next most efficient competitor. Low cost provides defiance against powerful suppliers by providing more flexibility to cope with input cost increases.

In this study therefore, the medium scale miner with the lowest costs would earn the highest profits in the event when the competing products are essentially undifferentiated, and selling at a standard market price. Lynch (2003) shows that organizations following this strategy place emphasis on cost reduction in every activity in the value chain. It is important to note that an organization might be a cost leader but that does not necessarily imply that the organization’s products would have a low price. In certain instances, the company can, for instance, charge an average price while following the low cost leadership strategy and reinvest the extra profits into the business (Lynch, 2003). Examples of companies using the cost leadership strategy include RyanAir, and easyJet, in airlines, and ASDA and Tesco. The strategy has also been applied by a Titanium mining companies in Australia, Madagascar and in Kwale County, Kenya by Base Titanium though these are large scale mining (LSM) operations. The application of the strategy in middle scale mining (MSM) operations such as those going on in Taita Taveta County, Kenya has, however, not been examined in previous studies (Ireland et. al, 2011; Frambach et. al, (2003).

### **2.3 Empirical Literature**

In Ghana, cost leadership has been used to create a low cost of operation within their mining groups. Aryee, Ntibery and Atorkui (2014) argue that, cost leadership is a strategy used by both MSM and the well-established LSMs. In their work that has focused on the trends in the Small Scale Miners (SMS) and MSM of precious minerals in Ghana, Aryee, Ntibery and Atorkui (2014) further contended that when MSM invested in common leadership that operated in a structured format at low costs, they were able to increase their minerals production by 11% annually over the period January, 2010 to December, 2015. A study by Sulemanu (2014) also concluded that cost leadership strategy significantly influences the performance of small scale miners in Ghana. He has shown that those firms/miners who have come together and embraced common management/leadership are able to reduce the operating costs and benefit from shared management ideas thus increasing the production of gold and increasing their market base. This has been argued to be similar in other countries like Angola, South African and the Democratic Republic of Congo (DRC) by other scholars like Brian (2015) and Bosse, Charles and Kalvig (2013).

Amoah (2012) did a study and argued that, economies of scale have been enjoyed among the medium scale miners by adopting the cost leadership strategy in Tanzania, Malawi and Uganda. According to his findings, the production of minerals has been on an increase for the miners who have adopted shared management by having their groups/firms being managed by one central management. This also helps by having the cost of production of minerals and services decrease as the mines are able to increase production; leading to increased profits (Marc, 2014).

Nina and Lynda (2014) investigated the approaches to working with small-scale and medium scale Miners in Kenya, Uganda and Tanzania. The study findings indicated that there is a very strong relationship between the performance of miners and the adoption of the cost leadership strategy. According to the study, miners who adopted the strategy in Kenya's western region, Tanzania's eastern districts and Uganda's southern districts had their production increase by 35 to 55 percent. The study also established that when miners tend to come together under well-structured leadership, more production is achieved since the costs of management are distributed and shared equally.

Marc (2014) did a study in Kenya and Tanzania among the medium scale miners and concludes that, cost leadership strategy has a positive impact on mining firms that do not have enough muscles to employ individualized management or departmental experts. Cost leadership helps them by having shared expenses that could be used to hire expertise, shared ideas that increase productivity, shared marketing opportunities that will increase the sales.

Nyame and Grant (2014) carried out a study among miners in Western Kenya. The study revealed that miners who adopt the cost leadership strategy are able to benefit from the reduced cost of production, are able to share the marketing costs thus increasing their market base, and are able to hire or employ both qualified personnel and modern technology that consequently increases their production. However, study focused on the mining industry in Western Kenya which is quite different from that in Taita Taveta County in the Coastal Region of Kenya. The present study takes an in-depth look at the influence of cost leadership strategy on performance of medium-scale mining businesses in Taita Taveta County.

A study by Okoth (2013) in Wagusu Village concludes that, for small and medium scale miners who have combined forces to hire common mining and mineral experts, managers and other skilled personnel, they produce on average up to 58% amounts higher of gold than the artisan miners who keep on doing guesswork in exploration.

## **2.4 Research Gaps**

The foregoing review has examined both the theoretical and empirical underpinnings of the cost leadership strategy used in mining firms. The discussions have focused on how this strategy has been used to obtain cost advantages through reducing costs and increasing production. The studies have also shown that some mining firms have been able to collaborate by sharing production resources among them and, therefore, obtained cost advantages. The application of the cost leadership strategy in middle scale mining (MSM) operations has been examined in studies in other contexts other than Taita Taveta County, Kenya. Therefore, the effects of this strategy on performance of MSMs in the county remained largely unaccounted for.

### **3.0 Research Methodology**

#### **3.1 Research Design**

This study adopted a descriptive survey research design. This design was found suitable as it brings out information on attitudes that would be difficult to measure using observational techniques.

#### **3.2 Target Population**

A report by the Ministry of Mining of Kenya (2017) has shown that there are 22 registered groups and other 13 small companies owned by between one to 10 individuals who are operating as medium scale miners in Taita Taveta County, Kenya. The miners attached to these groups or companies are 502. Therefore, the target population for the study was 502.

#### **3.3 Sample Size**

For this study, the sample is given by the Yamane formula of 1976 as shown below:

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

where, n = desired sample size when population is less than 10,000; e= sampling error; N = population size. At 95% confidence level, the sampling error is 0.05. Therefore the desired sample was:

$$n = \frac{502}{1 + 502(0.05)^2} = 222$$

Simple random sampling was used to select the 222 respondents so as to allow full participation of the respondents.

#### **3.4 Data Collection, Validity and Reliability of Research Instruments**

Primary data was collected using copies of structured questionnaire designed by the researcher which were administered through ‘drop and pick later method’. The research used content validity as a measure of the degree to which the data collected using the questionnaire represented the objectives of the study. The instrument was therefore verified by the researcher’s academic supervisors from the university. The reliability of the instrument was determined using a test-retest administered to 10 subjects which were not included in the main research sample. Cronbach alpha is the formula used for determining the reliability which is based on internal consistency (Cronbach, 1951). The standard minimum of 0.6 as the alpha was recommended (Gupta, 2004), as the minimum level for item loadings. The instrument reliability coefficient obtained was  $\alpha = 0.8831$  which was above the recommended value and, therefore, the instrument was adopted.

#### **3.5 Data Analysis**

The questionnaire were received and sorted out to separate those fully filled and thus valid for the study from those that did not meet the researcher’s expectations. Data processing was carried out through editing, coding and classification. The data collected was quantitative in nature and was analyzed using descriptive statistical methods with the help of SPSS.

#### **4.0 Data Analysis, Findings and Discussion**

##### **4.1 Instrument Response Rate**

The study targeted 222 respondents and administered questionnaire to them, out of these 211 of them responded representing 95.05% response rate which was considered adequate to constitute a basis for valid conclusion (Mugenda & Mugenda, 2003).

##### **4.2 Cost Leadership Strategy and Performance of Medium Scale Miners**

Respondents were required to indicate whether they supported the idea that leadership strategy has been applied effectively by the medium scale miners in Taita Taveta County and the following results were as indicated in Table 1 below.

**Table 1: Application of Cost Leadership Strategy**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	132	62.6	62.6	62.6
	no	79	37.4	37.4	100.0
	Total	211	100.0	100.0	

The results in Table 1 suggest that cost leadership strategy had been adopted by most mining firms in the area as indicated by majority (62.6%) of the respondents. According to Aryee, Ntibery and Atorkui (2014), cost leadership is a strategy used by both medium scale miners and the well-established large mining organizations to create a low cost of operation within their niche. The use of this strategy is primarily to gain an advantage over competitors by reducing operating costs below that of others in the same industry.

**Table 2: Cost Leadership Application by Middle Scale Mining Firms**

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Medium scale miners have come together and shared management costs so as to benefit from large production (economies of scale)	10 (4.7%)	20 (9.5%)	49 (23.2%)	89 (42.2%)	43 (20.4%)
Medium scale miners have a clear understanding of the cost leadership strategy and have effectively adopted the cost leadership strategy to check on cost of operations.	3 (1.4%)	29 (13.7%)	60 (28.4%)	101 (47.9%)	18 (8.5%)
Labour costs have been effectively reduced due to adoption of cost leadership strategy.	0	32 (15.2%)	79 (37.4%)	85 (40.3%)	15 (7.1%)
Input costs are effectively managed due to the integration of the cost leadership strategy by MSMs.	8 (3.8%)	25 (11.8%)	69 (32.7%)	86 (40.8%)	23 (10.9%)
Distribution costs have been reduced due to cost leadership strategy adoption by the MSMs	3 (1.4%)	21 (10.0%)	67 (31.8%)	79 (37.4%)	41 (19.4%)

The results in Table 2 indicate that majority (62.6%) of the respondents were of the view that medium scale miners in the area had come together and shared management costs so as to benefit from large production (economies of scale). The findings also suggest that most medium scale miners in the area had a clear understanding of the cost leadership strategy and have effectively adopted the cost leadership strategy to check on cost of operations as indicated (56.4%). Most respondents agreed that labour costs have been effectively reduced due to adoption of cost leadership strategy (47.4%). The input costs were effectively managed due to the integration of the cost leadership strategy by MSMs (51.7%). In addition, distribution costs had also been reduced due to cost leadership strategy adoption by the MSMs (56.8%).

#### **4.3 Measures of Medium Scale Miners' Performance Indicators**

Respondents were asked to rate the extent to which various variables influenced the performance of MSMs in Taveta Taveta County. The results are given in Table 3.

**Table 3: Performance of MSMs**

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
Our firm has been able to increase the base of production quantities	35 (16.5%)	20 (9.4%)	20 (9.4%)	75 (36%)	61 (28.9%)
Our firm has been able to increase its profits	16 (7.6%)	37 (17.5%)	77 (36.5%)	49 (23.2%)	32 (15.2%)
Our firm has been able to increase its market share	35 (16.6%)	62 (29.4%)	55 (24.3%)	42 (21.6%)	17 (8.1%)

The results in Table 3 indicate that most MSMs had been able to increase their base of production quantities as indicated by majority (64.9%) of the respondents. Majority (37.4%) also reported that their firms have been able to increase their profits. However, most firms had not been able to expand their market share as indicated by majority of the respondents (46%).

#### **4.4 Discussions of Findings**

The findings imply that the performance of the MSMs in Taita Taveta County was generally good and could be attributed to the cost leadership strategy. With regard to cost leadership adoption in the MSMs, the study findings support those of Nina and Lynda (2014) whose study in Kenya and Tanzania revealed that when miners tend to come together under well-structured leadership, more production is achieved since the costs of management are distributed and shared equally. Another study by Nyame and Grant (2014), similarly, revealed that miners who adopt the cost leadership strategy were able to benefit from the reduced cost of production, were able to share the marketing costs thus increasing their market base. They were also able to hire or employ both qualified personnel and modern technology that consequently increases their production. These findings also agree with those of Anyona and Rop (2015) that medium scale mining across the country were performing well on the basis of production quantities, market share and profitability which was attributed to mitigation of expenditure, such as, reduced cost of production overheads. These findings reinforce the theoretical views of cost leadership strategy

advanced by Porter (1980) that firm successfully pursuing cost leadership strategy pursues cost reduction. However, the findings failed to support Calthrop (2010) view that cost leadership is about cost per unit of input, not lowest cost *per se* which means the firms were more keen on low cost producers rather than use competitive costing techniques which were more sustainable in the long run.

## **5.0 Conclusion and Recommendations**

### **5.1 Conclusion**

The foregoing findings have revealed very important aspects of cost leadership strategy that are currently being used in the mining business in Taita Taveta County. First, it emerged that the mining firms in the area had formed alliances so as to share management costs and benefit from large production - economies of scale. Specifically, the shared resources had seen a reduction in labour costs, input costs and distribution costs. Theoretically, the findings are in line with the Generic Strategies of Porter (1980) who argued that cost leadership enables a firm to become the low cost producer in its industry. Consistent with this theory, the firms were exploiting the industry structure to obtain competitive advantage through sharing of resources to enable them become low cost producers. As such they were able to obtain economies of scale, proprietary technology, preferential access to raw materials and other factors to boost their performance. However, contrary to the generic strategies theory, the firms were not necessarily in competition with each other and pursued cost leadership essentially from a performance point of view and not competition. Hence, concept of an industry leader was not evident in the study.

Therefore, based on the results arrived at, it can be concluded that, the cost leadership strategy when applied by the various MSMs in the area leads to increased mines output, increased profits and reduced costs of operation. Further, the strategy when applied to MSMs, has the power to help the miners share management costs leading to benefits from large production (economies of scale), besides reducing distribution costs. The study also concludes that cost leadership strategy is more industry specific than context specific meaning it can be applied anywhere so along as the industry structure is well understood by the actors.

### **5.2 Recommendations**

Based on the conclusion drawn, the study recommends that the medium scale mining firms in the area need to pursue competitive costing techniques which are more sustainable in the long run rather than just cost reduction. This will involve mining firms following a cost structure that is based on the cost per unit of input which can enable them to adjust the costs objectively relative to the production environment. This follows from the fact that production costs necessarily vary along units of inputs which are then aggregated. Therefore, focusing on the cost per unit of input would make their cost structure more competitive and also make them more efficient producers.

## **References**

Amoah. (2012). 'Sand winning destroys arable lands', *Ghanaian Chronicle*, May 3, 2012.

Bancroft, P. (1984). *Gem and crystal treasures: The world's finest minerals and crystals*. Western Enterprises Mineralogical Record.

Barney, J.B. (2002). *Gaining and sustaining competitive advantage*, 2nd edition. N.J: Prentice hall.

- BosseJønsson, Charles & Kalvig. (2013). 'Toxic mercury versus appropriate technology: Artisanal gold miners' retort aversion', Resources Policy, vol. 38.
- Bridges, C. R. (1974). Green grossularite garnets ('tsavorites') in East Africa. *Gems and Gemology*, 14(10), 290-295.
- Calthrop, P. (2010). The six disciplines of cost leadership on CEOFORUMGROUP, <http://www.ceoforum.com.au/articledetail.cfm?cid=6275&t=/Paul-Calthrop-Bain-International/The-six-disciplines-of-cost-leadership>.
- Christopher, M. (2011). *Logistics and supply chain management* 4th ed. - Great Britain: Pearson Education pp.4.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3): 297-334.
- Ekow, E-M. (2015). *Policy proposal to classify medium-scale mining underway*. <http://thebftonline.com/business/mining/17789/policy-proposal-to-classify-medium-scalemining-underway.html>
- Frambach, R. T., Prabhu, J., & Verhallen, T. M. (2003). The influence of business strategy on new product activity: The role of market orientation. *International Journal of Research in Marketing*, 20(4): 377-397.
- GNA. (2014). *Mantrac holds seminar for small and medium scale miners*. <http://www.ghananewsagency.org/economics/mantrac-holds-seminar-for-small-and-medium-scale-miners-96982>
- Hilson, G., & Garforth, C. (2013). 'Everyone now is concentrating on the mining': Drivers and implications of rural economic transition in the eastern region of Ghana. *Journal of Development Studies*, 49(3): 348-364.
- Hilson, G., Hilson, A., & Adu-Darko, E. (2014). Chinese participation in Ghanas informal gold mining economy: Drivers, implications and clarifications. *Journal of Rural Studies*, 34: 292-303.
- Horkel, A. D., Neubauer, W., Niedermayr, G., Okelo, R. E., Wachira, J. K., & Werneck, W. (1984). Notes on the geology and mineral resources of the southern Kenyan coast. *Mitt. Österr. Geol. Gesel.*, 77: 151-159.
- Intermediate Technology Consultants (ITC) and Intermediate Technology Development Group (ITDG). (2014). *Mining Capability Statement*. United Kingdom: Burton Hall.
- Mugenda, O., & Mugenda, M. (2003). *Research methods: Quantitative and qualitative approaches*. Nairobi: Act Press

- Nina, C. & Lynda, L. (2014). *Investigating approaches to working with artisanal, small-scale, and medium scale miners: A compendium of strategies and reports from the field*. Report.pdf
- Nyame, F. K., & Grant, J. A. (2014). The political economy of transitory mining in Ghana: Understanding the trajectories, triumphs, and tribulations of artisanal and small-scale operators. *The Extractive Industries and Society*, 1(1), 75-85. doi:10.1016/j.exis.2014.01.006
- Nyanchoka, N. (2013). *Strategic management practices as a competitive tool in enhancing performance of small and medium enterprises in Kenya*. School of Business; University of Nairobi.
- OECD. (2014). *Madagascar and Kenya - African Economic Outlook* OECD, viewed 28/11/2014,<<http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2013/P>
- Okoth, S. (2013). *Gold mining at Wagusu Village: Report on the Baraza*. Bondo- National Environment Management Authority (NEMA). Unpublished Masters Thesis, University of Nairobi, Nairobi, Kenya.
- Porter, M.E. (1980). *Competitive Strategy: Techniques for analyzing industry and competitors*. New York: The Free Press.
- Porter, M.E. (1985). *Competitive Advantage – Creating and Sustaining Superior Performance*. New York: The Free Press.
- Powell, T.C. (1995). Total quality management as competitive advantage: A review and empirical study. *Strategic Management Journal*, 16(1): 15–37.
- Raphael, T. & Terrence, A. (2016). *Agreements renewed for concessions for miners*. <http://gina.gov.gy/tag/small-and-medium-scale-miners/>
- Republic of Kenya. (2014b). *Mining Bill, 17th March (2014) Special Issue*: Kenya Gazette Supplement No. 28. National Assembly Bills No 8. Government Printers, Nairobi.
- Republic of Kenya. (2015). *Government county departments annual plans*. Government Printers, Nairobi.
- Sheldon, CG (2014), 'Broad-Based training and small grants: Changing lives of artisanal miners and mining communities in Uganda and Kenya', in CG Sheldon, AZ Casis, GCaV Seiler &Mier (eds), *Innovative Approaches for Multi-Stakeholder Engagement in the Extractive Industries*, World Bank, Washington DC.
- Sirmon, D. G., Hitt, M. A., Ireland, R. D., & Gilbert, B. A. (2011). Resource orchestration to create competitive advantage: Breadth, depth, and life cycle effects. *Journal of management*, 37(5): 1390-1412.

Sulemanu, K. (2014). *Ghana's government focuses on reforming medium-scale mining*. Ghana Chamber of Mines.

UNEP and Artisanal Gold Council. (2014). *Reducing mercury use in artisanal and small-scale gold mining: A practical guide*. United Nations Environment Programme Nairobi, Kenya

UNIDO. (2013a). *Mercury programme, United Nations Industrial Development Organization*, viewed 1/06/2014, <<http://www.unido.org/en>

UNDP. (2015). *Economic and job creation potential of artisanal and small-scale mining in Taita Taveta County*. <http://www.ke.undp.org/content/kenya/en/home>

UNDP. (2016). *The Legislative framework on mining in Kenya: Working in small or medium-sized mines*. UNDP, Nairobi Kenya.

World Bank Group. (2015). *Small and medium scale mining development project*. <http://projects.worldbank.org/P007559/small-medium-scale-mining-development-project?lang=en>