Tanzania Journal of Engineering and Technology 2023, **42(1)**: 141-157
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Websites: https://ajol.org/tjet; https://tjet.udsm.ac.tz

ISSN 1821-536X (**print**); ISSN 2619-8789 (**electronic**)
https://doi.org/10.52339/tjet.v42i2.915

Regular Research Manuscript

Product Costing and Pricing in Small and Medium Enterprises in Tanzania

Pendo Bigambo[†], Simon I. Marandu and Erasto Elias

Department of Mechanical and Industrial Engineering, College of Engineering and Technology
P.O. Box 35131, Dar es Salaam, University of Dar es Salaam, Tanzania

[†]Corresponding author: pbigambo@gmail.com, pendob@udsm.ac.tz;

ORCID: https://orcid.org/0000-0002-2365-2015

ABSTRACT

This paper reports on a study that was conducted on twenty (20) metalwork small and medium enterprises located in Dar es Salaam with the aim of establishing methods used by SMEs in Tanzania in setting selling prices of their products. The study was necessitated by the apparent discrepancy of prices for similar products from SMEs. The approach used to gather information was mainly through direct interview and the use of questionnaires. Direct observation and literature review were also used to establish the whole costing and pricing practices in metal manufacturing SMEs. The findings of the study established that product selling practices of the surveyed SMEs were based on instinct and appearance of the buyer rather than using systematic approaches of establishing production costs and adding reasonable profit margins. It was further indicated that the product costing practices used by SMEs resulted in under-pricing or over-pricing of products, which subsequently led to unreliable markets for the products. Based on the findings of the study, a costing system was formulated aiming at assisting SMEs in setting prices for their products. However, further studies are needed to expand the information in the formulated costing system leading to a comprehensive costing system to cater for all activities of SMEs.

ARTICLE INFO

First submitted: July. 29, 2022

Revised: Nov. 18, 2022

Accepted: Feb. 15, 2023

Published: June, 2023

Keywords: *SMEs, Product costing system, product selling price, direct costs, overhead costs*

INTRODUCTION

The role of Small and Medium Enterprises (SMEs) in economic growth has been recognized as important by every nation around the world. The sector is considered to engineer growth and poverty reduction through the creation of jobs and incomes to people (Yahya and Mutarubukwa, 2015). The European Commission considers SMEs as key drivers to economic growth, innovation, job creation, and social integration (Eurostat, 2018). In the UK, SMEs account for 58.9% and 51.9% employment and turnover of £ 2,600 billion, respectively (Singh et al, 2009). In India, SMEs in the manufacturing sector accounts for 40% of the nation's industrial output and 35% of the total export hence contributing significantly to the India's economic growth (Uma, 2013). They also play a pivotal role of being the employment hub of the country. In Sub-Saharan Africa, particularly South Africa, SMEs contribute 57% and 61% to the country's GDP and employment, respectively (Makiwa, 2018). In addition, large scale companies are also

becoming more reliant of the SMEs product and services, usually through subcontracting (Singh et al, 2009), indicating the importance of these enterprises in the overall world's economy. As with any other country, the role of both formal and informal SMEs in Tanzania has been evident which is a result of the Tanzania government's efforts in establishing and promoting its SMEs (URT, 2003). The SME sector represents a large number of existing companies and provides jobs to Tanzanians, therefore, reducing unemployment and poverty. In 1993, 12 % of the rural labour force was self-employed in the SME sector while in urban areas it was estimated to be 34%. The sector also contributed about 50% of the industrial products (Kirumba, 1997). It is now estimated that the SME sector which occupies a dominant place in the Tanzania's economy consists of more than 3 million enterprises and contribute to about 27% of the Growth Development Product - GDP (Ministry of Trade and Industry, 2012). Based on the importance of the SMEs sector, the "Tanzania's National Development Vision 2025" has highlighted the SME sector as a key contributor to the country's long-term development and it is, therefore, apparent that the future of Tanzania's economy will become increasingly reliant upon SMEs. Accordingly, the nations' wealth creators and concerned people in the Government, business and education sectors will continue to work in a tandem to give impetus to the growth of the SMEs in the country.

In Dar es Salaam and Tanzania in general, there are now many SMEs dealing with various businesses of manufacturing different products. The recent drop in formal employment in the country has led to the enormous increase of the number of SMEs, leading to an upsurge in competition amongst them. Also, the competition emanates from relative cheaply priced imported products and high standardised and formalised products produced by larger firms (Singh et al., 2009). Thus, SMEs are forced to establish different strategies to enhance their competitiveness. Among the strategies that can be adopted by the SMEs is proper costing and pricing of their products and services.

Product costing is the process of tracking and studying all the expenses that are accrued in the production and sale of a product, from raw material purchases to expenses associated with transporting the final product to retail establishments (Sunarni, 2012). Product pricing, on the other hand involves assigning of a selling price to a product or service and usually includes the overall cost of production and a profit to be made after selling the product (Brierley, 2013). Product costing can directly influence the performance and effectiveness of a business enterprise because overpricing can result in loss of business and goodwill in the market, while under-pricing may lead to financial losses for the enterprise (Niazi, 2006). Subsequently, product costing is regarded as an extremely important component in evaluating and planning overall business strategies.

Despite the obvious advantages of proper product costing and pricing, it is very common to find varying prices for the products produced by most SMEs, depending on the type of the customer and the way the customer can bargain. This means, two customers can buy similar products at quite different prices. It is also common to find that some locally made products such as school desks, cost higher than similar imported products, which probably indicates an element of poor product costing and pricing. These pricing practices leave the following questions to be answered:

a) What are the actual selling prices of products that are produced by local SMEs?
b) Do SMEs have any costing system that they use in reaching the selling prices?

c) Are SMEs aware of proper product pricing procedures to avoid losses or overpricing when selling their products?
d) Do SMEs make profit by selling on haphazard prices?

To answer these questions, there was a need to investigate the systems used by local manufacturing SMEs in handling the costing of their products. It is only through understanding and applying proper pricing systems that a company can avoid under-pricing or overpricing of products; which in turn ensures competitive and sustainable businesses. This paper reports on the study that was conducted on several metal working SMEs in Dar es Salaam to satisfy this need. The paper also reports on a product costing system that was developed in order to assist manufacturing SMEs in establishing their production costs and setting prices for their products hence obtaining appropriate profits from their product sales.

Definition of SMEs

The term SMEs refers to micro, small and medium enterprises. Currently, there is no commonly accepted definition of SME, however, different countries use various measures of size depending on their level of development, with the common factors used to classify SMEs including the total number of employees, total investment and total turnover (URT, 2003). The European Commission for example, define SMEs as enterprises with fewer than 250 employees, an annual turnover of less than €50 million, or a balance sheet total of no more than €43 million (Eurostat, 2018). In Tanzania, SMEs are categorised according to the SMEs policy of Tanzania where Micro, Small and Medium enterprises (MSME) are present based on their capital investment in machinery (URT, 2003) as shown in Table 1.

Table 1 Categories of SMEs in Tanzania (Source: URT, 2003)

Category	Number of employees	Capital investment in machinery (TZS)
Micro enterprises	1 – 4	Up to 5 million
Small enterprises	5 – 49	5 million – 200 million
Medium enterprises	50 – 99	200 million – 800 million

Overview of Product Costing

The literature on product costing and associated strategies is very broad and somewhat characterized by the type of the readers (i.e., academic elites, business personnel, SMEs' practitioners etc.). According to Niazi et al. (2006), product costing involves manufacturing cost estimation of standard mechanical components to cost analysis of highly customized assembled products. It also covers process cost optimization techniques, specific methods for overhead costing, unique approaches for estimating the conceptual design phase as well as general costing procedures intended for future design cycle. However, the major component of the total product cost is the manufacturing cost (Hundal, 1997). Knowing the product manufacturing costs helps a specific company to understand whether the product will be manufactured profitably, and at what price it should sell. Decisions can also be made on whether a certain product should be phased out and what quantities of each product should be

produced in order to maximize resource utilization.

Elements of Product Costing

The main elements of product costing are presented in Figure 1, where the total cost is presented as the sum of direct cost and added overhead expenses (Chadwick, 2001). Direct costs are reported to include costs of raw material in the form of product components and packaging, direct costs of labour to transform raw material into finished products and direct expenses charged to a specific job or product (Chadwick, 2001). On the other hand, overhead costs are described as indirect expenses accrued during the production process and included costs such as cleaning of the production facility, maintenance costs, security costs, taxes, energy and water charges, designing and development costs, marketing costs and administrative costs which cannot be directly assigned to a certain product.

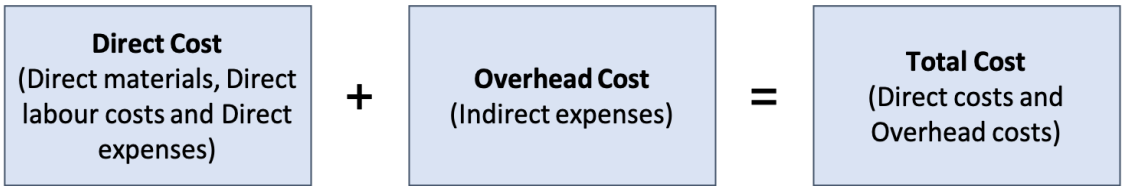

Figure 1: Main elements of product costing (Source: Chadwick, 2001)

In general, product costing should include all expenses incurred in pre- and post-development stages of a product such as information gathering, specifications development, product ideas generation, embodiment design, production planning, materials procurement, actual manufacturing, quality assurance, sales and delivery logistics. All in all, it is usually easy to identify material and labour costs associated with a specific product than it is for overhead costs which benefits more than one product or product line (Hughes and Gjerde, 2003). Different costing systems allocate overhead costs in different ways. For instance, traditional costing methods allocate overhead costs by using simple measures such as total machine or labour hours, whereas, Activity Based Costing (ABC) systems depend on cost pools and cost drivers that separate and allocate costs to products in a manner that approximates their usage. Variable-costing systems treat overhead costs as a collection of costs incurred to support all activities during manufacturing as it will be explained later.

Steps involved in Product Costing

Product costing follows the following steps (Caplan, 2006):

(a) Identifying cost object; which are cost units targeted for the costing exercise. For example, we might want to know the cost of making one unit of a product in which the cost object is one unit.

(b) Identifying the direct costs associated with the cost object; which are the costs associated with the cost object and can be traced to cost object in an economically feasible way. It includes direct materials and direct labour.

(c) Identification of the overhead costs; which are the costs associated with cost object but cannot be traced to the cost object in an economically effective way. They include electricity, factory office salaries, building and machine maintenance, as well as factory depreciation.

(d) Selection of cost allocation base to use in assigning overhead costs to the cost objects; which is the assignment of the overhead costs to cost object.

(e) Development of the overhead rate for allocating overhead costs to cost objects.

Existing Product Costing Techniques

Traditional costing methods and highly novel estimation methods have been applied in estimating product costs for years. These traditional methods apply simple ways of costing a given product by assigning direct costs and overhead costs to a specific product. In these systems, the only direct costs are labour and material charges while all other costs are lumped together as overhead costs depending on the number of units produced, labour or machine hours used in production (Hughes and Gjerde, 2003; Hundal, 1997). This costing system can in turn lead to a significant misallocation of the overhead costs especially when some products are produced in mass quantities while others are produced in low volumes. On the other hand, recent years have witnessed changes in business environments such as global competition decline in information costs, increase in product varieties and establishment of enterprise-wide information systems prompting companies to increase the sophistication of their product costing system (Al-Omiri and Drury, 2007; Drury and Tayles, 2005).

One aspect of product costing technique involves the use of certain criteria to categorize product costing. Niazi et al. (2006) used a grouping method to classify products with similar features while estimating product costing. They categorized the product costing methods into qualitative and quantitative techniques. Qualitative product costing compares a new product with previously manufactured product to establish similarities in the new product. The identified similarities aid to incorporate the previous data into the new product so that product costing is not initiated from the scratch. As a result, the costing efforts and time are greatly reduced. On the other hand, quantitative product costing technique does not rely on past data but rather involves detailed analysis of a product design, its features, and corresponding manufacturing processes. Product costs are therefore calculated based on an analytical function of certain variables representing different product parameters or as a sum of elementary units representing different resources consumed during the whole product production process.

Another aspect of product costing uses the output of a costing reporting system, known as Activity-Based Costing (ABC), which has been built on heuristic design choices such as a simple rule of thumb to group resources in cost pools and select drivers for allocating the pooled costs to products (Balakrishnan et al., 2011). Cost drivers are items such as number of units produced, cost of materials used, number of different materials used, labour and machine hours, while resources consumed include salaries, space, time and energy (Hundal, 1997). According to Schoute (2004), previous researches on the complexity of product costing focused on comparing the use of Activity-Based Costing (sophisticated systems) with other types of product costing systems which are unsophisticated. Nevertheless, it has been established that it is difficult to distinguish between the two systems, although, the sophisticated product costing system is convenient in identifying different resources consumed by a product during manufacturing (Drury and Tayles, 2005). When using sophisticated costing systems, greater emphasis is put on organizations to understand the cost of each component in a product as well as the cost of their value chain from product design, purchase of raw materials, through production and distribution costs in order to effectively compete with multinational companies and eliminate wasteful efforts and lower costs (Cokins and Hicks, 2007). However, the main disadvantage of using Activity-Based Costing system is the difficulties in obtaining accurate information to enable proper cost allocation at each activity and

their cost-driver rates (Qian and Ben-Arieh, 2008; Hundal, 1997).

Overview of Product Pricing

Pricing is one of the most important decisions in business as it assigns a selling price to a product or service (Brierley, 2013). It usually includes overall production cost and a profit to be made after selling the product. Pricing of products is something every business person thinks about. No one wants to price his/her product out of the market, but at the same time everyone wants to provide a sufficient margin to cover production cost and overheads, generate enough profit and stay in business (Skripak, 2018).

Issues in determining product prices

It is undeniable that, the ultimate reason for any company to have a costing system is to ensure that a profit is made from that business. The amount of profit to be made depends on the overall production costs which include:

(a) Variable costs e.g., materials, labour, packaging and advertising costs.
(b) Fixed costs (overhead) e.g., tools, equipment, utilities, depreciation and taxes.
(c) Selling price, i.e., the amount that will be charged to acquire the product.
(d) The number of items sold and service rendered.

Furthermore, there are other issues that need also be considered when setting product or service price. These issues include:

(a) What customers are willing to pay.
(b) The break-even-point (where Total Sales Revenue = Total Costs); are all costs covered?
(c) The amount of profit to be made (profit margin).
(d) Pricing of competing products.

Existing Pricing Procedures

Pricing strategies are approaches that can be used by organizations in pricing their products and services correctly and in line with the current market demand. The core objective of pricing strategy is to establish an optimum price while maximizing both profits and the number of items sold (Dolgui and Proth 2010). Published literature provides various pricing procedures that are being used in different manufacturing industries (Zimbroff and Schlake, 2015; Dolgui and Proth, 2010).

Figure 2 shows the common four pricing strategies which are based on the relationship between product quality and price (Dolgui and Proth, 2010; Obigbemi, 2010). These strategies are;

(a) *Premium Strategy* involves allocating high prices where there is uniqueness in the product offered. The method is used when substantial competitive advantages exist and is highly effective when a product is of a status symbol or is perceived as being of very high quality.
(b) *Penetration Strategy* involves setting the price of a product intentionally lower than the competition in order to obtain a larger market share. Once the market share is achieved, the price is increased. It is mostly used when the product is firstly introduced in the market or when the market is new. The technique leads to cost reduction pressure and discourage the entry of new competitors.
(c) *Economy Strategy* is a no-frills low-price pricing strategy. The cost of marketing and manufacturing are kept at a minimum level and the product price is set just high enough to make a very small profit in the hope to attain large volumes of sales. The strategy is appealing to customers who are extremely price conscious.
(d) *Skimming Strategy* involves charging relatively high price because of the presence of substantial competitive advantage. However, the advantage is not substantial because high product pricing usually attracts new competitors into the market resulting in inevitably price falling due to

increased supply. The technique is commonly used by start-ups and is convenient when huge investments made for research and development need to be reimbursed.

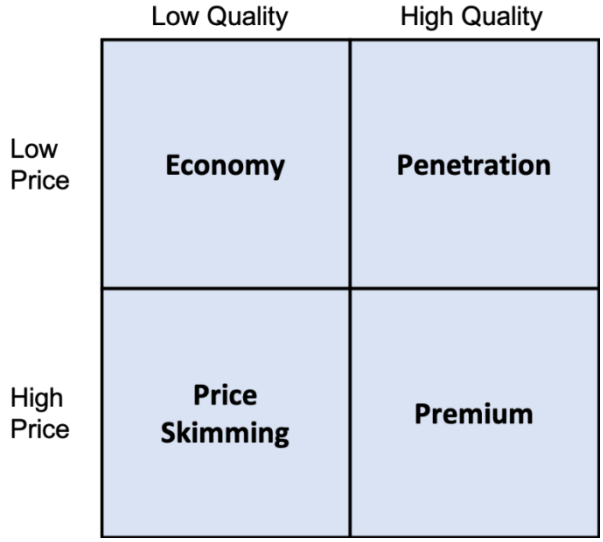

Figure 2: Pricing Strategies Matrix, reproduced from www.businesssetfree.com

(e) *Cost-plus or mark-up pricing* is another procedure that is used to determine product price based on cost (Zimbroff and Schlake, 2015). The method is commonly used in retail setting as well as in areas where an item is resold by an intermediate that links the producer to the final consumer (Skripak, 2018). The process involves setting prices that would cover the cost of purchasing or producing a product and provide enough profit to allow the company to earn its target rate of return. It involves two steps (Petersen, 1999); the first step being determining the cost of producing the goods which include a variable and fixed component. The costs are calculated on an average basis, i.e., Equations (1) – (1b).

$$AC = AVC + AFC \quad (1)$$

in which,

$$AVC = {}^{TVC}/_{Q} \quad (1a)$$

and

$$AFC = {}^{TFC}/_{Q} \quad (1b)$$

whereas, AC = Average total; AVC = Average variable cost; TVC = Total variable cost; TFC = Total fixed cost; AFC = Average fixed cost; Q = Number of unit products.

The second step involves determining the mark-up over costs, which considers the targeted rate of return. Therefore, if the return requires $ X of total profit, the mark-up over costs on each unit of output will be X/Q. Hence, the price will be Equation (2).

$$P = AVC + AFC + {}^{X}/_{Q} \quad (2)$$

The advantages of cost-plus or mark-up pricing include simplicity and ease of use as well as clear justification for price changes. However, the procedure has high chances of giving wrong cost data; relying on historical or accounting data instead of using incremental or opportunity costs. Moreover, most of its application procedures base on fully distributing of common costs to the various goods produced in the firm (Petersen, 1999).

Other pricing strategies such as psychological pricing, Product line pricing, Optional-product pricing, Captive product pricing, Product bundle pricing, Promotional pricing, Geographical and

Value-based pricing, are also available and have been well discussed in the literature (Zimbroff and Schlake, 2015; Dolgui and Proth, 2010).

Relationship between Product Cost and Price

There are many factors that influence pricing decision in manufacturing companies, with cost being the basic factor which can be efficiently managed by the business (Tobi, Osasrere and Adeniran, 2015). Availability of accurate cost information is seen to be the basis for pricing decision. Consequently, for a business to have a profitable sale, the relationship between product price and cost is essential (Zimbroff and Schlake, 2015; Daly, 2002), where the price should be higher than the real product cost. If a company wants to achieve a 15 % profit, a logical starting point to achieve this target would be to determine the total production cost for the item to be sold and then apply the 15 % profit margin to that value. If by any case, a more that 15 % profit is obtained, then it becomes a bonus.

Other factors such as competition and the number of items produced are also important in setting product prices, and this is well detailed elsewhere (Zimbroff and Schlake, 2015; Daly, 2002).

METHODS AND MATERIALS

Research Design

The purpose of this study was to establish product costing and pricing systems that are used by manufacturing SMEs in Dar es Salaam before developing a simple product costing and pricing system that can be used by these SMEs in establishing their production costs and selling prices. To accomplish the objectives of the study, two components were involved as part of the research methodology. The first part consisted of a review of published work while the second part involved an empirical study. The review of published work provided secondary information that helped in both formulation of the research design for the empirical study as well as in supporting the findings of the study. The field study involved qualitative data collection and analysis techniques.

Data Collection

Primary data were collected during the survey mainly through in-depth interviews with the SMEs' personnel from production and marketing teams based on prepared set of questionnaires that aimed at capturing the study variables. A total of twenty (20) metal working SMEs located in Dar es Salaam city were surveyed in order to identify their awareness and knowledge in product costing, procedures they used in establishing product costs and the parameters they considered in product costing. The surveyed manufacturing SMEs were conveniently identified with the assistance from Small Industries Development Organization (SIDO) and they were located at different areas including SIDO industrial estate in Vingunguti area, Mwenge, Chama in Buguruni, Kariakoo, Dar es Salaam Institute of Technology (DIT), Sinza and Tabata. Each interview took approximately 30 minutes with the researcher taking notes during the interviews. The interview questions were set in such a way that data related to the main study topics are generated in order to address the research goals.

Data Analysis

The collected information was numerically coded and uploaded into Microsoft Excel (MS) software package which does not require a large sample size or normally distributed variables for computer-aided analysis. The analysed data, together with secondary information from the literature review, were then applied in the formulation of a costing system suitable for manufacturing SMEs. The system was prepared in MS Excel software due to its user-friendliness and its popularity to most

computer users. Testing of the formulated system was conducted on a number of selected products in different SMEs in order to establish its functional viability and to gather the views of users. The performance of the system was tested in 6 manufacturing SMEs, with one product being tested in each SME. During testing of the costing system, views of the targeted users were also gathered.

FINDINGS AND DISCUSSION

Description of the Surveyed SMEs Products

During the study, it was established that most manufacturing SMEs that were surveyed produced variety of household and industrial items. These products included incubators, inverters, stainless steel hospital equipment such as cans, energy serving wood cooking stoves, manhole covers, incinerators, tricycles, block making machines, underground cables, corn milling machines, welding machines, as well as plates and bodies for large vehicles indicating variations of metal products that are being produced by metal manufacturing SMEs in Dar es Salaam. Examples of the surveyed metal products are shown in Figure 3. It was further established that, the main customers of these products were government and private institutions, hospitals, schools, prisons, homes, livestock keepers, small scale farmers, local industries, construction companies as well as individual entrepreneurs. These customers came from both in and out of Dar es Salaam.

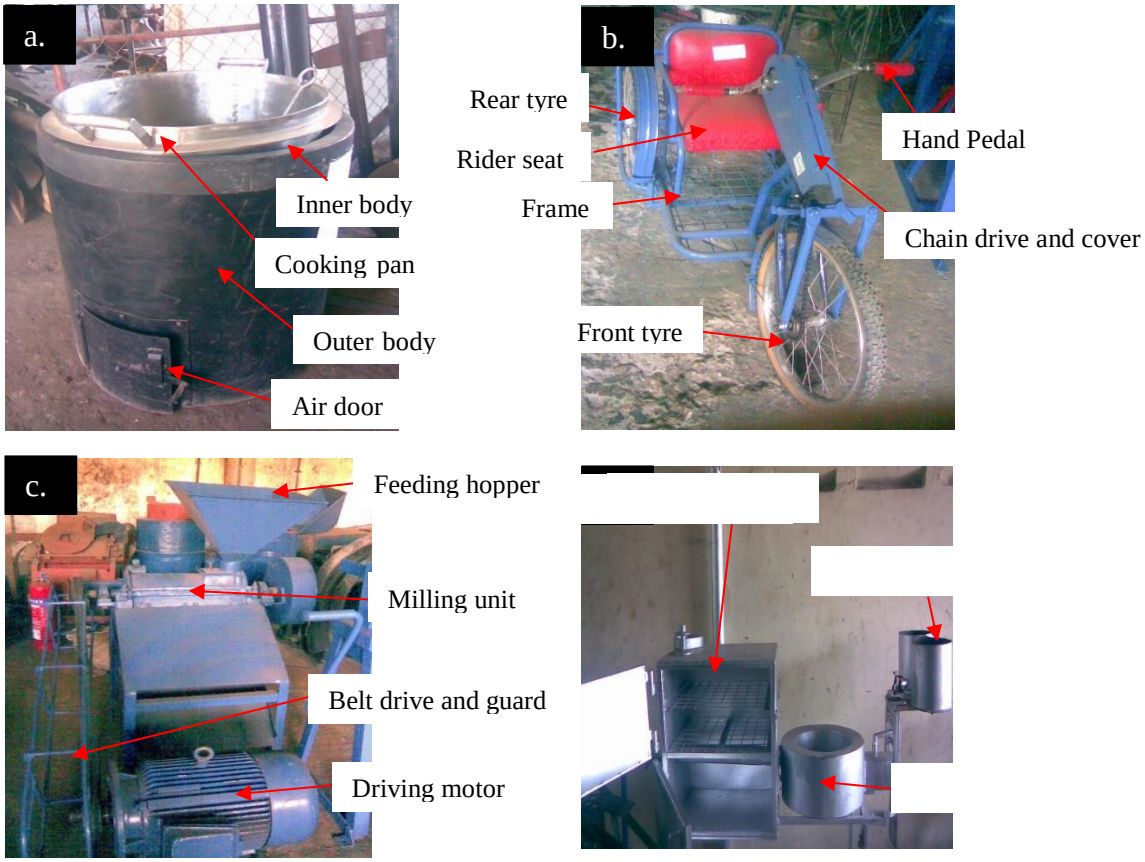

Figure 3: Examples of metal products produced by the surveyed SMEs; a. Cooking stove at Tanzasaw, b. Tricycle at DAGE, c. Maize milling machine at DAGETO and d. Cooking stove at NGOSHA

Current Product Costing and Pricing Procedures in Metalwork SMEs

The first question that was asked during the interview sought to gain an understanding of the different procedures that were used by the surveyed metal working SMEs in their product costing and pricing. The findings of this study suggests that, out of the 20 surveyed SMEs, 15% sold their products at the same price for all customers whereas 85% used different prices depending on the size of the product, number of ordered products and importance of the product to the customer. Other factors included product's promotion and bargaining power of the customer. It was further established that the profit margins set by the surveyed SMEs ranged from 10-40%. However, none of the surveyed SMEs had the basis for the set profit margins, implying the possibility of same product being sold at two different profits.

Furthermore, the study showed that 25% of the surveyed SMEs used previous experiences in product pricing, 70% used different costing formulae or systems to arrive at a price, whereas one (1) SME priced its products by looking at the status of the customer. It was also found that, the major parameters used by the SMEs in the product costing process were materials, overheads, labour, profit margin, time, skills and technology, machinery, taxes, the uniqueness of the product as well as transport costs. Some of these parameters were used by different SMEs to formulate their costing and pricing formulae.

Table 2 shows some of the typical costing formulae used by the surveyed SMEs and the identified weaknesses. It is clear from the table that most formulae missed the key cost components and were not formulated in standardised way suggesting a possibility of setting higher or even lower selling prices when compared to their actual production costs. In addition, most formulae missed machine charges and overheads components which are very important in the determining the total production cost of a product. Furthermore, in some formulae cost components were not elaborated enough, suggesting the possibility of costing errors when a new person in the enterprise was to set the price using the available formulae. In summary, although the surveyed SMEs had some costing and pricing formulae, they lacked formalised formulae database and in most cases product prices were not set in standardised methods. In addition, the survey established that, most SMEs that used formulae to determine their costs, did not bother to do regular calculations to check the costs of their products which made it difficult to establish ways to take care of the changing circumstances such as the costs of materials.

Benefits of using Proper Costing and Pricing Procedures

When asked on the benefit of proper costing and pricing procedures, it was established that all the surveyed SMEs knew very well the benefits of proper costing and pricing procedures although they did not really know if the procedures they used in their product costing and pricing were proper. During the interview, the surveyed SMEs were also asked to mention some benefits of using proper costing and pricing procedures. According to these SMEs, the benefits of proper product costing and pricing included business growth in the competition environment, avoiding losses, maintaining customers, competitiveness, proper profit margin, sustainable business, smooth operation, easy to manoeuvre selling prices, planning business, stable prices, satisfaction to both customer and seller, and attracting more customers. The reported benefits are similar to those found in the reviewed literature (Lew, 2019), where the benefits of knowing how to properly establish the product costs and prices are detailed.

Table 2 Costing and Pricing formulae currently used in metal work SMEs

S/No.	FORMULA	WEAKNESSES
1	Materials + Running costs + Labour + Profit	• Running costs are not specified
2	Materials + Overhead + Labour + Profit	• Machine charges are not included • Overhead costs are not specified
3	(Materials + Power + Manpower + VAT) x 1.8	• Machine charges and overhead (apart from power) costs are not included
4	Materials + Labour + 20% Profit margin	• Machine charges and overhead costs are not included
5	(Machine + Materials + Overhead) x 1.2	• Labour charges are not included
6	Working hours + Logistics + Materials + Profit margin	• Overhead costs are not included • Working hours and logistics are not specified
7	(Materials + Inputs) x 1.4	• Inputs are not specified
8	Materials + Labour + Machines + 30% Profit	• Overhead costs are not included
9	Materials + Labour + Running cost	• Running costs are not specified • Profit margin is not included
10	(Direct + Indirect costs) x 1.4	• Direct and indirect costs are not specified
11	Materials + Labour + Machines	• Overhead costs and profit margin are not included
12	Materials + Labour + 20% Overhead	• Machine charges and profit margin are not included
13	Material + Tax	• Overheads, labour and profit margin are not included.
14	Materials + Labour power	• Does not include overheads, machine charge and profit margin
15	Materials + Marketing costs	• Does not include overheads, labour, machine charge and profit margin

Most literature have particularly stressed the importance of having a proper costing system in tracking down different production costs which can then help the SMEs in decision-making and identifying areas that are costing more and make quick decisions to cut expenses and minimize resource use hence avoiding losses within the business.

Source of Costing and Pricing Knowledge and the Need for Further Training

Regarding the source of costing and pricing knowledge, the study established that 70% of surveyed SMEs acquired their costing knowledge through experience; 10% through learning from experts; 35% through training; 10% through training and experience; and 5% through training and learning from experts. The trained SMEs got their training from various institutions such as SIDO, the Institute of Finance Management (IFM), Tanzania Gatsby Trust (TGT), Vocational Education Training Authority (VETA), University of Dar es Salaam Innovation and Entrepreneurship Centre (UDIEC), The Eastern and Southern African Management Institute (ESAMI) in Arusha, Tungsrum Lamp in Hungary and Bahari Food in Mikocheni, Dar es Salaam.

Surveyed SMEs were further asked whether they needed any training on proper product costing and pricing methods. Out of the 20 surveyed SMEs, 85% showed

interest in getting more training on better methods of product costing and pricing from different training institutions and at reasonable prices. The remaining 15% were open minded and could not decide, they wanted to know the cost implications of the training before making up their minds.

FORMULATION AND TESTING OF THE COSTING SYSTEM

Formulation of the Costing System

It was established in this study that, for proper costing and subsequent pricing, various factors must be considered, including costs of materials, labour costs, machine charges as well as factory overheads. Adding these factors by using specific formulae, together with the amount of required profit, can be used as a simple method for doing product costing and pricing. These factors are also detailed in the literatures (Tobi et al, 2015; Zimbroff and Schlake, 2015; Petersen, 1999;). However, most of the surveyed metal-work manufacturing SMEs performed their costing without any proper costing formulae or systems. Furthermore, the product costs were not being recalculated regularly to reflect changing circumstances such as material costs and product design alterations. This proposes improper product costing procedure. Therefore, by using the results of the analysed data, a product costing and pricing system was developed to fill up the gaps or weaknesses of the used costing systems or formulae, thereby assisting manufacturing SMEs in not only performing accurate and consistent product cost estimates but also generating sensible profits.

The costing and pricing system was developed in a Microsoft Excel Computer Software with the main components being material costs, labour costs, overhead costs, machine charges and profit margin combined together using the below mathematical expressions; here

$$\textit{TOTAL PRODUCTION COSTS} = \textit{DIRECT OPERATING COSTS} + \textit{OVERHEAD COSTS}$$

with direct operating costs including materials, labour and machine charges.

$$\textit{PRODUCT SELLING PRICE} = \textit{TOTAL PRODUCTION COSTS} + \textit{PROFIT MARGIN}$$

The costing and pricing system was then formulated by developing the main costing template and sub-templates for each cost component, i.e., material costs, machine charges, overhead costs and labour charges. In order to establish the total cost of a product, each cost component is dealt with in its respective sub-template and the final cost is automatically sent to the main costing template. However, all the cost components including the cost of materials, labour hours and the time taken in using machines should be traced effectively and should be updated regularly to ensure the system works efficiently. Figure 4 shows the relationship between the established sub-templates and the main costing template. The main costing template presented in Figure 5 is the main part of the costing system, indicating all cost components involved in the product costing process that is material costs, labour charges, machine charges and overhead costs. In this part of the system, the user is required to input the company name, the product name and the required profit margin. The amounts of the cost components of the system are imported automatically from their respective sub-templates.

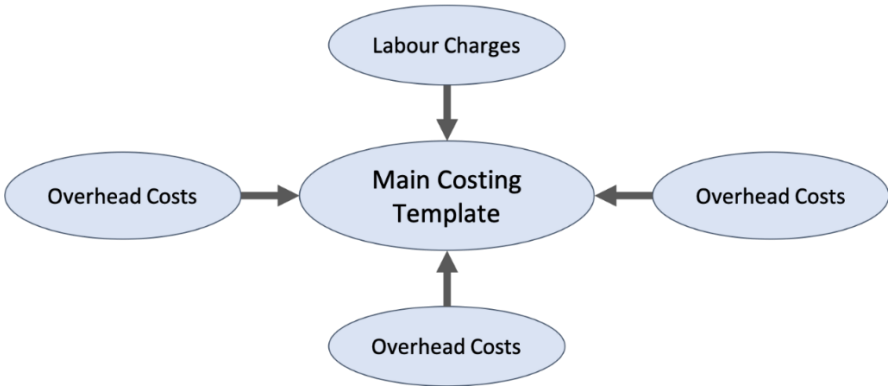

Figure 4: Structure of the costing system, indicating the four main components feeding the main costing template

Once all the required information is fed into the system, the total production cost of the product and the subsequent product selling price are obtained.

COMPANY NAME:	XXX	
	DATE: 10/11/2022	
PRODUCT COSTING AND PRICING SYSTEM		
PRODUCT NAME	REQUIREMENTS	TOTAL AMOUNT (TZS)
BLOCK MAKING MACHINE	MATERIALS COST	70,000.0
	HOURLY LABOUR COSTS	60,000.0
	MACHINE CHARGE	280,000.0
	OVERHEAD COST	5,040,000.0
	TOTAL PRODUCTION COST	**5,450,000.0**
	PROFIT MARGIN	20%
	PROFIT	1,090,000.0
	PRODUCT SELLING PRICE	**6,540,000.0**

Instructions: Data and text can only be input in the Yellow boxes.

Figure 5 Extract of the Main Costing Template showing the components involved in product costing

Testing of the Costing System and Views of the Potential Users

In order to establish the practical relevance of the developed costing system, it was necessary to test the designed costing system on metal products produced by different SMEs. For that matter, the designed costing system was tested to six (6) products from six (6) different SMEs, selected based on the study time limit and willingness of the manufacturers to participate in the exercise. The selected products included tricycle, block making machine, wheel barrow, incinerator and cooking stove, all from SMEs located at SIDO Industrial estates in Dar es Salaam. A standard block making machine produced by the Technology Development and Transfer Centre -TDTC at the College of Engineering and Technology of University

of Dar es Salaam was also involved during the testing of the product costing system. The testing process involved first establishing actual product manufacturing parameters, which included material costs, labour costs, machine charges and overhead costs. These costs were input into their specific costing templates within the system. The profit margin was then set for each product and the overall costs were then automatically computed by the main costing system. The obtained results are summarised in Table 3. It is also worth mentioning that, the testing process was challenged by the fact that most SMEs had no proper records for all factors, especially those associated with overhead costs. For that matter, assumptions were used in some cases. Similar challenges have also been reported in the literature (Sunarni, 2012; Al-Omiri and Drury, 2007).

Table 3: A summary of the test results of the product costing system

S/No.	Product	Current Price (TZS)	Price as per Costing System (TZS)	Variation (%)	Remarks
1	Tricycle	220,000	317,340	44	Consideration to raise the price of the product is important.
2	Block making machine	2,400,000	3,007,500	25	Consideration to raise the price of the product is important.
3	Wheel barrow	80,000	116,900	46	Consideration to raise the price of the product is important.
4	Incinerator	5,000,000	4,167,600	-17	For competitiveness, the price of the product could be reduced without getting any loss.
5	Cooking stove	3,200,000	3,131,000	-2	Could slightly reduce the price of the product.
6	Standard block making machine	350,000	416,860	19	Consideration to raise the price of the product is important.

It is clear from the table that the application of the costing system indicated variations in costs of products of the mentioned SMEs. The results of using the costing system in four (4) SMEs showed that their products were under-priced whereas two (2) SMEs had their products over-priced. It was realized that the variations were due to lack of knowledge on the part of the SMEs in establishing product costs correctly. For SMEs whose products were under-priced, it was apparent that they got meagre profits if any from their businesses, thus struggling economically. The study observed that the price of the under-priced products should be raised to include all costs of production whereas the overpriced products had room for price reduction to sell competitively in the market. Both undercosting and overcosting of products have been reported to be caused by inaccurate costing systems which in turns results to incorrect product pricing and subsequent profit margins (Al-Omiri and Drury, 2007). For instance, overcosting may lead to discontinuation of products and services that are mistakenly reported to generate low profit

margin while undercosting may lead to continuing of products that wrongly reported to generate high profit margins.

When asked for their comments regarding the costing system, most of the SMEs found the costing system very interesting. All SMEs, where testing of the system was conducted asked if there was a possibility for a training to be organized so that they could learn how to use the designed costing system. The main observation behind the interest shown by the SMEs was the capability of the system to provide the price quickly when the cost factors (e.g., material costs) are varied.

CONCLUSION AND RECOMMENDATIONS

Conclusions

The aim of this study was to investigate on the costing and pricing procedures that were being used by manufacturing SMEs in Tanzania and then develop a costing system that could assist these SMEs in the whole process of product costing and pricing. Data was collected through surveying a total of 20 metal working SMEs and employing questionnaire and general observation forms of data collection.

The study showed that the surveyed SMEs knew the importance of proper product costing, however, the methods used for product costing were inadequate and mostly led to over-pricing and under-pricing of their products. These shortcomings have continually resulted in intermittent businesses leading to unreliable economic growth of the SMEs. Thus, many SMEs have perished prematurely or are struggling to survive due to lack of sales or low sales of their manufactured products.

The study concludes that it was possible to formulate a proper and user-friendly costing system for metalwork SMEs, the testing of which showed success in product-pricing and raised awareness and interest of most SMEs in undergoing changes in the issue of product costing and pricing. There is a need, therefore, to extend the developed costing system to make it more comprehensive and adaptive to SME needs so that it becomes a necessary tool for establishing manufacturing costs of a product and subsequent selling price for the benefit of the SMEs and their customers.

Recommendations

Based on this study, the following are recommended:

(a) The Tanzania's manufacturing SMEs should adopt the formulated costing system in this study and give feedback on areas of improvement to enable formulation of a much more comprehensive costing system.

(b) SMEs should be encouraged to use computers, particularly Microsoft Office packages, to have access to the use of the formulated costing system. SIDO can pioneer by ensuring that training in computer application is incorporated in the SMEs support services.

(c) SMEs should think of innovating their products to create clear differences between their products and those of their competitors in terms of quality, durability and aesthetics to fetch better prices and markets. The costing system can assist such innovations in terms of checking the behaviour of product production cost with changes are made.

(d) The costing system was developed based on the metalwork industry only. It is therefore recommended to extend the costing system to other sectors like textiles, food processing and services to test its suitability. It is important to note that these other industries may have specific requirements to consider in formulating a costing system.

ACKNOWLEDGEMENT

The researchers are grateful for the financial support from the Ministry of Education and Vocational Training through the University of Dar es Salaam.

ABBREVIATIONS

GDP	Growth Domestic Product

SMEs	Small and Medium Enterprises
URT	United Republic of Tanzania
SIDO	Small Industries Development Organization

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