

STUDY OF THE IMPACT OF QUALITY COSTS ON PROFITABILITY: THE CASE OF SMALL AND MEDIUM INDUSTRIES IN TANZANIA

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This study investigated the importance of managing quality costs in Small and Medium Industries (SMIs) as a strategy for improving company profitability. It investigated costs of poor quality; the relationship between profitability and bad quality costs and good quality costs. It also investigated the relationship between quality costs and investment in the development of quality management systems.

The study covered three regions in Tanzania, namely Dar es Salaam, Arusha and Mwanza. The study has clearly underscored the importance of initiatives to promote and enhance the effective management of quality costs as a strategy for enhancing profitability in SMIs

Keywords: *Quality Management, Quality costs, SMIs*

INTRODUCTION

The growing globalisation of trade is increasingly forcing companies to be concerned with quality of products and services so as to ensure customer satisfaction. This calls for more effective management through institutionalisation of quality management and assurance systems coupled with the strengthening of quality mindedness or culture.

While in many countries, there has been a significant emphasis on the importance of quality management, the situation here in Tanzania is not encouraging. The industrial sector in Tanzania has for a long period remained largely unaware of the critical importance of quality management for its competitiveness. The situation is particularly worrisome as regards the Small and Medium Industries (SMIs). Despite the useful role of SMIs in the economic development of the country, managers and staff in the companies have not accepted and appreciated the criticality of quality management to enhance competitiveness and sustain growth of their individual companies.

As a result many companies have high rejects, high sub-standard products, high idle machine time, high idle labour, bad company image, over employment, high labour turnover, high customer turnover, high production costs, poor raw materials, low working capital, poor training schemes, poor salaries, poor analysis of complaints, high costs of rework and many more quality related problems. All these are the undesirable quality costs that are being borne by the SMIs.

It is thus argued that many SMIs are finding themselves operating at a loss or even closing down operations due to lack of customers because of the poor quality of their products/services and uncompetitive selling prices resulting from high production /operating costs. There is, however, a dire need for a systematic research to establish clearly the extent and nature of the impact of quality costs on the profitability of SMIs.

A pro-active attack on quality costs is expected to increase the awareness of quality costs and thus give employees an appreciation of the costs that result from mistakes or poor management and not forgetting emphasising on prevention and planning rather than the normal practice of fire fighting or troubleshooting. The quality costs approach can measure progress and thus encourage further processes to be designed to eliminate errors in operations by reinforcing emphasis on doing the right job, right the first time.

LITERATURE REVIEW

Industrial managers in Tanzania do not yet widely share a common understanding on the implication of quality to the competitiveness and growth of their operations (Kundi, 1994). As argued earlier, the quality problem in Tanzanian companies is a real major problem, which requires the co-operation and involvement of the whole company as well as support institutions such as the Tanzania Bureau of Standards (TBS, 1996).

Several factors have been observed to affect the implementation of quality initiatives in Tanzania and several questions have to be addressed first in order to successfully achieve an effective implementation of quality management. Such factors include poor working conditions, meagre salaries, low and delayed allowances, delayed staff promotions, low worker-involvement, poor welfare policies, etc (TCCIA, 1995/6). But a major and very serious problem is the lack of a culture of quality or quality attitudes in the country at large (Ashmore, 1992).

Companies could save a lot of money if they design, develop and offer their products/services, right the first time (Msafiri, 1993). One should consider the time spend to re-do something in terms of repair, re-work, re-testing and scraping. Furthermore, one has to evaluate and quantify in monetary terms how much materials are being wasted. Companies should strive to optimise usage of resources, people & materials, and as well as assets to improve company profitability.

Quality cost are usually measured in four areas which, when added together, represent the total quality costs. The four cost areas or categories are:

- Appraisal costs
- Preventive costs
- Internal failure costs and
- External Failure costs

Failure costs result from defective products, parts, raw materials found within the company or after the product has being delivered to the customer. Included in this category are costs for wastes / rejects; reprocess/recycle; re-inspection, downgrading, complaints, guarantees, allowances, recalls, wrong decisions, etc. Sometimes, the failure costs are also called bad quality costs as they are unwanted costs in the company.

Appraisal costs are the costs of inspection and testing products and raw materials so as to establish conformity to quality requirements (e.g., incoming inspection, product quality audit, process control costs, etc.). These are part of good quality costs.

Prevention costs are the costs incurred in the effort of preventing defects from occurring. Such costs comprise training, development of quality assurance system, vendor evaluation, system quality audit, planning and organising for quality, quality improvement measures, market research costs, R&D costs, design costs, etc. Prevention costs are also considered to be part of good quality costs.

- Unfortunately, the existing cost-accounting systems do not pro-actively capture the above (quality) costs. Traditionally, cost accounting systems divide expenses into prime costs, overhead costs and management costs as follows:
- Prime costs consist of direct material and direct labour expenses. These are inputs into the production of the finished product or service.
- Overhead costs include indirect materials (supplied or consumed in operation but not as

direct part of the end product or service), indirect labour (employees not working on the end product but providing services indirectly related to production) and fixed costs e.g. land, machinery, buildings, etc.

- Management costs (period costs) consists of general administrative, selling and distribution expenses.

Obviously, this categorization is not suitable for capturing the various types of costs related to quality.

Most companies in developing countries spend too little efforts on prevention activities and in most cases appraisal costs are relatively given higher attention with only ad-hoc attention given to failure costs and prevention costs (Msafiri, 1993). In Tanzanian companies, the situation is even worse as companies still believe in the old concept of quality inspection. But companies are yet to understand that inspection means sorting out good from bad and never building quality into the product. As a result of the wrong concept there are huge failure costs both internally and externally.

Management should be keen to establish optimum levels of operation to achieve most efficient balance between the different quality activities so as to become costs conscious. Figure 1 below provides the shape of the cost curves for management to visualize and

determine the trade off point.

The shape of the cost curve recognises the trade-off between appraisal costs, prevention costs (which are rising) and the failure costs (which are falling). Conceptually, as appraisal and prevention costs increase, failure costs decrease down to a certain point. Once this point is reached, any additional appraisal and prevention costs increases with total quality costs. In practice it is very difficult to identify this point of lowest total quality cost due to lack of cost identification, traceability and measurement difficulties [Juran & Gryna, 1998].

It should hereby be noted that the value of data on quality costs should not be underestimated. The identification of quality problems and areas of significant high costs in the SMIs must be conducted using an appropriate framework such as a quality cost categorisation system. This quality cost system helps in increasing awareness of quality costs, giving employees an appreciation of the costs that result from mistakes and thus emphasise on prevention rather than troubleshooting.

It should be noted that most organisations in Tanzania concentrate on fixing problems rather than preventing them [Msafiri, 1993]. The efforts and costs associated with preventing problems are considered as good quality costs. Since failure costs are the most expensive bad costs then improving the activities behind these

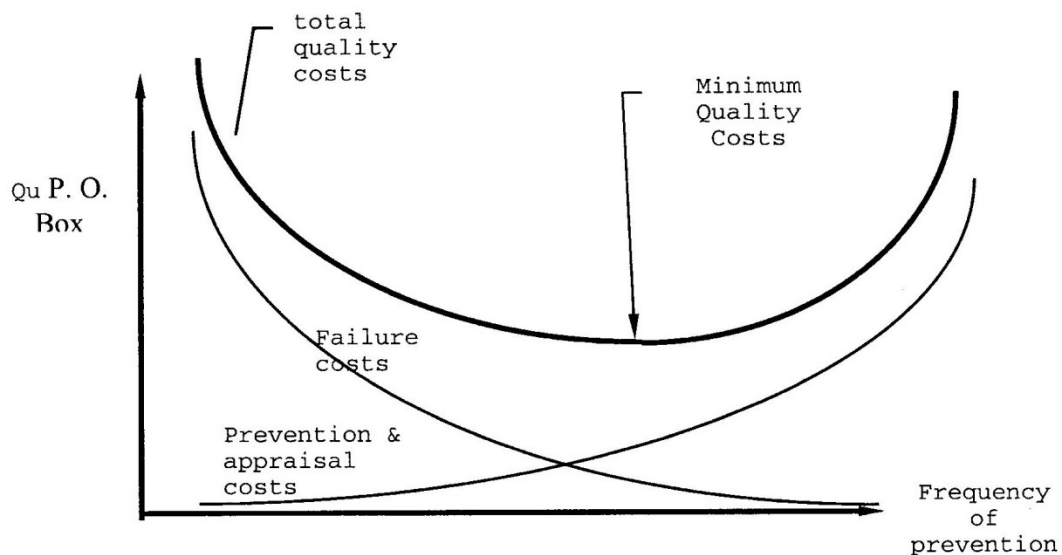


Figure 1: Trade-off between preventive, appraisal and failure costs

costs would give the greatest return which will be reflected to the company's profits directly.

It is hypothesised that prudent attention to quality costs focusing more on prevention should contribute significantly to improved company performance and have improved company profitability.

This study therefore tested the following research hypotheses:

- Hypothesis I: SMIs in Tanzania have high costs of poor quality averaging to more than 50% of company turnover.
- Hypothesis II: SMIs in Tanzania have very low investments in good quality costs, averaging to less 20 % of company turnover.
- Hypothesis III: Low revenue performance in SMIs is related to high levels of bad quality costs and low levels of investments in good quality costs.
- Hypothesis IV: Low levels of bad quality costs and greater investment in good quality costs are related to the levels of development in quality management systems

RESEARCH METHODOLOGY

Population

The population of interest in this study was the small and medium industries (SMIs), mainly agro-based and metal industries in Tanzania. The SMIs sector is operationally defined as

comprising of formally licensed companies employing between 10 and 200 employees and producing tangible products.

Sample

This study was conducted in Dar es Salaam, Arusha and Mwanza. Table 1 shows the number of companies surveyed in the four regions. The three regions were purposely chosen –with budgetary limitations in mind, to focus on the main centres of SMIs activities

In the regions covered, SMIs dealing with agricultural and metal industries were randomly chosen and then surveyed on voluntary basis. Within each selected organisation a stratified random sample of up to 10 respondents was selected.

Table 2 shows a profile of the respondent companies while Table 3 is a profile of the respondent-individuals.

Procedure

The researchers started with pilot studies of two companies in Dar es Salaam to evaluate the suitability of the questionnaires, chart-out strategies for enhancing the efficiency and effectiveness of the data collection exercise and also train the research assistant on the data collection procedures as well as key objectives and concepts of the research. During these visits both the Swahili and English versions of the data collection instruments were pilot-tested.

Table 1. Number of Respondent Companies

No	Region	Number of companies visited	Number of companies responded	Number of respondents
1	Dar es Salaam	23	18	112
2	Arusha	18	15	89
3	Mwanza	22	22	98
Total		63	55	299

Table 2. Companies' Profile

Ownership:	91% private	9% public		
Type of business	48.5% in agro-business	26.5% in metal	16.2% in wood	8.8% other industries
Education of employees	with-out primary ed.- 2%; Diploma - 4%;	primary edu.- 49%; Degree - 1.4%;	Form IV - 27%; Postgraduate diploma/degrees - 0.6%	Form VI - 16%;

Table 3. Respondent individuals

Gender	males 74.6 %;	females 25.4%			
Age structure	0-20 yr - 1.1%	21-30 yrs - 28.2%;	31-40 yrs - 49.%;	41-50 yrs - 19%;	over 50 yrs - 2.7%
Working in department	production - 49.5%;	marketing- 13%;	finance - 8.1%;	technical support - 10.4%;	personnel - 12.9%;
	other departments - 6.1%.				
Job level	top management - 7.1%;	middle management - 13.5%;	supervisory - 34.3%;		operatives - 42.6%.
	other - 2.5%.				
Experience with present company	1-5 yrs - 59.4%;	5-10 yrs - 23.1%;	10-20 yrs - 15.9%		over 20 yrs - 1.6%;
Formal education	without primary school - 2.5%\	primary school - 47.6%;	secondary Form IV - 32.9%;		Form VI - 3.7%;
	Diploma/Degree - 10.4%;	Postgraduate - 2.9 %			
Ownership	4.3% - owners	95.7% - non-owners.			

During the visits in the three regions covered, most of the industrialists indicated that the concept of quality costs was new. The researcher and the assistant therefore had to spend a lot of time explaining the concepts involved in the research and guided closely the respondents in filling the questionnaires. In most cases, substantial efforts were spent on establishing the relevant quality costs. This was necessary because almost all companies did not have the practice of tracking quality costs.

The main problems faced by the researchers were the low awareness in quality costs, lack of commitment of company management in providing certain data and a general lack of systematic recording of data. Due to the low awareness of quality and lack of data ready in the desired form, the researchers had to make several visits to the companies and also spend lot of time during the visits to educate management on the importance of quality costs as well as provide means for the estimation of some of the quality costs.

Company level performance data were collected from company records and on the basis of extensive assessment interviews with carefully identified (informed) people in the respondent companies. Individual employees completed the individuals' questionnaire, designed to measure some of the independent variables and demographic information.

Measurement of Study Variables

Company revenues and profits were used to indicate company performance and was obtained/calculated for the past year.

A comprehensive categorisation of bad and quality costs for each major function of a company was prepared as part of the data collection instrument. For each company function, quality costs were estimated for the past one-year. Good quality costs/investments were defined to include preventive costs and appraisal costs. Bad quality costs were defined to include both internal and external quality failure elements.

Using structured and unstructured questions, the extent to which basic quality management system elements based on the ISO 9000 classification exists in a given company were measured (ISO, 1996). A detailed Likert-type scale, appearing as part of the individuals' questionnaire, measured the perceptions of the employees of the extent of implementation of the basic elements of quality management systems in their respective companies. Each of the selected employees in a company rated on a 7-point scale the extent of implementation of specified elements of a quality management system

RESULTS

Quality Management System Implementation

Generally, the implementation of effective quality management was found to be rather low. There is therefore a need to assist the SMIs through training and other interventions so that they are able to develop and use effective quality management systems.

Testing of the Hypotheses

The data collected have provided support for all the hypotheses, indicating that:

- SMIs in Tanzania have high costs of poor quality averaging to more than 50% of company revenue. The one-sample t-test results indicated that the ratio of bad quality costs to company turnover was significant higher than 50% ($t_{53} = 3.255, p < 0.001$). The mean ratio was actually 514% indicating that the SMIs in the agricultural and metal industries have quite high levels of bad quality costs.

- SMIs in Tanzania have low good quality costs, averaging to less 20 % of company turnover. The one-sample t-test results indicated that the ratio of bad quality costs to company turnover was significant higher than 50% ($t_{53} = -18.5, p < 0.001$). The ratio was much less than 20% and averaged about 3%. It appears therefore that most SMIs are not investing sufficiently in good quality costs, that is, preventive and appraisal measures that are designed to ensure well-demanded and quality products produced competitively/efficiently.

- Low revenue performance in SMIs is related to high levels of bad quality costs and low levels of investments in good quality costs. The correlation generally provided support for the hypothesis. The variable "bad quality costs" was shown to be significantly negatively related to company profitability ($r = -.241, p < 0.10$). On the hand, good quality costs (investments) were found to be significant and positively related to company profitability ($r = .338, p < 0.05$). These results imply that quality costs (both bad and good) should be at centre of management of the SMIs in their efforts to improve the profitability of the companies. Further policies that can be of assistance to the SMIs so that they can reduce their levels of bad quality costs and also encourage them to increase investments in good quality costs should be pursued. One area mentioned very frequently by the surveyed SMIs in contributing to their bad quality costs is the high level of electricity tariff and the unplanned power cuts.

•Low levels of bad quality costs and greater investment in good quality costs are associated with SMIs whose quality management systems are well developed. Quality Management System implementation was significantly negatively related with the level of bad quality costs ($r = -.282, p < 0.05$) and positively related with the levels of investments in good quality costs ($r = .278, p < 0.05$). The observed support for hypothesis IV points to a clear need to promote the development of Quality Management Systems, particularly guided by the ISO 9000 series of standards as a strategy for managing effectively the issue of quality costs and thereby contribute to the profitability of the SMIs. In this connection, the role of the Tanzania Bureau of Standards and the relevant Government Ministries should be further clarified and enhanced.

Limitations

The main limitation is that the study covered only three major cities of the country. One would have wished a more representative coverage of the country.

Areas for Future Research

Future research should address how the policy and external business environment of SMIs is contributing to negative quality costs and what should be done to improve the environment so that it is more supportive/facilitative.

CONCLUSION

Implementation of effective quality management by SMIs is generally poor. As a result, these industries are facing quite high levels of bad quality costs which no doubt are affecting their profitability. The drivers of bad quality costs appear to be within and outside the control of the management of SMIs. At the same time, SMIs are not investing meaningfully in good quality costs. There is no way companies in Tanzania can talk about being competitive if they do not spend time to establish their quality costs. Performance of Tanzania firms is declining due to the unknown quality costs. In the case of SMIs in Tanzania immediate attention is required regarding workers education and training on

quality management and quality costs. Companies should identify respective training needs as well as tailor made training programmes to cater for every worker in the company.

It has been clearly shown that most SMIs have not established adequate quality management systems. Worse still, discussions with the management of the SMIs revealed a general lack of understanding of quality management systems and of internal capacities to develop the same. This is a major issue that should be addressed. National institutions such as TBS, the Ministry of Industry and trade should seriously be mobilised to assist; So should the training institutions in this country. Most importantly, the management of SMIs should become well aware of the importance of this issue.

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