Profitability Analysis of Women Entrepreneurs on Palm Oil Refinery in Kigoma Municipal, Tanzania

Abstract

This paper was analyses the profitability of the women entrepreneurs on oil palm refinery at Kigoma Municipal in Tanzania for year 2024 using variables of age of respondent, education level of respondent, experience in business, purchasing cost, labor cost, transportation costs during buying, refinery charge and selling price. Data were collected using a structured questionnaire administered to a random sample of 65 oil palm women entrepreneurs. The data were analyzed using (SPSS) to determine descriptive statistics, profitability analysis and Multiple Linear Regression Model (MLRM)results. The obtained results showed that the highest cost for oil palm refinery process stages is Tsh 1,200,000.00 = (70.5%) for labor charges of average total variable costs per year. The profitable analysis showed that oil palm refinery process in the study area is an average gross margin (TR)-(TVC) per women enterprises of oil palm refinery was Tshs. 2,589,000.00 per year while the net profit was estimated at Tshs. 2,533,000.00. The benefit cost ratio of the entire enterprise was 2.44, thus indicating an additional return for every one shilling selling on oil palm refinery or processed. The multiple regression models revealed that the experience in oil palm refinery process enterprises, cost of seed purchasing, labor cost, costs of refinery process and cost of selling oil has a positive and significant relationship with profitability of women entrepreneurs' success (β = 0.108, 0.084, 0.214, 0.347and 0.088, p value > 0.05). The adjusted R^2 of the model was 0.86 which means the independent variables explain 86% of the variation in the profit per 20 litres of the oil palm enterprises. The paper recommended that to expanding and up-scaling oil palm refinery production for providing adequate investment capital to operate so that can be guaranteed loans.

Keywords: Profitability analysis, Entrepreneurs, Palm Oil, Linear regression Model

1.0 Introduction

Oil palm (Elaeis guineensis) is one of the world's most efficient oil-bearing crop. It has an annual average productivity of 3.8 tons of oil per hectare which is six times the productivity of sunflower and nine times that of soya (Omar, 2019). The foreseen potential of oil palm crop in boosting the economy led Malaysia into replacing their rubber farms with oil palm plantations in the 1960s (Abazue et al., 2015). Same literature reports that, by the end of 1970s the intervention had led to reduction of poverty to farmers by 56.5%, that is, from 68.3% to 11.8%. As of 2020, oil palm industry contributed 3% of Malaysia's GDP (Chang, 2021) and 13.7% of Indonesia's GDP (Gultom et al., 2021). Given the increase in global population, global demand for palm oil is also increasing and since the leading suppliers have limited land for expansion of their oil palm plantations, it means that there will be limited production, hence limited supply (Murphy *et al*., 2021).

Tanzania imports about 98% of its palm oil from Malaysia and Indonesia as stated by 3ADI+

(2019), shortage of palm oil supply will be a greater challenge. To overcome that, the country must ensure that there is sufficient domestic production of palm oil. To accomplish that, Tanzania Investment Centre (2020) suggests that a total of 142,500 hectares are to be planted with 20,377,500 improved Tenera oil palms variety that produces an average of 4 tons per hectare annually, making an annual production of 570,000 tons. This will suffice the annual domestic palm oil demand of 364,800 tons and the total annual domestic edible oil demand of 570,000 tons (TPSF, 2017; Dalberg, 2018; TIC, 2020). However, as of 2018/19 agricultural season, Tanzania had a total of 9,742 hectares planted with oil palms, majority of which were the local low yielding Dura and Pisifera varieties. The plants had an annual average productivity of 2.2 tons per hectare and the harvested yield from 79.2% of the planted area was 16,593 tons (TIC,2020).

Palm oil is the most widely consumed edible oil in Tanzania, with consumption of just over 0.55 Mt p.a. of CPO, of which 98% is imported, mainly from Southeast Asia, and refined in Dar es Salaam by a handful of companies. 80% of Tanzania's small palm oil output comes from Kigoma Region in the far west, with over 30,000 smallholder farmers practising very small-scale palm oil-based mixed cropping system, mostly for own consumption, but where revenues from locally, artisanal-produced palm oil constitute at least 30-50% of their farm revenues. Farmers either process their own FFBs using traditional human-powered machines or sell them to other farmers who process collectively (Camco Clean Energy, 2014). Production and processing methods are traditional and characterized by very low productivity. In order to stimulate the local palm oil industry, the tariff on imported CPO was increased in 2018 from 10% to 25%, and on semi-refined and refined palm products from 25% to 35%. While this is likely to increase prices in the short term, as there is no ready domestic production to fill the supply gap, the Government plans to invest USD 4.3 m to boost domestic cultivation of oil palm over the medium to long term (Temu et al., 2013).

Tanzania is the 12th largest CPO importer in the world (ITC, 2017) and palm oil products are Tanzania's second largest imported commodity (by value), behind petroleum products. 98% of palm oil consumed is imported from South-East Asia either as CPO and refined in Dar es Salaam by a handful of companies. Additionally, CPKO is imported for ingredients in soap and shampoo production. Domestic demand is currently estimated at 370,000 MT and growing at around 12% per annum (Dalberg, 2017). As Tanzanians continue to increase wealth, palm oil demand will continue to raise, a phenomenon that has already been studied in neighbouring Kenya, a slightly richer country with similar culinary culture that with a lesser population imports three times as much CPO as Tanzania. Agricultural production estimates for palm oil in Tanzania, vary drastically between 200,000 MT – 500,000 MT (GAFSP, Dalberg, etc.), but estimates converge around domestic production constituting less than 2% of the country's consumption. Domestic production of CPO and CPKO remains a separate sector to the importation, refinement, and retailing of CPO and CPKO. Monthly import volumes show no correlation to harvest in Tanzania nor has a domestic producer emerged as a supplier or competitor to the refiners and processors in Dar es Salaam.

The Government of Tanzania (GoT) is implementing measures to protect the local palm oil industry. According to the 2018 budget statement, the import tariff on CPO increased to 25% up from10%, and 35% on semi-refined and refined palm products, from 25% in conformity

with EAC regulations (3ADI+, 2018). This tariff is yet to flow through to prices and import volumes, but it can be expected to increase prices in the short term as there is no ready domestic production to fill this gap. The short-term effect rather is the subsidization the business of refining imported crude oil. There have been also records on importing refined oil declared as crude oil. Over the medium to long term the increasing demand will need to be met through extending local production or through increasing imports. Upwards of 90% of the to date admittedly negligible domestic palm oil production in Tanzania comes from the Kigoma region where production, processing and marketing is established in form of a cottage industry characterize through low inputs and low outputs.

In Tanzania, the regions of Kigoma, Mbeya and Pwani are the main oil palms producing– with Kigoma producing about 61.4%, Mbeya 35.7% and Pwani 0.9% as per 2017/18 agricultural season data (AASS Report, 2018). In the poorest region of Tanzania, Kigoma – there are over 30,000 smallholder subsistence palm oil farmers (3ADI+, 2019). Meanwhile, the country imports over 500,000 MT of palm oil per annum. Thus, palm oil value chain development offers great potential for both import substitution and poverty alleviation. At the same time, other goals such as environmental conservation, improved nutrition, and gender equality and women's empowerment may be achieved through sustainable palm oil value chain development.

Women's small businesses are the backbone of the economy and job creation in urban and rural areas (Jalbert 2000; UNGA 2011). Throughout the world women entrepreneurship is visible in both informal and formal small businesses that provide employment, food security, health, economic growth and the vitality of their respective countries (FAO 2014; ILO 2014). In the Organization for Economic Co- operation and Development (OECD) women owned small and medium-sized enterprises (SMEs) account for 60 to 70 per cent of jobs with a particularly large share in Italy and Japan, and in the United States (OECD 1996; 2000). The situation in the EU shows that women-owned SMEs are increasing at a faster rate compared to male-owned SMEs (EU 2014).

Women's entrepreneurship is a growing global phenomenon, attracting considerable research attention during the last few decades (Henry, Foss, & Ahl, 2016). Not only does it contribute to economies in terms of job creation and economic growth (Kelley, Bosma, & Amoros, 2010), it is also recognized as a source of increasing entrepreneurial diversity in a range of economic contexts (Verheul et al., 2006); as such, it offers a valuable focus for concerted scholarly research. However, despite the significant contribution of women entrepreneurship in Pakistani context, still, it faces numerous barriers and challenges, which can hinder them from entrepreneur's success (Torres-Ortega, Errico, & Rong, 2015). On the other hand, women entrepreneurs have been ignored to be supported on starting their venture in many emerging economies (Roomi & Parrott, 2008a, 2008b). Unfortunately, less attention has been given to women entrepreneurs in emerging economies despite their sustainable contributions toward GDP (Kelley et al., 2010) and entrepreneurial orientation and small and medium-sized enterprises' performance (Khan, 2020). Due to the complex interaction of socio-cultural factors, religious, and family structures (Roomi, 2013). The role of women in Pakistan's traditional and masculine society has been the subject of debate. Women face discrimination and gender inequalities owing to gender-biased power relations based on inequality and prejudice (Roomi, Rehman, & Henry, 2018). This research is an attempt to discover factors influencing the performance of women entrepreneurs in this context.

Women in Tanzania are the backbone of the economy and are leading in the self-employed sector (FAWETA 2008). However, the growth of women-owned businesses in Tanzania is faced

with gender stereotyping, marginalization from financial institutions and the fact that the government and donor's investment focus in the development of women entrepreneurship is largely urban-based with women entrepreneurs in rural areas remaining marginalized (Makombe 2006). Research show that the government, chamber of commerce and donors have attempted to put in place policies that promote women entrepreneurship development (UNIDO 1999). These polices recognize the need to support women entrepreneurship to boost economic growth, job creation and the existing policy interventions and programmes (ILO 2003). The main focus has been on narrowing the urban-rural gap between the growth in women entrepreneurship in urban areas and investment in SMEs owned by rural women through skills training, financial support and markets (Stevenson & St-Onge 2005).

Based on the literature, in this paper the main objective is to assess the profitability of women entrepreneurs for Palm Oil processing at SIDO area in Kigoma Municipal. Furthermore, the analysis of women's entrepreneurship role in PO seeds value chains could help policy address challenges that women particularly face to entrepreneurship. Though oil palm provides several value added products, this study analysed the role of women in the oil palm value chain with particular reference to palm oil in Kigoma Municipality. In this study, both entrepreneurs seeking to maximise profit from the business of Palm oil processing engagement in various activities of the value chain with a great potential for improving welfare in household. So, there is wide gap between the potential profit of palm oil processing and inputs actual costs obtained in the field to the women entrepreneur. Therefore, the analysis of this paper is to figure out those refinery process input costs in the number of oil litres produced in one batch in this study was constituted by the following variables costs; Buying, Cleaning and drying, Transportation, Processing (pressing), Taxes, Fire woods, Water and Others in the SIDO area in Kigoma Municipal.

2.0 Literature Review

In Malaysia via the crude palm oil (CPO) industry studies though financial gain is the key motivator for palm oil producers to use the supply chain (SC), it is uncertain whether the new sustainable practices that go along with it are profitable. The current profitability of the palm oil SC is also critical, and future profitability is unknown unless sustainable SC policies are implemented (Qaim et al., 2020). As a result, the palm oil industry's difficulty reflects supply chain model (SCM's) profitability and viability. From the plantation and transportation perspectives, this study examined if SCM is economical and sustainable for the Malaysian palm oil sector. As previously said, this industry is confronted with a significant environmental concern that has societal ramifications. According to Muzayanah et al. (2018), managing natural resources, which includes the sustainability of CPO's SC, is challenging due to its dynamic and uncertain nature and its contradicted objectives (environmental, social and economy).

According to Adebo and others (2015), palm oil in Nigeria is one of the commodities produced in rural areas. It is consumed daily as the human diet and also used as an industrial raw material. Consumption of palm oil has increased its potentials for income generation and poverty alleviation. A study conducted in Ekiti state indicatedthat people in that state generate income from palm oil production. About 96% were gainfully employed through palm oil production; 75.0% were able to improve their standard of living while 66.7% indicated ability to meet basic needs. Thus, oil palm production is highly lucrative, and it has the ability to improve the standard of living of the farmers; thus, bailing them out of poverty (Adebo et al, 2015). According to Seed Change Annual Report (2015), palm oil is one of the Tanzania stop imported items. However,

little successful investment has been made to modernize the industry and support developing domestic supply. In Kigoma region, oil palm is grown on smallholder farms and processed manually. Most of the palm oil in Tanzania is produced in the Kigoma region (90% of the palm) and most or almost all of this oil is produced by smallholder farmers. While in Africa, the yield ranges from 12 to 13 tons of fruit bunches per ha per year, in Kigoma, palm oil yields are around 5 tons of fruit bunches per ha per year.

The main objective is the profitability analysis of women entrepreneurs on palm oil refinery in Kigoma Municipal, Tanzania of women's entrepreneurship role in agricultural value chains could help policy address challenges that women particularly face in agribusiness. Though oil palm provides several factors for refinery, this study analysed the profitability of women in the oil palm refinery with particular reference to palm oil in the Kigoma Municipal in the Eastern Regions. In this study, both women and men are entrepreneurs seeking to maximize profit from their business engagements in various nodes of the value chain.

3.0 Methodology

3.1 Study Area

The study was carried out for women entrepreneurs at SIDO business centre in Kigoma Municipal in Tanzania for 2024/2025 which were chosen because is among the highest producers of oil palm and artisanal palm oil processing in the region. The Municipal was chosen because palmcoffee cultivation is an important source of income for smallholder farmers. Kigoma region with 6,819 ha (70.0 percent) had the largest planted area, followed by Mbeya with 2,102 ha (21.6 percent). The other palm oil producing region was Pwani (444 ha: 4.6 percent). The total production was 16,593 Tons from 7,717 ha harvested with an average yield of 2.2Tons/ha. Kigoma region with 10,192 Tons (61.4 percent) had the highest production from 5,487 ha harvested, followed by Mbeya 5,918 Tons (35.7 percent) from 2,031 ha harvested and Pwani Region with 156 Tons (0.9 percent) (TIC, 2020). However, oil palm industry in Tanzania is dominated by cultivation of low yielding Dura and Pisifera oil palm varieties (3ADI+, 2019). This has led to relatively low annual productivity of 2.2 tons of palm oil per hectare as compared to Indonesia where farmers harvest an average of 3.4 tons per hectare annually with potential of yielding up to 9 tons per hectare to an overview of the industry and challenges for small-scale oil palm farmer applications (Daemeter consulting, 2013). A cross-sectional research design was used and considered appropriate because data were collected at one point in time from women entrepreneur's groups of respondents at SIDO business centre (FGs). Moreover, it was also easier and adequate to organize and relate the data collected at a single point for processing, analysis, and presentation (Kothari, 2004). Quantitative data were collected using a structured questionnaire; qualitative data were collected through key informant interviews; while secondary information was obtained from published and unpublished reports. Data for this study was subjected to different types of analyses with the aid of statistical package for social scientists (SPSS, Version 2023).

3.2 Population of the study

According to (Kothari, 2007), the term population means an entire group of individuals, events or objects that have common observable characteristics. It refers to all elements that meet certain criteria for inclusion in a given universe. Population of oil palm refinery to women entrepreneurs in SIDO centre at Kigoma Municipal is estimated to be 200 (3ADI+, 2019; TIC, 2020). The study used the Cochran large population sample size formula ($n = z^2\ (P)(Q)/\alpha^2$) with the Cochran

finite population correction at 5% level of significance to determine the appropriate sample as 65 respondents. Therefore, sample size for this study was computed by using Cochran formula (*Equation 1*). This formula is normally used for computation of a sample size that best represents a large population of unknown size (Uakarn et al., 2021). From the formula, 138 and 384 were obtained as minimum and maximum sample size for this study respectively. However, due to limited resources, a sample size of 65 respondents (quarter of an average of the maximum and minimum sample size) was used for this study. Based on that, a total of 65 oil palm women entrepreneurs was randomly selected from unregistered group namely; SIDO women Entrepreneurs. These respondents were randomly selected from a sampling frame of Cochran formula (Cochran, 1977).

$$n = \frac{Z_{\alpha}^{2} p\,(1-p)}{e^{2}} \quad \ldots\ldots(1)$$

Where;
Where:
n = Sample size,
p = Population proportion,
z = Value at reliability level of 95% or significance level 0.05 (1.96),
e = Acceptable sampling error (0.05).

$0.1(1-0.1)1.96^{2} = 138$

$0.5(1-0.5)1.96^{2} = 384$

Average = 260
¼ of average = 65

Analytical Framework

From the properties of cost function, other factors being equal, total cost as function of inputs and output price will increase as output and input used increases. Also, when two factor inputs in production process increases it is also expected that the total cost will increase. This conforms to the quality of well-behaved cost function which should be concave and non-decreasing in input prices. Other authors who have contributed to this area of interest include: Forsund, Lovell and Schmidt (1980), Schmidt (1985), and Greene (1993).

Estimates of the value margins are the best tools to analyze performance of a value chain at each level of the chain. Value margin will be calculated by taking the difference between producers and retail economic prices.

The producers' share is the commonly employed ratio calculated mathematically as, the ratio of producers' economic price to consumers' price. Mathematically, producers' share can be expressed as:

$PS = P_{Ep}/C_p = 1 - VM/C_p$ ……(2)

where:
PS= Producer's share
P_{Ep}= Producer's economic price
C_p = Consumer price
VM = value margin

The above equation tells us that a higher value margin, diminishes producers share and vice versa. It also provides an indication of welfare distribution among production and value chain agents.
Calculating the total value margin will be done by using the following formula. Computing the Total Gross value
Margin (TGVM) is always related to the final price paid by the end buyer
TGVM= (Consumer price - Producer price/ Consumer price) *100
where, TGVM=Total gross value margin.

Net Value Margin (NVM) is the percentage over the final price earned by the intermediary as net income once value chain costs are deducted. The equation tells us that a higher value margin diminishes the producer's share and vice-versa. It also provides an indication of welfare distribution among production and value chain agents.

NVM= gross value margin – value chain cost/ Consumer price) *100
From this measure, it is possible to see the allocative efficiency of value chain. Higher NVM or profit of the value chain intermediaries reflects reduced downward and unfair income distribution, which depresses value chain participation of smallholders. An efficient value chain system is where the net margin is near to reasonable profit.
Value margin at a given stage '*j*' (*GVMj)* will be computed as:
$GVMj = (EPj - PPj/TGNM)*100$ …… (3)
Where, EPj is Economic price at jth link and PPj is purchase price at jth link.
Total gross profit margin also will be computed as:
TGPM=TGVM-TOE
Where, TGPM is total gross profit margin, TGVM is total gross value margin and TOE is total operating expense.
Similar concept of profit margin that deducts operating expense from value margin will be done
Then profit margin at stage "i" is given as:

$GPMj = (GPMj - OEj/TGPM)*100$ ……(4)
where,
GPMj =Gross profit margin at jth link
GVMj =Gross value margin at jth link
OEj =Operating expense at jth link
TGPM=Total gross profit margin
The collected data was coded and analysed to determine the gross margin from the production systems adopted in the study area. Market price and quantity of fresh fruit bunch, palm oil, kernel oil and by-products in the identified production systems were determined along with the total variable costs of production as the independent variables for gross margin.
From formula: Gross margin (π) = Total revenue
(*TR*) – Total variable costs (*TVC*)
$\pi_i = TR_i - TVC_i$ ……..…… (5)
Where;
i = Oil palm selling system
π_i = Gross margin obtained from selling systems.
TR_i = Total revenue obtained from palm oil refinery,

TVC_i = Total variable costs incurred

3.5 Model Specification

This study relies on the factors of profitability of the women entrepreneurs in the palm oil refinery. The determinants include age, education level, experience for refinery, purchasing price, labour, transport, packing, refinery process and selling process. The determinants of demographic and socioeconomic characteristics of samples are qualitative decisions that are based on probabilities of either choosing to agree or not (in this case, the demographic and socioeconomic characteristics of samples of women entrepreneurs in the palm oil refinery channel). Other quantitative choice model of interest in this type of decision is the logistic regression model (Green, 2000; Gujarati & Sangeetha, 2007; Adong et al., 2012).

Linear regression model is a very useful tool in predicting a categorical variable from a set of predictor variables. It is often chosen if the predictor variables are a mix of continuous and categorical variables, and/or if they are not normally distributed (Wuensch, 2006). Factors that examine women entrepreneurs in the palm oil refinery are well documented in literature (Allen & Gale, 1994; Tanga et al., 2000; Lapar et al., 2003; Bahta & Bauer, 2007; Boughton et al., 2007; Barret, 2008; Agwu et al., 2012). This literature identifies a wide range of socio-economic and demographic variables that affect women entrepreneurs in the palm oil refinery.

$$\beta_0+\beta_1\chi_1+\beta_2\chi_2+\beta_2\chi_2+\beta_3\chi_3+\beta_4\chi_4+\beta_5\chi_5+\beta_6\chi_6+\beta_7\chi_7+\beta_8\chi_8+\varepsilon_i \quad \text{.....(6)}$$

Whereby:

π = Net Total Profit

χ_1 = Age of respondent (Year)

χ_2 = Education Level of respondent

χ_3 = Experience in business (Year)

χ_4 = Purchasing price (Tshs/per bag)

χ_5 = Labor cost (Tshs/ bag of oil palm).

χ_6 = Transport costs during buying (Tshs/bag of oil palm),

χ_7 = Refinery charge (Tshs/bag of oil palm),

χ_8 = Selling price (Tshs/Tin of oil palm),

ε_i = Error term

Basic information on the inputs and output were entered into Excel's spreadsheet and simulated using SPSS 23.0 software programs.

Regression analysis

Regression analysis of Equation (6) was done using SPSS statistics/data analysis version 23.0. As a first attempt during the model building process, various types of relationships (for example, linear) between the dependent variable (π) and each independent variable (χ_i) were examined on structural equation. The reliability and stability of the regression model was then tested against violation of Ordinary Least Square (OLS) estimation assumptions, that is, abnormality, distributed independent variable, autocorrelation, heteroscedasticity and multicollinearity. π_{ij} is the profit level of the *i* is a function term of respondent in the j^{th} refinery production.

4.0 Results and Discussion

4.1 Demographic and Entrepreneurs Characteristics of Oil Palm Refinery Participants

The paper examined the different women entrepreneurs of oil palm processor's characteristics which include: age of the entrepreneur, level of education, level of experience in oil palm profitability processing industry, how they acquired the purchasing of oil palm refinery, Transport costs during buying, refinery charges and selling of oil in markets. The demographic characteristics of the women entrepreneurs of oil palm refinery is presented in Table 1. The age distribution for the majority of the respondents showed a range between 31 and 45 years old with only 55.4% of the respondents being highly involved in the business of oil palm refinery. This indicates that women oil palm enterprises were operated by people within the productive age. Only 4.6% of the respondents had Informal education compared to 61.5% and 24.6% that had either primary or secondary education respectively, while 9.2% had degree education. These results indicate that few highly educated people were engaged in the oil palm enterprises, the majority of the entrepreneurs being primary school graduates. A high proportion of the respondents (49.2%) had 2 - 5 years of experience in the oil palm refinery business, while 33.8% had experience of between 6 - 10 years of experience of dealing with oil palm processing, only 10.8% of the respondents had 0 - 1 years of experience and 6.2% had above 10 years. This implies that oil palm refinery enterprises are relatively income generated activity and hence the need for improving managerial capabilities for higher productivity for profitability.

Table1 show that the relationships between age, educational level and business experience to oil palm refinery were determined. A Chi-square test for demographic characteristics indicated statistically significant relationship between age and participation to women entrepreneurs in oil palm refinery, $\chi 2 = 26.55$, $p = 0.000$. This implies that age of the respondents determined women entrepreneur should participate in oil palm processing business for profitability gain. The study findings show that there was statistically significant relationship between educational level and participation to women entrepreneurs in oil palm refinery, $\chi 2 = 61.99$, $p = 0.000$. These results suggest that educational level was a key determinant factor for women to participation to in oil palm refinery. In this case, respondents with primary education are women entrepreneurs in oil palm refinery. Furthermore, the relationship between experience in business attended by women entrepreneurs and processing of oil palm profitability is revealed statistically significant relationship at $\chi 2 = 56.91$, p = 0. 000.This implies that experience in oil refinery of the respondent is the factor matters of the profitability analysis at refinery business. In this regard,

descriptive statistics revealed that enterprises of oil palm for women has good rate contribution of employment in Tanzania.

Table 1. Demographic characteristics of the Oil Palm Refinery in 2024 (N=65)

Variable		Frequency	Percentage	$\chi 2$	P-value
Age				**26.55**	**0.000**
	18-30	4	6.2		
	31-45	36	55.4		
	46-60	15	23.1		
	60+	10	15.4		
Educational level				**61.99**	**0.000**
	Informal education	3	4.6		
	Primary school	40	61.5		
	Secondary school	16	24.6		
	Degree Level	6	9.2		
Experience				**56.91**	**0.000**
	0 – 1	7	10.8		
	2 – 5	32	49.2		
	6 – 10	22	33.8		
	Above 10	4	6.2		

4.1 Profitability analysis of Oil Palm Refinery

Additionally, this study summarized that the prices of variable and fixed items for profitability analysis of oil palm refinery was carried out by taking the costs of various inputs consideration. The results obtained from profitability analysis are presented in Table 2, the average costs of various oil palm stages from purchasing to selling are made to the end of using refining processes. First is purchasing, fractionation with crystallization and separation processes to obtain solid (palm stearin), and liquid (olein) fractions. Then melting and degumming removes impurities. Then the oil is filtered and bleached. Physical refining removes smells and coloration to produce refined, bleached and deodorized palm oil (RBDPO) and free fatty acids, which are used in the manufacture of soaps, washing powder and other products. RBDPO is the basic oil palm product sold on the commodity markets.

Gross Margin Analysis results as summarized by Table 2, show was carried out to assess the profitability of oil palm refinery women enterprises as presented in Table 2. The results reveal that oil palm seeds purchases (average cost of oil seed purchasing and transportation during buying) for refinery had accounting for about Tshs 15,000.00 (0.9%) of the total variable costs of refinery production. The highest cost is (70.5%) for labor charges of different activities, refinery costs during stages is (21.2%). Other costs were included loan borrowed in year (7.4%), while the costs for women entrepreneurs attended training for oil palm business had the least cost of 0.0%. It was further observed that entrepreneurs of the oil palm refinery did not receive any opportunities of attending training for this business. Other fixed costs were equipment for seed drying (85.6%), drying yard points (14.4%). During the survey, it was observed that some of a few facilities costs are not charged such as storage during waiting for refinery and market authority fee. It was further observed that many of the women enterprises are did not own refinery machine. Consequently, some of the enterprise conducted their business along the milling machine sides for easy access to the operators and costs minimization.

The average gross margin (TR)-(TVC) per women enterprises of oil palm refinery was Tshs. 2,589,000.00per year while the net profit was estimated at Tshs. 2,533,000.00. The benefit cost ratio of the entire enterprise was 2.44 thus indicating an additional return for every one shilling selling on oil palm refinery or processed. Furthermore, the benefit-cost ratio analysis gave a value, which is above one (2.44>1), confirming the viability of palm oil refinery for women entrepreneurs. This agrees with the finding of Chiemela et al. (2021) who reported that palm oil production in Nsukka Local Government Area of Enugu State is both viable and profitable. It is, therefore, necessary to encourage more people to engage in palm oil production as a means of enhancing their income generation. The average return on every shilling invested in the oil palm refinery business (24%), implying that women entrepreneurs are profitable in business of oil refinery. This finding results show that there were no women entrepreneur who operated at loss break-even point, that is, TR-TC=0.

Table 2. Summary of Costs, Revenue and Profit of Oil Palm Refinery

Various Costs Analysis in TSHS of Refinery Process at SIDO Kigoma Per Year in 2024		
Variables	**Average Costs (Tshs)**	
Variable costs (Tshs)	**Tshs**	**(%)**
Cost of oil seed purchasing and transportation during buying	15,000.00	0.9
Cost of Training attended	0.00	0.0
Cost of labor	1,200,000.00	70.5
Cost Loan borrowed in year	126,500.00	7.4
Cost of refinery	360,000.00	21.2
Total Variable Cost	**1,701,500.00**	**100.0**
Fixed costs (Tshs)		
Cost of drying	8,000.00	14.4
Cost of holding or storage	0.00	0.0
Cost of equipment	47,500.00	85.6
Cost of market fee	0.00	0.0
Total Fixed cost	**55,500.00**	**100.0**
Total Cost (FC+VC)	**1,757,000.00**	
Average Total Cost in year	**878,500.00**	
Benefits (Tshs)		
Revenue (selling from Oil refinery)	**4,290,000.00**	
Gross margin (TR)-(TVC)	**2,589,000.00**	
Net profit (TR)-(TC)	**2,533,000.00**	
Benefit-Cost Ratio (TR/TC)	**2.44**	

4.2 Econometric model analysis of profitability oil palm refinery

The results of the estimate the profitability function, the results of multiple regressions are presented in Table 4 showing the relationships between the dependent variable net total profit **(π)** and all independent variables were assessed. The year of age of respondent (χ_1) and transportation costs (χ_6) had negative beta coefficient, while education level of respondent (χ_2), year of experience in business (χ_3), price of purchasing price (χ_4), price of labor (χ_5),costs for refinery (χ_7) and selling price of the oil refined (χ_8) had a positive coefficient with the dependent variable. This means that increase in price of oil palm for age of entrepreneur and transportation costs will reduce profit while increase in price of labor, experience, purchasing costs, refinery costs and selling costs will increase profit and vice versa. The results revealed that variation in profitability of oil palm refinery is significantly influenced by the price of oil refined. The adjusted R^2 of the model was 0.86 which means the independent variables explain 86% of the variation in the profit per 20 litres of tin of the oil palm enterprises. The adjusted R–squared value indicated that the model was explaining 86% of the variation in the profit production by women entrepreneurs. This had shown a sensible as well as a high degree of goodness of fit in adequately explaining the determinants of profit of oil pam output. The model had an F-value of 86.97 significant at 1% level (*p-value*=0.000) implying that the independent variables significantly explained the variation in the dependent variable all at 1% level. All the independent variables in the model were also tested for multicollinearity and proved no serious level of multicollinearity as supported by mean Variance Inflation Factor (VIF) of less than 10 (Table 2) (Edriss, 2003), the mean VIF was 1.28.

Table 3: Analysis of Econometric model estimation of costs for Oil Palm Refinery

Coefficients[a]						
$\beta_0+\beta_1\chi_1+\beta_2\chi_2+\beta_2\chi_2+\beta_3\chi_3+\beta_4\chi_4+\beta_5\chi_5+\beta_6\chi_6+\beta_7\chi_7+\beta_8\chi_8+\varepsilon_i$						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	- 8.976	30.07	0.8420	-0.42	0.673
	π = Net Total Profit	-57.62	48.01	0.0324	-1.20	0.234
	χ_1 = Age of respondent	-0.98	0.04	-0.5605	-23.22	0.000
	χ_2 =Education Level of respondent	-5.88	2.22	0.0050	-2.64	0.010
	χ_3 = Experience in business	0.21	12.71	0.1084	0.02	0.987
	χ_4 = Purchasing price	-1.25	0.21	0.0852	-5.82	0.000
	χ_5 = Labor cost	0.98	0.03	0.2141	38.19	0.000
	χ_6 = Transport costs during buying	-0.67	1.26	-0.3005	-1.98	0.051
	χ_7 = Refinery charge	-30.25	1.66	0.3465	-1.53	0.131
	χ_8 = Selling price	-0.15	1.96	0.0876	-0.92	0.361
Durbin-Watson		1.60				
R^2		0.87				

Coefficients[a]						
$\beta_0+\beta_1\chi_1+\beta_2\chi_2+\beta_2\chi_2+\beta_3\chi_3+\beta_4\chi_4+\beta_5\chi_5+\beta_6\chi_6+\beta_7\chi_7+\beta_8\chi_8+\varepsilon_i$						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
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	χ_7 = Refinery charge	-30.25	1.66	0.3465	-1.53	0.131
	χ_8 = Selling price	-0.15	1.96	0.0876	-0.92	0.361
Adjusted R^2		0.86				
Variance Inflation Factor (VIF)		1.28				
Durbin Watson d-statistics (11, 90) 1.603592; VIF 1.28. significance at 5%						

In addition, experience in oil palm refinery process enterprises, cost of seed purchasing, labor cost, costs of refinery process and cost of selling oil has a positive and significant relationship with profitability of women entrepreneurs' success (β = 0.108, 0.084, 0.214, 0.347and 0.088, p value > 0.05). It shows that the women entrepreneurs have a high self-confidence level so it can help during oil palm refinery business performance in women entrepreneurs' success. As R^2 = 0.87 in this research model, it indicates that 87% of the total variance in women entrepreneurs' success (profitability) can be using these factors such as the need for achievement.

5.0 Conclusions and Policy Implications

In analyzing the profitability of oil palm refinery process to income for women entrepreneurs in Kigoma Municipal was reveal that oil palm refinery has potential profitability for women entrepreneurs in the study area. However, oil palm business also faces by a number of costs such as oil palm seeds purchases (average cost of oil seed purchasing and transportation during buying) for refinery had accounting for about Tshs 15,000.00 (0.9%) of the total variable costs of refinery process. The highest cost is (70.5%) for labor charges of different activities, refinery costs during stages is (21.2%). Other costs were included loan borrowed in year (7.4%), while the costs for women entrepreneurs attended training for oil palm business had the least cost of 0.0%. All this indicated the importance and potential of the business of oil palm refinery has

among small scale women entrepreneurs in Kigoma Municipal.

Based on the results of profitability analysis of the study, there is clear indicating that oil palm refinery women entrepreneurs are operate business in profitable ventures. Thus revealed by the benefit-cost ratio analysis gave a value, which is above one (2.44>1), confirming the viability of palm oil refinery for women entrepreneurs. This implies that if this process is optimized, and the oil enterprises are promoted and supported, they will have even greater impact on the incomes and livelihoods of participants as well as improving the country's economy. Furthermore, this implies that if more effort is invested on improving and supporting oil palm refinery, the aimed target of profitability entrepreneurs will be also achieved among small scale farmers. The result of the current study of linear regression model indicates that profitability of oil palm refinery is significantly influenced by the price of oil refined, the positive sign in the model and significantly are affected by education level of respondent, year of experience in business, price of purchasing oil palm seeds, price of labor, costs for refinery, and selling price of the oil refined have a positive and significant impact on oil palm refinery women entrepreneurs' success (profitability) at Kigoma Municipal in Tanzania. The adjusted R^2 of the model was 0.86 which means the independent variables explain 86% of the variation in the profit per 20 litres of tin of the oil palm enterprises. The current study concluded that the experience in oil palm refinery process enterprises, cost of seed purchasing, labor cost, costs of refinery process and cost of selling oil has a positive and significant factors has a positive and significant impact on women entrepreneurs' success (business profitable). Therefore, it is recommended to improve mechanism the process of oil palm refinery, LGA arranging relevant training for women entrepreneurs and farmers are very important points which can improve quantity product to market and costs minimization for product profit maximization. For expanding and scaling-up oil palm enterprises the government would establish policies to improve the limiting factors for entail providing adequate investment capital to operate so that can be guaranteed by funding through formal sources of credit like co-operative societies and micro-credit institutions.

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