

TOTAL QUALITY MANAGEMENT IMPLEMENTATION: THE CASE OF GOLD JEWELLERY INDUSTRY IN THE KUMASI METROPOLIS OF GHANA.

Fening, P.A.¹, Agyei, I. K.², Baah, S. K.³, Adala, C. E.⁴ Tetteh, N. A.⁵

^{1,2,3,4}Department of Industrial Art, Faculty of Art, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

⁵Department of Industrial Art, Dr. Hilla Limann Technical University, Wa, Ghana

Abstract

This paper fills a gap by providing empirical evidence on the implementation of total quality management (TQM) practices in the small-scale gold jewellery industry and to ascertain the level at which total quality management (TQM) practices have been implemented in the jewellery industry of Ghana. To achieve such objectives, questions such as to what extent are managers of gold jewellery industries committed to TQM principles of training, customer driven information, process control and improvement, employee empowerment, supplier involvement, and communications were asked. Again, to what extent has the practices of TQM impacted on performance of the industry in terms of productivity, marketing, sales, profit, and quality of product and service was also asked. The study was a work site based cross-sectional one, conducted among 150 gold jewellery industries in the Kumasi Metropolis. Data obtained for this study were acquired through the use of questionnaire and personal interviews. Data collected included socio-demographic profile, training, experience, job duration, and commitment of management to quality, total quality training, customer driven information, and availability of quality data, TQM methods, and supplier involvement. 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 study observed that differences exist between the industries in relation to managerial education level, TQM awareness, managerial commitment to TQM, principles of continuous improvement, use of new technology, putting the customer first, effective supervision and enforcement of quality practice. The relatively low level of implementation of TQM by the majority of the jewelers has impacted negatively on their financial and organizational performance. The study examined for the first time TQM implementation in the small-scale gold jewellery industry in Ghana, using cross sectional data collected via questionnaires. The findings will be of value to managers of these industries to enable them initiate the necessary approach to achieving organizational excellence. Policy makers could also initiate policies aimed at encouraging training in TQM practices of small-scale industry owners and managers.

Key Words: Customer focus, gold jewellery, quality, small scale industry, management

Introduction

The concept of quality has its roots back in medieval Europe, in the late thirteenth century, where craftsmen organized themselves into guilds to protect their products. Quality today has become one of the most important competitive strategic weapons, which is key to developing products and services. The principles of Quality Management underpin the ISO standards and is a fundamental rule for leading, operating and developing an organization or company, with the objective of continually improving performance over the long term through a focused approach to all stakeholders, particularly customers. The literature on TQM in Ghana has mainly focused on large and medium scale industries and foreign based companies, with very little attention to the small-scale industries which inadvertently form the large proportion of the work force and contribute significantly to the economy.

Quality can simply be defined as an attribute that differentiates a product or service from its competitors. The philosophy of quality continued into the Industrial Revolution in the early 1800s. During the mid-1920s, philosophy was broadened include not only the finished product but also the processes needed to achieve quality. Overtime growing international trade stimulated the development of internationally recognized quality standards, known as the ISO 9000 series of quality assurance standards that are the cornerstone of quality management. Following this the concept of Total Quality Management (TQM) came into practice when a serious weakness in manufacturing process was observed, whereby that quality control processes was observed to be controlled by Top Management to the total exclusion of the factory floor workers who incidentally had more insight into quality issues. The practice of TQM ensures that every single employee is working towards the improvement of work culture, processes, services, systems and so on to ensure long-term success.

The principles of TQM use a PDCA cycle (Plan, Do, Check, Act) for continue control and improvement of organizational outcomes. Today TQM has become a universal management framework that benefits all kinds of organizations. Organizations use

TQM to improve a 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.

The implementation and success of TQM practices may vary from organization to organization since no two organizations are the same. And even without a single agreed upon approach, the technique includes the following factors: committed leadership, adoption and communication of TQM, closer customer relationships, benchmarking, increased training, open organization, employee empowerment, zero defects mentality, flexible manufacturing, process improvement, and measurement.

Pertinent literature on QTM has shown that the adoption of TQM practices can allow firms to compete globally. Research has shown that 90% improvement rate in employee relations, operating procedures, customer satisfaction, and financial performance is achieved due to TQM implementation (Ghobadian and Gallea, 1996; Majumdar and Manohar 2016,). Jennings and Beaver (1997) indicated that the inability of small-scale firms to observe quality management practices has been identified as one of the major causes of their firm's failure. This assertion was supported by Hodgetts et al., (1999), who indicated that firms that implement quality practices are better performers as implementation of quality management practices is crucial in reducing the high direct cost associated with poor quality and this in turn will lead to increase in productivity and profitability. Deming (1999), the father of Quality also noted that the pursuit of quality is the key to higher productivity bigger profit, more jobs and a richer society.

Omachonu and Ross (1994) also reiterated that the effective implementation of TQM by firms will increase customer satisfaction and consequently customer loyalty.

Other TQM studies have also indicated that achieving high product quality and pursuing successful TQM implementation are highly dependent on top management support. Motwani et al (1994), however, disagreed with this assertion and indicated that there is no association between top management support for quality and the level of product quality achieved. Whereas several studies have been conducted in the developed world to assess the performance of organizations in their TQM practices. That of the developing world is scanty. Some of the reported studies in the developing world include that by Fening, (2012), Fening et al (2008), Salahedin and Mukhalati, (2009), Yusuf, and Dan (2007).

Changing global economic conditions and lifestyles have resulted in increased competition amongst organizations and companies. As a result, managers of today are increasingly exploring different approaches and strategies to achieve, improve, and sustain organizational performance and competitive advantage. Most small-scale organizations and companies including the gold jewellery industry in Ghana lack the necessary resources to implement quality management practices.

The Ghanaian tradition in gold jewellery making dates back to the 5th century B.C., when craftsmen from ancient Ghana Empire developed a vibrant goldsmith and jewellery making industry (Arhin, 1978). Jewellery making skills were passed on through generations to the craftsmen of present-day Ghana previously known as Gold Coast (Meyerowitz, 1974). Today, this tradition is evident in the local jewellery industry of over one thousand indigenous artisans.

The industry is largely made up of micro enterprises, consisting of the 'one-man' self-employed type, operating in the craft mode, using outmoded equipment.

Many craftsmen lack the requisite technical skills and are unable to keep abreast with modern trends. Others cannot work out the required alloy components accurately and are therefore unable to correctly prepare the various gold alloys and their solders. (Fening, 2015). The supply of gold to the sector is erratic and informal. A major portion of the required tools and equipment are imported and expensive. The aggregate equipment level of the sector is thus low which hampers efficiency and effectiveness in product delivery (Fening, 2015). Modern technology in the jewellery industry has remained largely untapped in Ghana. Over the years the craftsmen have evolved unique handcrafting techniques for executing exquisitely designed gold ornaments. While traditional know-how is indispensable to the sector, modern trends in jewellery production have completely revolutionized jewellery making especially for the mass market, to such an extent that it is no more globally competitive to operate solely in the craft mode as obtained in the country. Technology and research-led innovation are key factors in the long-term future of an industry, where they are needed in both design and manufacturing (Cross, 2002). While use of better designs can enable jewelers to differentiate in the market and attract higher premiums, technology can enhance productivity, quality and finishing of jewellery produced (Repp and McCarthy, 1989). Furthermore, the factors that have influenced the supply and demand of jewellery globally have impacted on the industry in Ghana as well. The response of the industry to these factors, and its capacity to adapt, have been affected by elements intrinsic to the country and the industry itself. It is through insight into the growth trajectories of the jewellery industry in different contexts that the evolution of Ghana's industry can be understood, and its potential for further development assessed.

From the foregoing discussion it can be said that in order for the jewellery industry to become globally competitive and to ensure accelerated growth, a paradigm shift towards the implementation of TQM is required. The question however, is how are the managers and owners of these jewellery industries familiar with quality management practices? And if they do what is the state of implementation?

Methodology

The study area which is 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 (Fig 1). The Kumasi metropolis was chosen for the research for a number of reasons, (1) it can boast of several goldsmithing industries, (2) 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,), (3) market for the neighboring countries of Cote d’voire, Burkina Faso, Mali, and Niger.

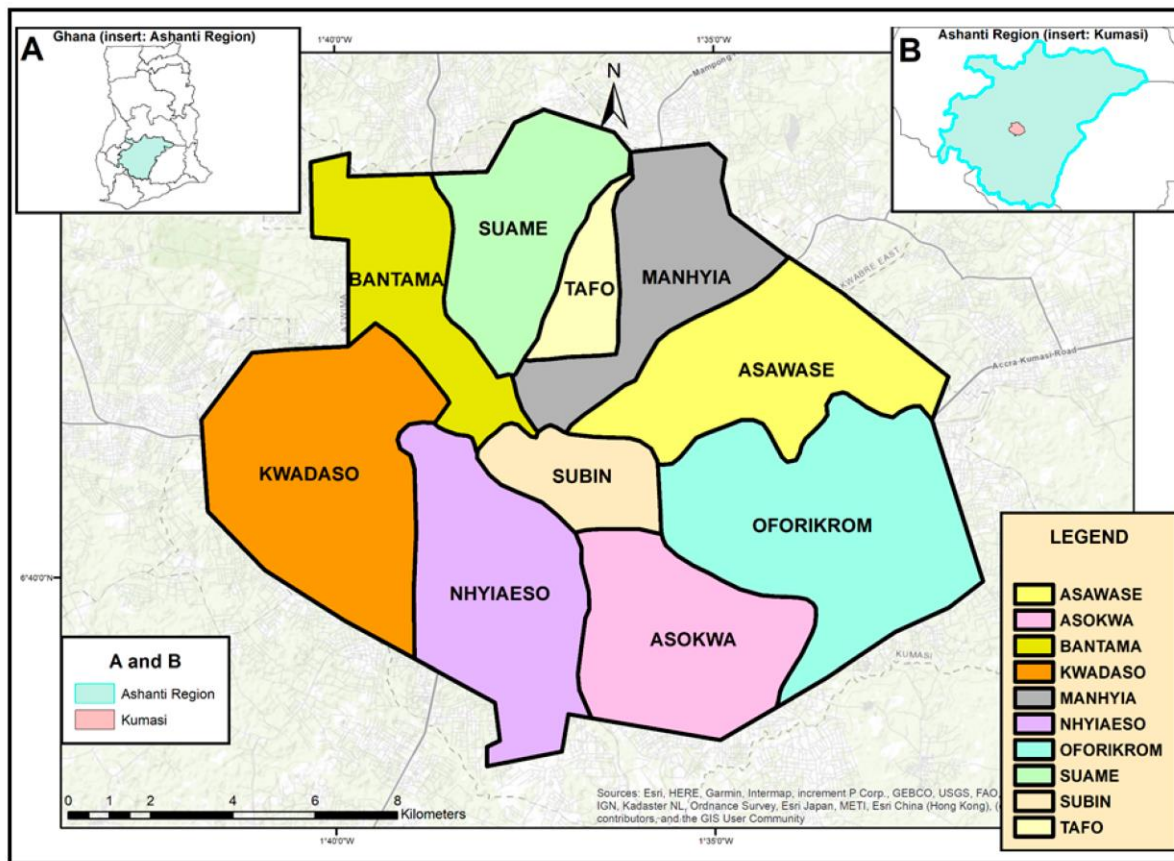


Figure 1. Study Area: Kumasi Metropolis with its sub-metropolitan divisions.

Source: Fosu Frimpong and Molkenhthn, 2021

Sampling Technique

Population for this particular study, is so large that its characteristics will be difficult to measure or cannot be measured. In such cases, before the measurement is completed, the population might have changed (Best, 2002). This is where sampling comes in to select sizeable members from the parent population to be studied.

Quartey and Awoyemi (2002) agrees that sampling without doubt is a subset of the population and consists of individuals, objects or events that form the population for the study.

The convenience sampling method was employed in arriving at the 150 small scale gold jewellery industries in the metropolis, which the researchers believe possess the experience relevant for this study and who have sufficient time and were willing to participate. The technique, involves 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 exposed them to tax authorities. Besides, the quality of responses was high as participants took their time to respond to the questionnaire.

Data collection

Data collected for this study was solely from primary sources which 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 managers and owners of the jewellery workshops. 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).

The data collection exercise was done between January and March 2022. 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 fifty (150) respondents were used for the study who were selected randomly.

Before the commencement of the study, gold jewelry workshops in the study area were located and coded. At each identified workshop the objective of the study was explained to the managers and owners 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, number of workers employed, whether industry uses TQM or any quality management tool, how long it has used TQM or any quality management tool, foreign owned and managed or indigenous owned and managed, training, customer driven information, process control and improvement and top management commitment to TQM.

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.

Results and Discussion

All the 150 craftsmen interviewed were Ghanaians and full-time practitioners who were in active practice. Twenty percent (20%) of them were below 40 years of age. The majority (75%) were between the ages of 40 and 50 years. The remaining 5% were 60 years and above. Most of them work in groups of between three and six. All the craftsmen interviewed had some level of education, spanning from basic education (5%), secondary (18%) and tertiary which comprises graduates from technical colleges, polytechnics, diploma awarding institutions and the universities (78%). Seventy two percent (72%) of the craftsmen were males and 28% female

Two (2) out of the sampled gold jewellery workshops were established before Ghana's independence of 1957. The others were established between 1960 and 2004. This confirms that the industry has seen a tremendous expansion after independence. The upsurge could also result from a number of factors including the increase in the number of graduates who studied jewellery and had gone into the trade and the diversification of the economy in accordance with the nation's Economic Recovery Program (E.R.P) objective of promoting substantial growth in the export sector and enhancing the country's earnings through the development, diversification and promotion of non-traditional exports.

This study considered seven of the critical factors in the implementation of TQM and how each of the factors contributes to the implementation of TQM in the gold jewellery industry. The factors considered were: Quality management, customer focus, top management commitment, education and training, process control and improvement, supplier quality, process control and improvement to customer satisfaction and staff involvement.

The respondents had a range of meanings to explain or define quality. Majority (68%) of them defined quality as the final product with the specified gold karat. Other things that comprise quality included the weight, shape, design and finishing of the product and durability.

The issue of product perfect fitness to customer though important, was not considered as a quality index. Almost all the respondents agreed to the fact that there are internal standards for jewelry making which to them borders on the availability of the needed equipment, which contributes significantly to the finishing product and for that matter product quality. This assertion agrees to the observation made by Fening, (2015), who indicated that the aggregate equipment level of the gold jewellery sector in Ghana is low and therefore hampers efficiency and effectiveness in product delivery.

A good customer service experience was also mentioned as very important to the industry. Over 64% of the respondents indicated that customer services were their priority, since that ensures that old customers are retained and new ones are attracted. Customer service was explained by the respondents as making a product to the specification and satisfaction of the customer. Timely delivery of services and products was also mentioned as a key component of customer service. While most (78%) of the respondents had service recording note books, in which requests are logged in with delivery dates, a few (18%) used 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.

When asked to give their views on their service delivery, 45% of them indicated that they are able to meet their timelines. Thirty percent (30%) said they can deliver on time most of the times, while 25% are not always able to deliver on time. This the craftsmen considered as being some of the challenges of the occupation.

The study observed that majority (86%) of the respondents had no knowledge of TQM concepts and were therefore yet to adopt TQM.

Reasons given for the non-adoption and implementation are provided in Table 1, with 138 of the industries indicating that they do not have the proper structures in place, 150 firms indicated they were not familiar with the TQM policy, while 118 firms stated that quality was ensured during the manufacturing process, but not TQM approach to quality. Majority of the managers also indicated they have had no training and education on the TQM concept and ISO 9000 standards.

Table 1: Non – Adoption and implementation of TQM

Factors	Number of industries	Percent
Absence of required Structures	138	92
Lack of knowledge on TQM	129	86
Quality is incorporated in work	118	78.6
Absence of TQM policy	150	100

These findings support earlier studies reviewed from literature by Mensah et al. (2012) that, TQM concept among indigenous Ghanaian firms is very low. However, during the interaction, it was noted that some TQM concepts were practiced during their daily work processes. For example, there was evidence of continuous improvement among them, as evidenced in new innovations for the production of old aphorisms and symbols. This was in part as a result of the ever-evolving nature of the industry and global cultural influence.

The role of leadership in quality management forms the backbone of any improvement strategy. Leaders and managers provide a unity of purpose, while also establishing the direction of the organization. As such, the responsibility of leaders consists of creating and maintaining the internal environment.

Top management role in the implementation of TQM in this study was observed to be very low. Only 15% of the respondents agreed that top management actively participates in quality management activities. Majority of them (75%) agreed that top management focuses more on product quality rather than the remaining TQM factors (Table 2).

Table 2: Role of top management in TQM implementation

Factors	Agree	Not sure	Disagree
Top management implements quality management practices	15	5	80
Top management discusses quality management issues with staff	12	4	82
Top management provides adequate resources for quality management activities	20	4	76
Top management focuses on quality of product	88	4	8
Top management provides adequate resources for employee education and training	12	9	78

An interesting observation concerning producer's raw material supplier as a TQM factor was that almost all the respondents had established long-term cooperation with designated licensed gold dealers who operate in shops close to their workshops. These dealers supply them with quality materials.

Process control and improvement in the various workshops were not very impressive. Most (72) of the visited workshops were small and limited in size. A few (18) of the showrooms attached to the workshops were also small and limited in size. Those without showrooms display their products in small show cases just within the workshop. The surroundings of some of the workshops were not impressive. Some of the production equipment were outdated which raises concerns about operating efficiencies.

A TQM concept that was evident in all the jewellery workshops was the employee empowerment through the apprenticeship model. The apprenticeship system continues to provide effective-informal training of craftsmen for the jewellery industry. About 60 % of the workshops visited had an average of two apprentices while the rest had between 3 to 6 apprentices each who worked with the master craftsman. The apprenticeship system gives employees a form of managerial or oversight responsibility. Training duties are delegated to master craftsman who ensures that teaching and learning is passed on from one set of apprentices to another. This finding is reiterated by many other research findings including that of Abdullah et. al, (2008) who indicated that training and education is one of the most important factors for the successful implementation of TQM. Employees of similar firms should therefore be encouraged to undertake such in house education and training models. The findings from this study however revealed that there was lack of adequate resources for employee education and training which impact negatively on TQM methods.

Table 3: Education and Training in TQM implementation

Factors	Agree	Not sure	Disagree
Education on Quality management is provided	4	8	88
Employees are trained on the job on how to use quality management tools	12	8	80
Resources are available for employee training on quality management	5	6	89
Employees are encouraged to undertake training	20	12	68

Response obtained from the survey concerning overall customer focus in TQM implementation showed that the study respondents are not customer oriented. As much as 65% of respondents disagreed that their firms conduct a customer satisfaction survey every year (Table 4).

Also, 45% of the respondents disagreed that their firms conduct market research survey in order to collect suggestions for improving their products and services.

Table 4: Customer Focus in TQM implementation

Factors	Agree	Not sure	Disagree
Quality-related customer complaints are given priority attention			
Our firm conducts a customer satisfaction survey every year	30	5	65
Our firm always conducts market survey for suggestions in order to improving our products and services	35	20	45
Our firm collects feed backs of complaints from customers	25	20	55

Deming (1999) proposed that one of the key practices of TQM is the preparation of a quality policy by the business organization. Unfortunately, none of the firms studied had a written quality policy document (Table 5). Majority of those who declared commitment to quality and enforcement of quality standards also reported that their products meet international quality standards although most of them do not know what quality standards such as ISO standards were. Ankrah (2012) stated that the availability of Information technology (IT) today is being leveraged in customer acquisitions, driving automation and process efficiency, delivering ease and efficiency to customers. In this study only a few (32%) of the firms make use of new modern technology in their businesses to improve the quality of their products and services. Employee participation influences the successful implementation of quality management by significantly enhancing savings and reducing wastes and defects and thereby saving time and energy.

Responding to the question of employee participation in quality management activities of firms, 80% of the firms indicated that employees are actively involved in quality related activities.

The results further showed that 70% of the employee's suggestions are well received and implemented for improvement.

The study revealed that the implementation of TQM concept by the gold jewellery industry was coupled with a lot of challenges including communication of quality policy to staff, lack of understanding of TQM concept, inadequate resource to train staff, TQM awareness, top managerial commitment to TQM, principles of continuous improvement, use of new technology, putting the customer first, effective supervision and enforcement of quality practice as listed in table 5. The challenges enumerated in this study were not different from those as indicated by Yazdani, A., Soukhakian, M.A. & Mozaffari, M. R. (2013) as barriers to TQM implementation. These challenges are said to have resulted in a lot of failures in the implementation of TQM among firms.

Table 5: Challenges in TQM implementation

Factors	Frequency	Percent
Lack of understanding of TQM concept	129	86
Inadequate resources to train staff	132	88
Implementation of TQM is expensive	84	56
Lack of communication on quality policy to staff	150	100
Lack of top management commitment	129	8
Absence of new technologies	126	84
Absence of discussion on quality management issues	117	78

Conclusion

The study as a novel, examined for the first time TQM implementation in the small-scale gold jewellery industry in Kumasi, Ghana, using cross sectional data collected via questionnaires. Some significant findings on the extent to which TQM is being implemented by the small-scale gold mining industry has been revealed by this study, which suggest that, TQM implementation in Kumasi, Ghana is generally very low among the jewellery industry. The evidence from this study leads to the conclusion that, composition of top management and their level of education and operations, have a significant impact in the implementation of TQM. Every effort should therefore be made by policy makers to create a quality and TQM culture in all small-scale industries. The TQM approach, methods and techniques should be tailored to the needs of the individual industry so as to make it more effective. The key among them should include, proactive commitment by managers and owners to continuous improvement in products and services, customer services and products and ensure TQM is for every employee not just top management.

References

1. Abdullah, M.M.B., Ahmad, Z.A & Ismail, A. (2008). The Importance of Soft Factors for Quality Improvement: Case Study of Electrical and Electronics Firms in Malaysia, *International Journal of Business Management*, 3(12)
2. Ankrah, E. (2012). Technology and Service Quality in the Banking Industry in Ghana. *Information and Knowledge Management*, 2(8), 52-60
3. Arhin K. (1978). Gold Mining and Trading among the Ashanti of Ghana. *Journal. Des Africanistes*. 4, 89-100
4. Beaver, G. (2002). Strategy and management in the smaller enterprise, *Strategic Change*, 11 (4), 175-81.
5. Best, J.W. (2002). *Research in education*. New Jersey: Prentice Hall Inc., Englewood Cliffs
6. Cross, N. (2002). Creative cognition in design: Processes of exceptional designers. In proceedings of the 4th conference on creativity & cognition (pp. 14-19). ACM.
7. Dayton, N.A. (2001). Total quality management critical success factors, a comparison: The UK versus the USA, *Total Quality Management*, 12 (3), 293-298
8. Deming, W. (1999). *Quality Management. 4 Edition*, Prentice Hall, London, UK.
9. Hodgetts, R., Kuratko, D. & Hornsby, J. (1999). Quality implementation in small businesses: perspectives from the Baldrige award winners. *SAM. Advanced Management Journal*, 64, 37-47
10. Ghobadian, A. & Gallear, D.N. (1996). Total quality management in SMEs. *Omega* 24 (1),83-106
11. Fening, F. A. (2012). Impact of Quality Management Practices on the Performance and Growth of Small and Medium Sized Enterprises (SMEs) in Ghana. *International Journal of Business and Social Science*, 3(13), 1-13.
12. Fening P. A. (2015). Design Trends in Gold Jewellery Making in Ghana and Global Cultural Influence. *Journal of Arts and Humanities* Vol 4. No. 4: 57-62
13. Fening, F.A., Pesakovic, G. & Amaria, P. (2008). Relationship between quality management practices and the performance of small and medium sized enterprises in Ghana. *International Journal for Quality and Reliability Management*, 25 (7), 694-708
14. Fosu, F.B. & Molkenhain, F. (2021). Tracking Urban Expansion Using Random Forests for the Classification of Landsat Imagery (1986-2015) and Predicting Urban/Built-Up Areas for 2025: A Study of the Kumasi Metropolis, Ghana. *Land*, 10 (1), 44
15. Jennings, P. & Beaver, G. (1997). The performance and competitive advantage of small firms: a management perspective. *International Small Business Journal*, 15 (2), 63-75
16. Kothari, C.R. (1990) *Research Methodology: Methods and Techniques* Wishwa. Prakashan, New Delhi.
17. Majumdar, J.P. & Manohar, B.M. (2016). Why Indian manufacturing SMEs are still reluctant in adopting total quality management. *International Journal of Productivity and Quality Management*, 17 (1), 16-35
18. Mensah, J.O., Copuroglu, G. & Fening, F.A. (2012). The status of Total Quality Management (TQM) in Ghana: A comparison with selected total quality awards winners from Turkey, *International Journal of Quality & Reliability Management*, 29 (8), 851 – 871
19. Meyerowitz E.L.R. (1974). *The early history of the Akan States*. Red Candle Press, London: pp 192-193
20. Morse, S.J. (1998). Fear of danger, flight from culpability. *Psychology, Public Policy, and Law*, 4, 250-267.
21. Motwani, J.G., Mahmoud, E. & Rice, G. (1994). Quality practices of Indian organizations: An empirical analysis. *International Journal of Quality & Reliability Management*, 11 (1), 38-52
22. Omachonu, V. & Ross, J. (1994). *Principles of Total Quality*, St Lucie Press, Delray Beach, Fla Pallant, J.
23. Pallant, J. (2001). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS for Windows (Version 10)*. Open University Press. Pp 1-15. ISBN 0 335 20890 8
24. Quartey, S.M & Awoyemi, M.C. (2002). *Research methodology in education*. Accra: KNA.B. Ltd., pp. 12, 34
25. Repp, E.V. and McCarthy, W.J., (1989). *Metalwork: Technology and practice*, Glencoe Publishing Company, New York, 1989, p. 316
26. Russell S.R. & Taylor, B.W. (2011). *Operations Management- Creating value along the Supply Chain, 7th ed.* Chapter 2, pp. 56-97. John Wiley and Sons.
27. Salahedin, I. S., & Mukhalalati, B. A. (2009). The implementation of TQM in the Qatari healthcare sector. *Journal of Accounting, Business & Management*, 16(2), 1-14
28. Shea, J. & Gobeli, D. (1995). TQM: the experiences of ten small businesses, *Business Horizons*, 38 (1), 71-77.

29. Yazdani, A., Soukhakian, M.A. & Mozaffari, M. R. (2013). Evaluation of Critical Success Factors in Total Quality Management Implementation and Prioritization with AHP—Case Study: Pars Oil and Gas Company. *European Online Journal of Natural and Social Sciences*, 2, 1624-1633
30. Yogesh Hole et al 2019 *J. Phys.: Conf. Ser.* 1362 012121
31. Yusuf, Y., Gunasekaran, A., & Dan, G. (2007). Implementation of TQM in China and organizational performance: An empirical investigation. *Total Quality Management*, 18(5), 509-530.