

Technological Advancement and Survival of Smes in Ghana: The Case of the Blacksmithing Industry in Kumasi Metropolis

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Abstract

The blacksmithing industry in Ghana is of significant antiquity, contribution to gratifying various socio-economic objectives of the country including, creating employment opportunities, encouraging the development of indigenous entrepreneurship and promoting effective resource utilization that are considered to be critical in the area of engineering economic development. That notwithstanding, research studies have indicated that the industry continues to suffer stagnation and their activities are largely unaccounted for. It is against this backdrop that this study seeks to investigate the determinants of survival of the blacksmithing industry vis-à-vis globalization and advancement in technology. The study was a work site based cross-sectional one, conducted among 109 blacksmiths in the Kumasi Metropolis. Data obtained were acquired through the use of questionnaire and personal interviews. Data collected included socio-demographic profile, expertise, marketing, advertising, record keeping, use of ICT, finance, TQM, as well as impact of covid. Data was analyzed using SPSS version 22. Descriptive statistical tools such as frequency and percentage were used to analyze the facts sought from questionnaire. The study recorded an overall response rate of 96.5%. The general outcome of the study showed that the majority of the blacksmiths were battling with a myriad of challenges that impacted on the performance and growth of their business, with 44% and 18% experiencing lower demand or no change in demand of their products respectively. The study identified the influence of market competition from foreign products, low adoption of strategic modern technology, low modern communication tools, low customer knowledge management, difficulties in accessing finance and sourcing for operational inputs and impact of Covid-19 as some of the factors responsible for the observed low profits. The study recommends the need for Government and the private sector to put in place the necessary intervening performance strategies and stimulations of production activities that will enable the blacksmithing industry to survive in the current economic uncertainty and technology advancement.

Key Words: Blacksmithing, performance, profitability, sustainability, technology

Introduction

Small and Medium size Enterprises (SMEs) are valued and noted as the backbone of the economic growth of every nation, since they sustain the country's economy and establish a

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supply chain system (Tong et al. 2022). Considerable attention has therefore been paid to the well-being and sustainability of SMEs, in many parts of the world recognizing the critical role they play in the country's growth (Shitaye 2022). Mamo (2020), further noted that (SMEs) play beneficial contributions to enhance income distribution, job creation, poverty alleviation, rapid industrialization, as well as export growth. The importance of SMEs as a creator of jobs and wealth cannot be overemphasized for a time like this when the global world is still grappling with recovery or struggling to recover from the COVID-19 Pandemic.

Although several studies that analyzed the performance and growth of SMEs have recommended for the need for financial support from Governments (Juergensen et al. 2020 and Pedauga et al. 2021), it is believed that it is innovation that will be required to bring about the needed changes for SMEs. Abed (2021) perceived that technology was an essential element in SMEs' survival. Unfortunately, there is a large research gap on the digital transformation of SMEs in developing countries, even though Hassen et al., (2019). indicated that it is technology that will lead SMEs to superior performance and competitive advantage. Baporikar and Shikokola, (2020) also shared the view that in the current technological era, the survival of SMEs' depends on their ability to adapt to new market mechanisms in a way that helps them to gain a competitive advantage in the global market. For example, it has been noted that, consumers are now able to undertake many of their tasks with the help of Amazon, Google Cloud, Facebook, Microsoft Azure, Netflix, etc. However, many SMEs, did not seem to grasp the benefits of, and have not acquired the digital skills for, running their businesses online (Antonescu, 2020). There is every indication and a higher probability from the foregoing that SMEs will readily adopt modern technologies once they realize the benefits and impact on performance of their business. (Scupola, 2009; Shah Alam et al., 2011). It is therefore important for SMEs not to consider the adoption of modern technology as an obstacle but rather as a means for enhancing the performance and growth of their business. Bearing in mind that each business, whether large or small, is crucial for the economy and therefore their sustainability, by adopting technologies, is essential in the current and future environment.

The blacksmithing industry in Ghana is one of the oldest cottage industries. The industry is believed to have been introduced into Ghana as part of the British colonial legacy for the manufacture and making of simple tools and implements for small and medium scale sectors in industries (Otor, 2014, Catherine et al., 2014). The literature on the industry indicates that the industry has gone through a lot of challenges (Nsiah 1993), Nevertheless, the trade still persists in parts of the major cities and towns across the country operated as small and medium scale family business holdings which is handed down from one generation to the next, keeping to the tradition of using obsolete tools and methods for production with very little economic impact. Unfortunately, economic and business scenarios have changed drastically over the last decade due to globalization causing many industries to seize on opportunity to achieve economies of scale.

The blacksmithing industry in Ghana has however, not been able to take advantage of the benefits of globalization. They are unable to compete with foreign goods that are sometimes better in terms of both quality and price. Research have shown that technological development and its adoption among small firms is the most important determinant for sustainability in an ever-changing competitive market (Fadahunsi 2012). The purpose of this study is therefore to investigate the determinants of the performance and growth of the blacksmithing industry that will make it technology competent.

The study will help the government to develop strategy and implement policies for helping the blacksmithing industry based on scientific knowledge. We expect this research to

also be beneficial in assisting other developing countries in exploring better strategies and developing future plans. This research will also contribute to academic literature and assist other researchers who wish to research on a similar topic. The results of this analysis will also provide many companies and SMEs with a systematic method for increasing their innovation capabilities, as well as a valuable source of ongoing competitive advantage for their sustainability during the post covid period.

Materials and Methods

The Study Area

Kumasi metropolis is the second largest city only to Accra the capital city of Ghana in terms of land area, population size, social life and economic activity. Kumasi is approximately 480 km north of the Equator and 160 km north of the Gulf of Guinea. It is between latitude 6.35°–6.40° and longitude 1.30°–1.35°, an elevation which ranges between 250–300 meters above sea level with an area of about 254 square kilometers. The unique centrality of the city as a traversing point from all parts of the country makes it a special place for many to migrate to. The city is a rapidly growing one with an annual growth rate of 5.47 per cent (Regional Statistical Office, Kumasi). It encompasses about 90 suburbs, many of which were absorbed into it as a result of the process of growth and physical expansion. The Kumasi metropolis was chosen for the research for a number of reasons, (1) it can boast of several welding SMEs industries including, blacksmithing goldsmithing, brass casting, smelting and foundry (2) the largest vehicle garage, (3) numerous mechanic workshops, and motor spare parts market (4) metal formulation plant (ITTU), (5) presence of large market (Kejetia) and nearness to large local and regional markets centers (Mampong, Ejura, Sunyani, Techiman, Tamale, Koforidua, Suhum, Swedru, Winneba, Cape coast.), (6) market for the neighbouring countries of Cote d’voire, Burkina Faso, Mali, and Niger.

Table 1. *Location of Blacksmiths workshop and respective number of blacksmiths*

Location	Number	%
Asawase	10	12
Asokwa	6	8.8
Bantama	2	4.8
Kwadaso	4	11.2
Manhyia	4	6.4
Nhyiaeso	2	8.8
Oforikrom	6	11.2
Suame	64	12.8
Subin	2	10.4
Tafo	7	13.6
Total	109	100

Research Design

This is a survey study with an explanatory research design. Explanatory designs attempt to establish cause-and-effect relationships to explain variance in the dependent variable or predict organizational outcomes (Yin 1994; Yin 2013). The primary goal of explanatory research design is to determine how events occur and which ones may influence specific outcomes. It also assists the researcher in planning and implementing the study in a way that will allow the researcher to obtain the desired results, increasing the chances of obtaining information that can be associated with the real situation (Myers et al. 2013). As a result, the study employed an explainer research design.

Target Population

Wahyuni (2012) described a population as a collection of elements from which a sample is drawn. As a result, the current blacksmithing industries in the Kumasi metropolis were the study's target population. The sampling frame used in this study comprises 150 blacksmiths who are in active business.

Sampling Technique

The convenience sampling method was employed in arriving at the 150 blacksmiths in the metropolis, which the researchers believed possess the experience relevant for this study and who have sufficient time and were willing to participate. The techniques, involve obtaining responses within the sample frame from willing respondents and also their availability for the study. The advantage here is that respondents will participate on their own volition and not selected against their will (Morse, 1998). This technique was chosen to boost response rate because respondents in this sector are reluctant in giving out information since they believed in one way or the other, information about their business may leak through to competitors and also expose them to tax authorities. Besides, the quality of responses was high as participants took their time to respond to the questionnaire.

Sample Size

The sample size for the study was determined using the sample size determination formula developed by (Yamane 1967), with a 95 percent confidence level and a level of precision (e) of 5.

$$n = N / (1 + N(e)^2)$$

Where:

n = sample size

N = number of people in the population

e = allowable error (%) Substitute numbers in the formula

$$n = 150 / (1 + 150 (0.05)^2) = 109$$

After calculating the sample size using the Yamane formula, the study's sample size of 109 is adequate to represent the population.

Data collection

Primary data obtained for this study were acquired through the use of questionnaire, personal observation and personal interviews. The design was adopted because of its appropriateness in describing the current situation of the operation of the industry (Kothari, 1990). The questionnaire was designed in open and close ended patterns and administered directly on the operators of the cottage industry. The questionnaire was pilot tested on 20 respondents and it yielded a Cronbach Alpha coefficient of 0.83. This coefficient signified high internal consistency and reliability (Pallant, 2001), and indicated that the information gathered through questionnaires is reliable and can be used for further statistical analysis. Based on the results of the pre-test, some unclear questions were rephrased without affecting the overall context of the instrument. The data collection exercise was done between August and September 2021.

Ten (10) enumerators were appointed, trained for the exercise and provided with the questionnaires. The questionnaires were orally administered to respondents using the local language where necessary to ensure more accurate information gathering. A total of one hundred and nine respondents were used for the study who were selected randomly.

Before the commencement of the study, blacksmiths workshops in the study area were located and coded. At each identified workplace the objective of the study was explained to the blacksmiths present and their consent sought for data collection. They were also informed that their participation was voluntary and that they could withdraw from the interview at any time without consequences. Data collected included socio-demographic profile, expertise, training/apprenticeship, ownership, work space, marketing, advertising, record keeping, use of ICT, occupational injuries in the past one year, finance, TQM, as well as impact of covid.

Data Analysis

Data collected was analyzed using SPSS version 22. Descriptive statistical tools such as frequency and percentage were used to analyze the facts sought from questionnaire and figures drawn.

Inclusion criteria

Blacksmiths above 18 years of age, who have practiced for at least 1 year were included in the study.

Limitation

The study sample did not include all blacksmiths in Ghana. It had primarily focused on those found in only the Kumasi metropolis, comprising a relatively small sample size of 109 blacksmiths. As such it limits the extent to which generalization of issues can be made. It was also very difficult in getting the right information from some of the selected blacksmiths for fear that the information provided would one way or the other get to the tax authorities as most of them do not fulfil their tax obligations despite the assurance given by the researchers that all information provided would be treated confidentially, through the use of strict coding measures.

Results and discussion

Profile of blacksmiths

All the 109 craftsmen interviewed were Ghanaians and full-time blacksmith practitioners who were in active practice. About fourteen percent (13.7%) of them were below 30 years of age. The majority (78.8 %) were between the ages of 31 and 50 years. The remaining 7.3 % were 51 years and above (Table 2). This implies that the majority of the skilled artisans are of an old age which is a challenge or constraint to the future of the industry. This observation could probably be due to the reason that the younger generation prefer collar jobs and lack interest in such a profession, which involves a long period of apprenticeship. A basic education is a requirement for every business. The higher the level the better the management and outcome of the business. An educated person is more organized and also appreciates the concepts of the business better. All the craftsmen interviewed had some level of education, spanning from basic education (58.7%), secondary (16.5%) and tertiary which comprises graduates from technical colleges, polytechnics and diploma awarding institutions (13.7%). Only 11 % of the respondents had no formal education (Table2). This agrees with the 2021 Ghana Population Census which classified about 67 per cent of the total population of Ghanaians as being literate (GSS 2021).

The study on gender distribution revealed that all the participants were male. This observation is not peculiar to Ghana alone, it is of a global phenomenon because blacksmithing has historically been misinterpreted as a males-only profession, which requires lifting of heavy materials, tools and equipment. In Ghana blacksmithing has also been tagged as “male dominated profession”. It is perceived as a high-risk job, demanding physical strength and time

consuming. In another breath, it is perceived to be for the school-drop-out, and has low social standing. That notwithstanding it is also perceived that blacksmiths do not make good money, and old-age poverty is pretty common. Statistics on female blacksmiths in Ghana is unavailable, probably because previous studies might not have captured them or their numbers might be very insignificant. The results obtained in this study on the gender distribution agree with the study by Adu et al., (2014), who assessed the blacksmith industry in Suame Magazine, Ghana.

Table 2: Profile of Craftsmen

Factor	Frequency	Percent
Sex		
Male	109	100
Female	0	0
Total	109	100
Age		
20 - 30	15	13.7
31 - 40	44	40.3
41 - 50	42	38.5
51 - 60	8	7.3
Total	109	100
Marital status		
Married	61	56
Single	48	44
Divorced	0	0
Total	109	
Religion		
Christianity	88	80.7
Islam	21	19.2
Traditionalist	0	0
None	0	0
Total	109	100
Education		
Junior High School	64	58.7
Senior High School	18	16.5
Technical	15	13.7
None	12	11
Total	109	100

Requisite skills, experience or expertise is a necessity for the success of every business (Soni, 2005). The number of years the respondents had practiced ranged from 2 – 30 years. A large proportion of the respondents (76%) did not possess the necessary technical qualifications related to blacksmithing. Instead the apprenticeship system provides effective-informal training for them. The apprenticeship system is well developed in Ghana where young men and women undertake sector-specific private training, which yields skills used primarily in the informal sector. Apprentices make up nearly 25% of working-age Ghanaians (Monk et al., 2008).

About 60 % of the blacksmith's workshops visited had an average of two (2) apprentices while the rest had between three (3) and five (5) apprentices each who worked with the master craftsman. Table 3 shows that eighty-eight of the respondents representing 80.7% of the shops were owned by individuals, fifteen (15) representing 13.7% were jointly owned.

The study observed that a total of only 12 of the respondents representing 11% owned more than one workshop. The reason for the low numbers could be attributed to lack of funds for the establishment of additional workshops. Research however indicates that the number of business entities or units have significant impact on the growth and profit of a firm. Grant et al., (1988) indicated that firms with two or more units usually enjoy synergy in production, marketing and other aspects of the firm which enhances its performance and growth. Also, in terms of income generation two or more units of a firm are more likely to provide twice the income of the firm.

Status of blacksmith industries

The study observed that the blacksmithing industry was divided into three (3) categories consisting of those blacksmiths who worked solely on the drilling of holes and the removal of broken bolts in vehicles and other equipment and replacing them with new ones they fabricated, described as lathe blacksmithing (7.3%). The second group consisted of those who fabricated household and farm implements such as hoes, cutlasses, rake, wheel barrows, gongon, pick axes, saws, ploughs etc (41.2%). The last group are engaged in heavy duty activities including fabrication of farm machineries, vehicle parts, trailer springs, vehicle frames, vehicle spare parts and accessories (51.3%). (Table 3).

Table 3. *Status of business*

Number of years in business	Frequency	Percentage
Less than 1 year	2	1.8
1 – 5 years	12	11
6 – 10years	42	38.5
11- 20 years	26	23.8
21 – 30 years	24	22
31 years and above	8	7.3
Total	109	100
Ownership		
Individual	88	80.7
Family	6	5.5
Group	15	13.7
Total	109	100
Type of blacksmith		
Household equipment	20	18.3
Farm implements	25	22.9
Heavy duty	56	51.3
Lathe	8	7.3
Total	109	100
Number of workshops		
One	97	89
Two	8	7.3
More than two	4	3.7
Total	109	100
Work premise		
Owned	88	80.7
Rented	21	19.2
Total	109	100
Business registration		
Yes	38	34.8
No	71	65
Total	109	100

The study established that majority (65 %) of the respondents had not legally registered their businesses. They attributed their noncompliance to factors including high registration fees, the bureaucracy processes involved, and required documents for registration.

A key obstacle to the growth of SMEs is the challenge in accessing capital for their businesses. Finance is needed at the starting phase of a business as well as at the enduring phases. The study observed that the capital base of the respondents is very weak. The startup funds for the majority (82.5%) of the respondents come from their own resources or borrowed fund from unorganized sectors like friends, relatives and professional lenders (17.4%). None of the respondents have obtained the required investment from organized sectors like banks, financial institutions and government channels. They cited the following reasons for not obtaining credit from these sources: (1) cumbersome financing system of government institutions and banks, (2) high interest rates, (3) need for collateral and (4) delay in obtaining funds.

Almost all (88.9%) the respondents indicated that the unreadily availability of the required raw materials and the high cost affects their entire operations. They explained that because they are segregated into small units with weak financial base, they usually resort to the services of middlemen to acquired raw materials on credit. Such an arrangement results in higher costs due to the high margins of the middlemen. Moreover, irregular supply of raw materials adversely affects their production schedules and delays in delivery.

Operational status of blacksmiths

Ninety-eight (98) of the respondents representing 96% use locally manufactured tools and equipment in fabricating items, while eleven (11) representing 10% use somewhat modern tools and equipment for production. Some of the basic hand tools use in their fabrication processes include hammer, chisel, tongs, punches, anvil, drifts, fullers, cone mandrel and drilling tool. It was also observed that majority of the respondents relied on the use of old techniques and stereotyped methods of production which probably explains why the industry has not and is still not making the needed impact at the national scale to rake in the needed foreign exchange through export.

Distance from home to workplace may influence daily time of opening business and spent on the job. The study noted that most (59.6%) of the respondents travelled from varying distances with different mode of transports to their work places (Table 4). These factors may also impact on the profitability of the business

The blacksmithing operations were observed to be mostly carried out in structures along the roadside and sometimes in miniature workshops and under trees with others using any available public space (popularly referred to as ‘no man’s land’). The work environment of majority (77.9) of the workshops visited was poor and not properly organized or managed which in itself impact negatively on the performance of the industry. A well organized and attractive workplace is viewed by consumers as organized and professional which attracts profit. Kessides (1993) posits that physical infrastructure contributes to the growth of an industry by raising the economic returns of labour (by reducing workers’ time in nonproductive activities or improving health. The need for artisans to improve upon their workplace safety and production processes has also been reiterated by the United Nations (UN, 2010:65).

It was observed that the blacksmiths had no specific time of eating and resort to buying food from food hawkers who visit the premises or from close by food sellers. Washing of hands before eating was not properly done and in certain instances the blacksmiths do not even wash

their hand before eating. There were basically no places of convenience at all the workshop visited. This may probably be due to lack of regulation and inspections, informal management structures, and lack of organizational safety culture as opined by Clarke, (2005), which contravenes article 24 (1) of the Constitution of Ghana which gives every person the right to work under satisfactory, safe and healthy conditions.

Table 4. Operational status

Startup capital	Frequency	Percentage
Own resources	90	82.5
Family/friends financing	19	17.4
Loan from financial institution	0	
Total	109	100
Distance to work place		
Far	65	59.6
Close	44	40.3
Total	109	100
Raw materials		
Readily available	12	11
Not available	97	88.9
Total	109	100
Equipment and tools		
Modern equipment and tools	11	10.0
Obsolete	98	89.9
Total	109	100
Work space		
Appropriate	24	22
Inappropriate	85	77.9
Total	109	100
Bank account		
Yes	84	77
No	25	22.9
Total	109	100
Occupational injuries		
Yes	109	100
No	0	0
Total	109	100
Business insurance		
Yes	0	0
No	109	100
Total	109	100
Membership of association		
Yes	42	38.5
No	67	61.4
Total	109	100

The importance of operating bank accounts by a business cannot be overemphasized. It enables the business to have access to financial credit and services by formal financial institutions. Payments of goods and services can also made through electronic transfers, debit and credit cards. It also serves as a guarantee to the business. The use of bank accounts by the respondents was very encouraging as the majority (77%) were observed to be operating various formal and informal

bank accounts (susu, rural banks, mobile banking, commercial banking) for their business (Table 4). The operation of SMEs like the blacksmithing industry is susceptible to all forms of threats, including political instability, natural disasters, theft, fire outbreaks and other economic crises. These unexpected events interrupt business activities resulting in significant financial burdens and collapse of some business. Studies have shown that most SMEs do not survive beyond a decade after being established while for others, surviving is a constant struggle due to these events (Ngoasong & Kimbu, 2019). It is therefore important for businesses to develop ways of cushioning themselves against such adversities – through various strategies, including but not limited to insurance uptake (Williams and Baláž, 2015).

Surprisingly none of the respondents in this study had any form of insurance for their business. They perceived investing in insurance as an additional cost. Insurance however, is very important for the proper performance and sustainable growth of any business as such the needed education should be provided for a change of this perception. Just like uncertainties in life, uninvited circumstances and events can also impact businesses. The COVID-19 pandemic is a typical even that made the world realized the uncertainty of life and business and in such a situation, insurance can be the only protection guard.

One key determinant for the performance and growth of any industry particularly SMEs is the formation of associations. Associations or work groups are important for several reasons. They serve as sources of information dissemination and link the production capabilities of its members with a wide array of markets. They also create a potential marketing strategy that position the group against larger and more powerful competitors (Torres, 2002). Furthermore, associations are more recognized by Governments agencies and financial institutions in matters of credit facilities and other related supports. The study realized that even though the blacksmithing industry had an association only 67 of the respondents representing 61% were members. While the majority could not give any tangible reason for non-membership, others expressed their wiliness to becoming members of the association.

Finance and marketing

The study observed that there was not much difference so far as the demand for products of the respondents were concerned. Forty-three (43) of the respondents representing 39.4% indicated improvement in demand and 48 representing 44% said demand had fallen while 18 representing indicated a no change in demand (Table 5). An important determinant trend impacting on the performance and growth of the blacksmithing industry is the demand for low-priced, machine-made products that are of higher quality. It came to the fore that the Ghanaian market is flooded with competitive foreign machine-made products that are less expensive than the high-quality products of Ghanaian counterparts. Similar observation was made in South Africa by Frost and Sullivan (2005).

Any business that invests in advertising its products has a competitive advantage and grows its business faster enjoying more profits (Riaz et al., 2015). None of the respondents in this study however had any form of advertising scheme apart from the usual inscriptions on their workshops. (Table 5). Barnes and Jacobsen, (2013) reiterated that the use of social media often gives a relative advantage to businesses. Modern communication tools allow organizational owners to reach their customers faster and more frequently, creating a more honest and open dialogue that leads to more relevant feedback. Social Media approach also has a strong relationship to the company's competitive advantage (Singla and Durga, 2015) and impact positively on marketing and strengthened customer relations and improved information usability (Sulaiman et al., 2015).

Table 5. *Finance and marketing*

Market demand for products	Frequency	Percentage
Increased	43	39.4
Decreased	48	44
No change	18	16.5
Total	109	100
Access to market information		
Yes	94	86.2
No	13	11.9
Total	109	100
Profit margin		
No change	58	53.2
Increased	51	46.7
Decreased	0	0
Total	109	100
Products Advertising		
Yes	0	0
No	109	100
Total	109	100
Access to bank credit		
Yes	0	0
No	109	100
Total	109	100
Tax incentives		
Yes	0	0
No	109	100
Total	109	100
Post Covid Govt support		
Yes	0	0
No	109	100
Total	109	100

As a result of the Covid 19 impact on businesses many governmental and nongovernmental organizations (NGOs) have provided various forms of support to SMEs, The Government of Ghana for instance has put in place diverse supports for businesses including the establishment of a Coronavirus Alleviation Programme to protect jobs, livelihoods and support small businesses. Additionally, there is the Government's GH¢600 Million Stimulus Package to small and medium scale enterprises (SMEs). Majority of the respondents (88%) in had heard of some of the interventions Government has put in place to support businesses including the establishment of a Coronavirus Alleviation Programme GH¢600 Million Stimulus Package to small and medium scale enterprises (SMEs) none of them had been a recipient of such package (Table 5).

Implementation of Total Quality Management

Organizations use TQM to improve their product design, ensure increased revenue, eliminate wastages and defects, encourages collaboration and team work and enhances market image. TQM is thus an improvement to the traditional way of doing business and a proven approach to guaranteeing survival in global market competition (Fening et al 2022).

Total quality management provides the quality assurance that customers will get what they expect, as well as a process for managing unsatisfied customers make needed corrections and prevent similar reoccurrences. Total quality management also boots the financial health of a business and improves talent connectedness and communication.

The respondents understood TQM to mean a range of different things in the context of their work. Majority (88%) of them understood quality to mean the final product ready for market. They also considered the weight, shape, design and finishing of the product as and durability as quality. Even though the respondents indicated their products were not subjected to the Ghana Standard Authority quality assurance standards and also do not know about ISO standards, they however, adhere to their internal standards. Majority (77%) of the respondents were operating with service recording note books, in which requests are logged in with customer name, product type, quantity and delivery dates. A few (16.5%) others were using a form of tally cards which are design to contain customer's name type of service, product and date of receipt of request and date of service or product delivery (Table 6).

Table 6. Implementation of TQM

Use of new technology	Frequency	Percentage
Agree	8	7.3
Not sure	28	25.6
Disagree	73	66.9
Total	109	100
Service delivery		
Meet timeline	55	50.4
Mostly deliver on time	30	27.5
Unable to deliver on time	24	22.0
Total	109	
Record keeping		
Yes (Note books)	84	77.0
Yes (Tally card)	18	16.5
No	7	6.4
Total	109	100
Continues improvement		
Agree	48	44
Not sure	55	50.4
Disagree	6	5.5
Total	109	100
Effective supervision		
Agree	102	93.6
Not sure	7	6.4
Disagree	0	0
Total	109	100
Putting customer first		
Agree	12	
Not sure	12	
Disagree	76	
Total	100	
Focus on quality products		
Agree	62	56.9
Not sure	42	38.5

Disagree	5	4.6
Total	109	100
Conduct market survey to improve on products and services		
Agree	8	7.3
Not sure	12	11.0
Disagree	89	81.6
Total	109	100
Quality policy		
Yes	0	0
No	109	100
Total	109	100
Source for information on business		
Social media	2	1.8
Internet	0	0
Business association	45	41.2
Colleague workers	62	56.8
Total	109	100

One important factor that affects the performance and growth of any enterprise is service delivery. When the respondents were asked to give their views on their service delivery, 50.4% of them indicated that they are able to meet their timelines.

About twenty eight percent (27.5%) said they can deliver on time most of the times, while 22% are not always able to deliver on time. The craftsmen considered these shortcomings as being some of the challenges of the occupation and attributed them to a host of reasons including shortage/non availability of raw materials, volume of products, lack of capital, obsolete equipment, and power cuts. The study showed that the respondents are not customer oriented. This was obtained from the fact that as much as 76% of the respondents disagreed that their firms conduct a customer satisfactorily survey yearly as a means for continuous improvement for quality assurance. Also 81.6% of the respondents disagree that their firms conduct market research in order to collect suggestions for improving their products and services (Table 6). The validity of this finding was earlier indicated by Obiri (2002) who conducted a study to investigate whether SMEs businesses adopt a market-led approach in marketing their products. The results showed that the majority of artisans fabricate products based on personal inspiration instead of the demand from the market.

That notwithstanding the greater proportion of the respondents indicated that customer services were their priority, since that ensures that old customers are retained and new ones are attracted. One of the key practices of TQM as proposed by Deming (1999) is the preparation of a quality policy by the business organization. Unfortunately, none of the firms had a written quality policy. The advent of ICT has impacted on how small and large business are operated across the globe in recent time. A lot of businesses have made tremendous improvement in their operations through the use of smart phones, internet and other social media platforms. (Harvie and Charoenrat, 2015, UN, 2008). Consumers are also increasingly using the internet as a source of information for acquiring products and goods (UNIDO, 2007; USAID, 2006).

Only a few (8%) of the firms surveyed make use of modern technology in their business to improve quality of their products and services. (Table 6). Rather they prefer to use the traditional old methods of doing business. This is contrary to the assertion by Ankrah 2012 that the availability of information technology today is being leveraged in customer acquisition,

driving process efficiency, delivering ease and efficiency to customers. These findings agree with that of other studies by Mensah et al (2012) and Fening et al (2022), that TQM among SMEs in Ghana is very low.

Benefit cost analysis

The study observed that though the blacksmithing industry has been in existence long before Ghana's independence, the artisans still depended on the use of obsolete tools and equipment and same method and techniques of operation as illustrated in Plates 1a -1c.



Plate 1a. *Furnace made in the ground.*



Plate 1b. *Artisan quenching a metal object in a bucket of dirty water*

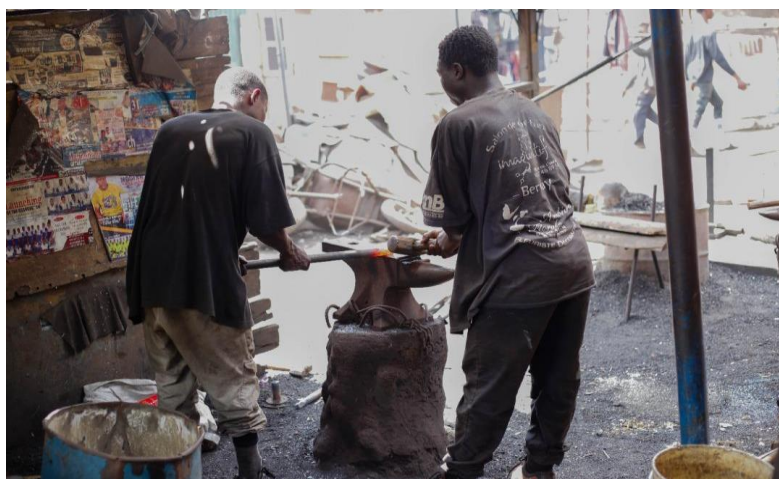


Plate 1c. *Artisans forging a heated metal*

A close interaction with the artisans revealed that most of them were unwilling to adapt to changes, since they consider those changes will not bring any significant change to the performance and profitability of their business. All the respondents complained of the high cost of technology adoption, for example acquisition of modern equipment and training in IT although as indicated by Shahzad et al., (2020) the relative advantage of technology overshadows the conventional operational processes. Subsequently a benefit cost analysis was conducted as a way of comparing the estimated costs and benefits (or opportunities) associated with the decision to determine whether it makes sense from a business perspective, to embark upon new technological approach for the industry.

The Benefit-Cost Ratio (BCR) = Expected Benefits / Total Costs

Assuming an artisan decides to purchase a closed furnace, a forging machine and a heat treatment bath, the potential cost and benefits will be as follows for time horizon of three years:

Cost calculations (Direct and Indirect)

Item	Cost GHC
Closed furnace	72000
Forging machine	60000
Treatment bath	30000
Operational cost	30,000
Total	192000

Benefits calculations

Item	Cost GHC
Revenue for 3 years	180000
Estimated revenue increase by 30% within 3 years	54000
Increase in product quality leading to presumed customer satisfaction increase in revenue by 10%	18000
Total benefits	252000

$$\text{BCR} = 252000/180000 = 1.4$$

According to the benefit-cost ratio calculations, the acquisition of these modern equipment has positive outcomes. Artisans should therefore consider to purchase modern equipment and embark on other technological innovations that will improve efficiency, quality of products, timely delivery of products, instill customer confidence and satisfaction and create industry competitive advantage.

Conclusion

The purpose of this paper was to present empirical evidence on the determinants for the performance and growth of the blacksmith industry in Kumasi metropolis, Ghana. The blacksmithing industry is of cultural and economic importance to Ghana. It keeps the age-old traditions alive and also provides employment to a number of people. The discovery that all variables considered in this study have a form of relationship to the industry's survival and growth is a good starting point. This serves to assist in putting in place the necessary intervening performance strategies and stimulations of production activities for enhanced profitability. The industry should work on implementing TQM practices to boost overall performance and market outcomes. They should also embark on social media concept that

increases awareness and gets public attention with emphasis on customer service and information and strategic technology adoption. Government, its agencies and the private sector could provide the needed support.

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