Impact ofMobile Money Technology on Sheabutter Marketing in Tolon District, Ghana

Abstract

Sheabutter processing and marketing is a major traditional enterprise among women in the Northern Ghana. The use of mobile technology has increased rapidly in many developing countries including Ghana. Lookingat the unique marketing and other forms of transactions among women in the shea industry, it is essential for the industry to adopt mobile technology to ensure smooth transaction and market transformation.Mobile money technology adoption and shea butter marketing among women was studied by using cross-sectional survey data from Tolon District in Northern Ghana. A total of 250 women sheabutter processors and marketers in 13 communities in the district was selected randomly in 2022. The impact of mobile money technology adoption was analyzed using the Heckman Treatment model,and revealed that the adoption of mobile money technology had positive impact on sheabutter marketing. The factors influencing mobile technology adoption were also examined using the Probit model.The study recommends that expansion of mobile technology networks, increased investment in education, provision of credit facilities to processors can improve the sheabutter business. Women processors in rural communities should be trained on how to use mobile phones to access financial services by telecommunication companies and NGOs.

Keywords: Mobile Money Technology, Sheabutter Marketing, Constraints, Tolon District.

1. Introduction

Butter is a fatty shea extract from the shea tree's seed. The Shea tree, also known as *Tharate*, grows wild in West Africa's dry Savannah area, from Senegal in the west to Sudan in the east, and into the Ethiopian foothills (Elia and Saussey, 2013). The Shea tree is a native and important economic and social asset in most African countries (Lovett, 2013), with a concentration in Ghana's northern savannah areas (Aniah et. al., 2014). The number of wild shea nut trees in Ghana was projected as 9.4 million, with the majority of them grown in Northern Ghana (Elia and Saussey, 2013). The shea tree may be found practically everywhere in Northern Ghana, with 77,670 sqkms in Western Dagomba, Southern Mamprusi, Western Gonja, Lawra, and Tumu, (Al-hassan, 2015).The shea tree grows primarily in Ghana's Northern, Upper East, and Upper West regions, with some portions of Brong Ahafo providing raw materials for the shea butter industry.

The shea butter sector acts as a crucial channel to escape the poverty trap for women who are forced to labor to supplement for family income. It provides them the opportunity to earn for their living (Collins, 2014).Shea nuts play important socio-economic role in Ghana in terms of employment and income generation to rural population especially women who are, directly involved in shea nut collection and butter extraction.Women are the industry's backbone and are mostly involved in gathering,processing of shea nutss and butter (Emily, 2015). Majority of women in Northern Ghana rely on the sales of shea butter and other shea-related items for their daily livelihood (United Nations Development Programme2017). The production of shea nuts and butter was the largest source of revenue for many women, rendering shea processing extremely important to local communities (Collins, 2014). The Sheabuterhas economic and health benefits to the growing populace in African countries including Ghana (Aniah et. al., 2014).According to the Global Shea Alliance, the majority (90%) of processed shea butter goes

to the food and cosmetics industry.Shea butter processing is an appropriate indigenous traditional industry that could highly support sustainable development of Northern Ghana but financing is one of the biggest constraints affecting entrepreneurs involved in the processing and marketing of sheabutter (Pufaa, 2013).

Finance could be a major constraint to expandshea butter exports from West Africa (Holtzman, 2004). The financial constraints faced by shea butter producers arise from two major dimensions i.e., inadequate production and marketing capital (Pufaa, 2013). Therefore, an economical way to mitigate the financial constraints is the introduction and adoption of mobile money technology in the sheabutter processing and marketing industry. Introduction and adoption of financial technologies globally has helped shea businesses attain growth which in turn improved the standard of living of people. However, none of these financial technologies adoptionhas much influence on agribusiness value chainin most developing countries (Abdul-Rahaman &Abdulai, 2021).

Human existence has been sustained largely by communication, from the early days of letter writing to the usage of advanced forms of telecommunication devices such as mobile phones(Jack & Suri, 2010).The mobile phone has proven to be a very relevant tool which has a very high level of acceptance among producers and consumers in many countries(Masamila et al., 2010). Mobile money adoption among value chain actors can offer significant opportunities for the development in the agribusiness value chain. Aside providing opportunities for savings, especiallyin socially volatile and risky environments (Beck et al., 2018), it allows for a reliable business transaction among agribusiness valuechain actors, reduces transaction costs, and facilitates market exchange (Jack & Suri, 2011; Kikulwe et al., 2014; Shambare, 2011).Reports

of 1998 indicated that less than 1 % of the population in Ghana had access to mobile phones and this number grew immensely to 55% over a decade (GSMA, 2009).

The Wireless Intelligence (2012) reported that mobile phone adoption and usage had increased tremendously from 150 thousand mobile phone subscribers in 2000 to 11 million subscribers by the end of 2009. This widespread usage of mobile phones has generated a lot of competition amongst telecommunication network service providers and has driven the engineering of services which help them to remain relevant and capture market share. The GSMA (2017) report indicated that, "there were about 30 million active users of mobile money services globally and that 56.9 million people have opened mobile money accounts in Sub-SaharanAfrica. Ghana currently has four communication companies (MTN, Airtel, Vodafone, and Tigo) that are involved in renderingmobile money payment services to the public(Roberts, 2016). MTN has 46% share in terms of mobile money subscriber services, followed by Vodafone (27%) and then Tigo (14%) and theremaining market share was captured by Airtel, GLO (NCA, 2015).

The mobile money service serves as a medium for the payment of bills, person-to-person transfers (P2P), government-to-person (G2P) transfers, payment of services such as public transport (Gutierrez & Choi, 2014).Djurfeldt*et al*. (2013) revealed that men and women tend to have unequal access to modern technologies and inputs and is a major cause for low productivity among women in the agribusiness value chain. Considering the fact that women dominate the shea industry, it is therefore relevant to explore their ability to access the financial technologies available *i.e.*,mobile money technology.Mobile Money provides financial inclusion to smallholder farmers who are excluded from the formal finance system, as well as informal sectors with low returns and low market demand(Abdul-Rahaman & Abdulai, 2021). As a result of these, Mobile Money is progressively becoming a key mode of payment for Ghana's

unbanked and underserved population (Boateng, 2011). There has been Mobile Money adoption rate of 70% among marketers and producers in the agricultural value chain (National Communication Authority, 2016). This study therefore intends to examine the factors influencing mobile money technology adoption and its impact on sheabutter marketing among women processors in the Tolon District.

2. Methodology

This study employed a multistage sampling procedure in selecting the sample. The Tolon district was purposively selected based on the intensity of sheabutter processing in the area. 13 sheabutter producing communities were also purposively selected due to the presence of excess concentration of sheabutter women processors in these communities. Simple random sampling was then used to select a total of 250 women sheabutter processors for the survey. These women were interviewed using a structured questionnaire for getting the information on sheabutter production and marketing, mobile phone and mobile money usage, processing and household information.In order to assess the impact of mobile money adoption on the sheabutter marketing quasi-experimental and cross-sectional survey designs was employed to collect data on shea processors and marketers. Quantitative questionnaire, face-to-face interviews were also used for gathering data. On data coding and entry, both Stata and SPSS wereused.

2.3 Method of Data Analysis

Probit Model

The decision to adopt Mobile Money technology depends on observed characteristics of the woman processor such as household size, age, educational level among others. The binary dependent variable, y (adoption decision) takes on the values zero (0) and one (1). In particular,

the binary probit model, *adoption* can take on a value of one (1) while non-adoption takes zero (0). The probit analysis providesstatistically significant findings onthefactors that increase or decrease the probability of adoption.

The probit model for this study is specified as:

$$Y^*_I = \beta x_1 + \beta x_2 + \beta \times_3 + \ldots + \beta \times_{ki}$$

Where Y* = MoMo adoption (1 for adopter, 0 for non-adopter), x1 = age of processor; x2 = number of years spent in school; x3 = phone ownership; x4 =distance to MoMo vendor; x5 = processing group; x6 = training; x7 = Access to credit. β is unknown parameters to be estimated (Naglar, 2002).

Heckman model was used to eliminate selection bias so that unbiased casual effects can be estimated. It makes assumptions about the relationship between two equations in an underlying behavioral model which are; a response schedule and a selection function. The model is however sensitive to the choice of variables included in the selection function which is demonstrated in the estimation of the impact of mobile money technology adoption on sheabutter marketing in this study. The stages are as follows;

First stage:

Adoption (Q) = $\beta_0 + \beta i Xi + \varepsilon_i$(1)

Where Q= MoMo Account (1=yes, 0=no)

Second stage:

Total sales= $\beta_0 + \beta_1 X_i + \beta_2 X_{ii} + \beta_3 \lambda_i + \xi_i$(2)

3. Results and Discussion

3.1 Sociodemographic Characteristics of Respondents

Table 1 reveals that 2.80% of the total sample were between 18-25 years old, 38.40% were aged between 26-35 years old, and 38.40% were between 36-45 years old as well. 18.40% of them were between the ages 46-55 and 2% were 65 years old and above. This indicates that majority of the women sheabutter processors is within the youthful age bracket.

Table 1: Age Distribution of Respondents

Age	Frequency	Percentage	Cum Freq
18-25	7	2.80	2.80
26-35	96	38.40	41.20
36-45	96	38.40	79.60
46-55	46	18.40	98.00
56+	5	2.00	100
Total	**250**	**100**	

Source: field survey, 2022

Figure 1 reveals that 75.2% have no education and only 24.80% of the women had formal education with only 1.6% of them having tertiary education.This means that majority of the women processors in the study area has no formal education.

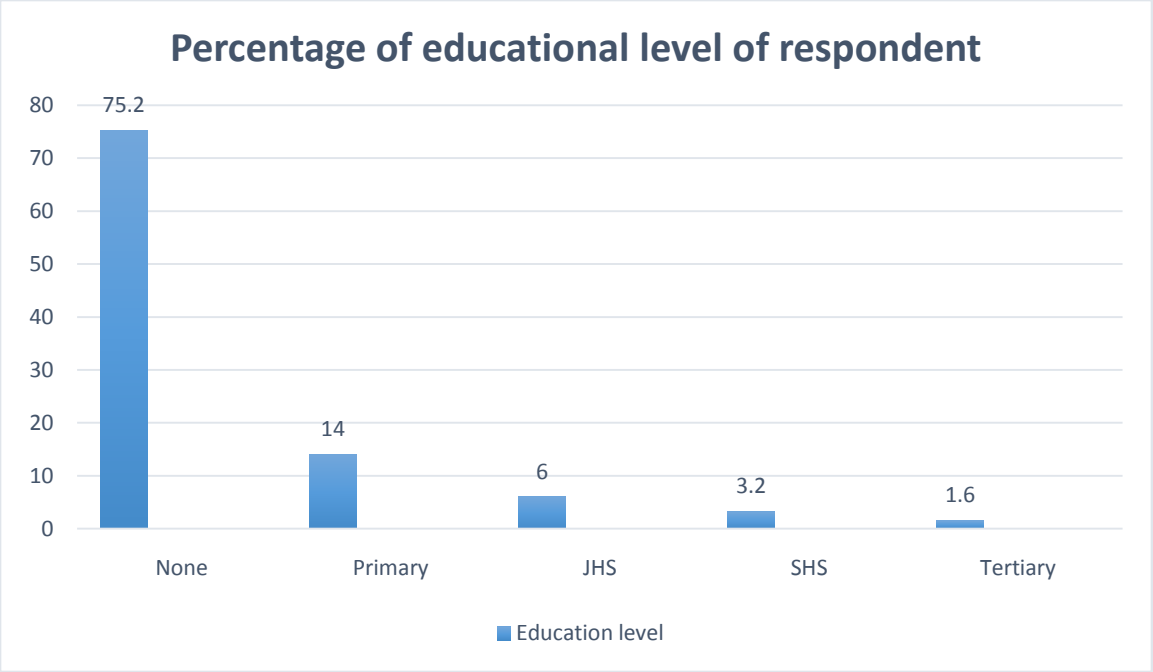

Figure 1: Educational level of respondents

With regards to ethnicity, the results show that majority (94.8%) are Dagombas due to the fact that the study area is dominated by Dagombas, 2.4% areMamprusisand 2.8% areGonjas. (See fig. 2).

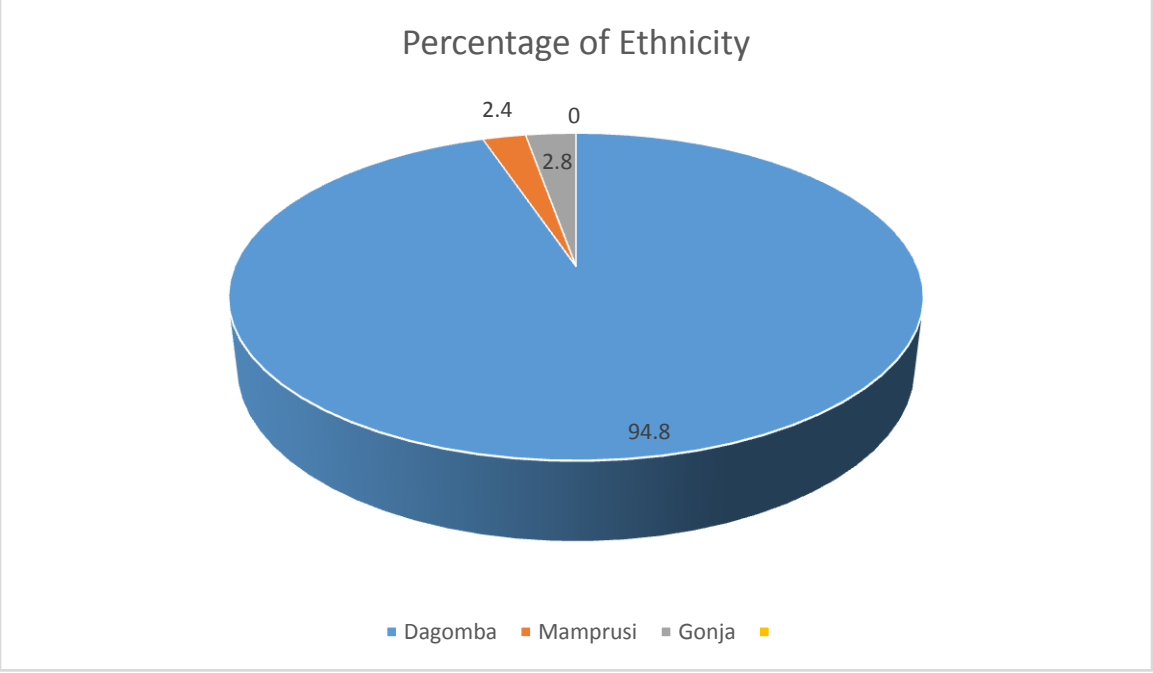

Figure 2: Ethnicity of respondents

3.2 Socioeconomic Characteristics of Respondents

As shown in Table 2, the results reveal that majority (78.40%) of the respondents indicatedthat sheabutter processing and marketing is their major occupation whilst the remaining said itis their secondary occupation. This finding is in line with intuition as most of the women in the study area are engaged in sheabutter processing complemented with crop and animal production.

Table 2: Occupation by Women Sheabutter processors in Tolon District

Major occupation	Frequency	Percent	Cumulative Percent
Sheabutter	196	78.40	78.3
Others	54	21.70	100.0
Total	**250**	**100.0**	

Source: field survey, 2022

Regarding credit access by the women processors, majority of the respondents (80.40%) did not have access to credit to supporttheir processing activities. 19.60 % of the respondents however said they had access to credit. The results are presented inOfthe 19.60%, 11.20% said they received the amount they applied for while the rest received different amounts than applied. The credit amount ranged from 200ghc to 800ghc with 8.80% of the 19.60% receiving 600ghc. All credits were received in cash rather than via mobile money, in-kind etc.

Table 3: Credit Access by Women Sheabutter Processors

Access to credit	Frequency	Percent
Yes	49	19.60
No	201	80.40
Total	**250**	**100.0**

Source: field survey, 2022

3.3 Perception of Women Processors about Mobile Money Use

The results of the perception of women processors about mobile money use are presented in Table 4.The results show that the women processers are aware about the mobile money technologyeven though they were illiterates. However, their perceptions about the technology varied greatly and seemed to show some lapses in their responses which suggest that they are deficient in knowledge in some aspects of mobile money. For instance, respondents had the likelihood to strongly agree or agree with most questions but yet still, there existed a substantial number of respondents who either strongly disagreed or said they did not know. This in it is entirety depicted gaps in the level of understanding of respondents about some key aspects of mobile money.

Based on the percentage count of respondents, 3.60%strongly disagreed that mobile money is safe and simple to use, the technology is safe and secured haddisagreepercentage of 12.12% and 22.09% responded neutral to Mobile money enables me to reduce operational cost in my marketing. 49.60% agreed that Mobile money is relatively less costly and also convenient to use and 46.00% strongly agreed that Mobile money enables me reduce the chances of been robbed and attacked. This portrayed a positive perception of the women processors about the mobile money technology.

Table 4: Perception of Women Processors about Mobile Money Use

Variable	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean
a. Mobile money is relatively less costly and also convenient to use	1.20	4.80	16.00	49.60	28.40	3.99
b. Most of my customers use mobile money for transactions and have strong believe in the technology	1.20	5.60	12.00	40.40	40.80	4.14
c. Mobile money enables me to reduce operational cost in my marketing	0.80	3.21	22.09	43.78	30.12	3.99
d. The technology is safe and simple to use	3.60	12.20	17.20	35.60	31.20	3.78
e. The technology is safe and secured	0.80	6.80	20.00	34.80	37.60	4.01
f. Mobile money enables me to strengthen relationships with other actors in my sheabutter business during marketing	0.40	4.80	18.80	44.80	31.20	4.01
g. Mobile money enables me expand my business faster	1.60	3.60	22.50	44.00	28.00	3.93
h. Mobile money enables me reduce the chances of been robbed and attacked	1.20	1.60	18.00	33.20	46.00	4.21

Source: field survey, 2022

3.4 Factors Influencing Mobile Money Technology Adoption

As shown in Table 5, years spent in school is significant at 5% with a positive coefficient. This shows a positive relationship between the number of years a processor spent in school and mobile money adoption. Educated processors are likely to adopt the technology faster than uneducated processors. This finding is consistent with the empirical literature that education enables farmers to make informed decisions such as technology adoption (Abdul-Rahaman & Abdulai, 2021).

Mobile phone ownership is also significant at 5% with a positive coefficient indicating a positive relationship between the owning a mobile phone and adoption of mobile money technology. Thus a 1% increase in the ownership of mobile phone leads to a 1% increase the rate of adoption of the technology, ceteris paribus. This is because those who have mobile phones have the capacity to adopt the technology than those who do not. This agrees with World Bank (2012) that found that the rapid adoption rate of this innovative financial technology in Africa is partially owing to the increasing rates at which mobile phone network is penetrating society and the adoption of mobile phone. Credit is significant at 5% with a positive coefficient, which implies that there is a positive correlation between credit acquisition and mobile money technology adoption. Credit acquisition increases the likelihood of adoption in the sense that most creditors are not willing to be physically available to hand over the cash to the processor after all requirements are met by incurring additional transportation cost, they prefer to just send it electronically which is in the best interest of the borrower as well since they are made to bare the transport cost most of the time.

Table 5: Factors Influencing Mobile Money Technology Adoption

Mobile money Adoption	Coefficient.	Std. Err.	P>z
Age	0.014	0.010	0.156
Years spent in school	0.056**	0.022	0.011
Marital status	0.064	0.117	0.584
Phone ownership	0.855 **	0.367	0.020
Use of phone in business	0.795***	0.243	0.001
Credit	0.435**	0.186	0.020
Distance to MoMo Vendor	-0.018**	0.008	0.031
Specific use of momo	0.052	0.052	0.317
Inverse Mills Ratio	-2.450	-4.855	0.014
Rho	-0.182		
Sigma	13.396		
Wald chi2(8)	= 79.51		
Prob > chi2	= 0.0000		
Number of Obs	250		

Source: field survey, 2022Significance level = *** 1%, **5% and *10% respectively

3.5 Impact of Mobile Money Technology Adoption

Age is significant at 5% with a negative coefficient which indicates a negative correlation between the age of a processor and quantity sold. As the age of a processor increases, the quantity she sells reduces due to factors such as health associated with old age, low quality butter, low quantity of processed butter etc. Mobile money account which represents mobile money adoption is also significant at 10% with a positive coefficient implies a positive relationship between adoption of the technology by women processors and quantity sold.

According to Fafchamps& Hill (2005), usage of mobile phones and mobile money facilitates negotiations between processors and customers. For example, smallholder farmers might regularly trade their farm yield to indigenous buyers immediately after harvesting their farms, with no need for extra storage or processing, since they need the money to pay for crucial consumption needs or unpaid bills. Due to the farmers negotiating and making transactions through the mobile phone and mobile money, their problem of travel period and transportation costs are relieved.

Table 6: Impact of Mobile Money Technology Adoption onQuantity Sold

Quantity sold	**Coefficient.**	**Std. Err.**	**P>z**
Age	-0.341**	0.161	0.035
MoMo Account	20.379 *	12.360	0.099
Household size	0.166	0.150	0.271
Sheabutter processing as major occupation	3.102	3.313	0.349
Processing group	2.757	3.012	0.360
Credit acquisition	5.801*	3.135	0.064
Experience	0.597***	0.203	0.003
Sales mechanisms	1.460	1.278	0.253

Source: field survey, 2022Significance level = *** 1%, **5% and *10% respectively

Chiputwa et al. (2015) stated that, usage of mobile money via mobile phone enables farmers to trade a greater quantity of their harvests before they are harvested. As well, the authors maintained that the usage of mobile phone makes it convenient for farmers and traders to communicate, hence aids the farmers to pre-negotiate higher prices for their harvests.Credit acquisition was also significant at 10% with a positive coefficient. This implies that the acquisition of credit by women processors positively affects their total sales. Credit helps the

processors to expand their scale of production and when this happens, they record increased levels of quantity sold. Literature has it that the effect of mobile money on farm output and welfare goes through various channels such as low cost of buying farming inputs, convenience in selling farm produce, opportunity to purchase input on credit through mobile money, avoiding travel time to access banking services.Experience is seen to also affect quantity sold positively. The more experienced a processor is, in both marketing and processing of butter, the higher likelihood to record high quantity sold.This is because experienced processors usually understand the customer's needs better and can better predict what will sell faster (which type of butter) and therefore spends little time in convincing a customer to make a purchase.

4. Recommendations

Looking at the numerous positive impacts of the technology, it can be concluded that the level of adoption of the mobile money technology should be increased by reducing the lack of technical know-how through intensive education of women processors on how to use the technology. The following recommendations have been drawn from the findings of the study: Policies that enhance the adoption of the technology needs to be promoted especially education on how to use mobile money to access financial services. Flexible credit services should be rendered to women processors so that they can increase their level of production and marketing.

5. Conclusions

This study examined the factors influencing the adoption, impacts and constraints to mobile money technology in sheabutter marketing using household survey data collected from selected communities in Tolon District of Ghana. We find a high level of awareness on the part of respondents about the mobile money technology during the survey, although there are limits to the level of adoption.Mobile money adoption among women sheabutter processors is increasing

as more young people venture into the business. 53.60% of the women interviewed use mobile money technology in their business transactions. Variables such as age, educational, phone ownership and distance to a mobile money vendor.Mobile money plays a very important role in processing and marketing of sheabutter, it increases quantity sold and reduces transportation cost in the marketing of sheabutter. Adopters of the technology utilized it to facilitate easy transactions and to generate more output (sales). It also facilitates credit acquisition and ensure that the actors in the marketing chain are youth with laudable experience.

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