

International Journal of Economic and Political Integration

Volume 1, Number 1: Spring 2011

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ISSN: 0974-3510

ISBN: 978-1-61233-544-5



Brown Walker Press

23331 Water Circle, Boca Raton, FL 33486-8540, USA

www.brownwalker.com/ASMT-journals.php

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Determinants of Kenyan Exports: A Gravity Model Approach

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Abstract: *Under the Kenya's blue print Vision 2030, the government identified marketing as a challenge to the agricultural sector. Efforts to maintain existing markets and create new ones to increase Kenya's bargaining power, and value addition in agriculture are emphasized. The development of this strategy will contribute towards conquering new markets and export expansion. This paper applies a panel data analysis to a sample of 25 Kenya's major export destination countries to analyse the determinants of exports, Kenya's major trading partners and the unexploited markets using the gravity model approach. The results show that Kenya's exports highly depend on foreign demand; the importer's GDP and population. Transportation costs are found to influence Kenya's exports negatively, hence better off trading with her neighbouring countries. Furthermore, some dummies namely the European Union, Common Market for Eastern and Southern Africa and Embassy/Consulate augmented the gravity model and were found to significantly influence Kenya's exports. The analysis also showed that there is unexploited export potential among some of Kenya's export markets, of which, if fully exploited, can contribute to the achievement of the agricultural sector's short-term goals.*

Keywords: New Trade Theories, Augmented gravity model, economic centre

Introduction

Exports are important in the process of growth and furthermore, expansion of exports is an integral part of economic growth process. Export promotion has been perhaps the one commercial policy issue that has attracted considerable attention both at national and international levels, and as analysts argue, this development has appeared to be a successful strategy for fostering growth and inclusive development. In this era of globalization and liberalization, the importance of exports can not be over-emphasized. Exporting products abroad enables a developing country like Kenya to widen its market beyond the size of the local market.

Kenya's external environment has been greatly influenced by the changing international and regional trading arrangement. For instance, the multilateral trading arrangements under the World Trade Organization (WTO) and the regional trading arrangement such as Common Market for Eastern and Southern Africa (COMESA), the East African Cooperation (EAC), and the European Union (EU), have greatly contributed to Kenya's export demand.

Since Kenya undoubtedly benefits from export activities such as greater capacity utilization, economies of scale, adoption of more efficient technology, the learning effects, and relaxation of foreign exchange constraints and given the importance of exports in Kenya's economy, it is important to analyse the factors that determine export flows between Kenya and her trading partners. Also, while formulating trade and industrial policies aimed at stimulating exports, it is important to understand which factors stimulate or deter entry of Kenyan exports into international market. In order to realize the goal of the blue print Vision 2030, Kenya will need to identify and eliminate the impediments to her competitiveness in the region (e.g. domestic policies for trade liberalization or openness etc). Equally important is to identify the destinations of potential supply of exports to effectively exploit export opportunities. This paper intends to estimate a model that can be used to analyse the determinants of Kenyan exports to identify export competitiveness factors in foreign markets and the unrealised export potential.

Although literature on commodity export supply functions start from structural equations, their reduced form equations are generally price-focused. By narrowing the factors to price variables,

the influence of non-agricultural sector therefore tends to be ignored and most studies modelling exports of African countries tend to follow this relative-price approach. Given the fact that export determination requires a multifaceted approach, this study takes a new dimension, that of New Trade Theories (NTT), the gravity model approach with an aim to identify the factors that explain Kenya's export behaviour and also to empirically test the impact of "trade resistance factors" (the geographical and policy factors). This work therefore improves on the earlier work by Were, et al. (2002) by incorporating these factors (the cross-border effects). The value added of the work carried out in this paper lies in the model's outstanding empirical performance.

The plan of this paper is as follows; the next section briefly presents a background and trend of Kenya's exports. Section 3 provides the theoretical and empirical underpinnings of the adopted gravity model. Methodology is presented in section 4 while Section 5 describes the data and presents the empirical results. The final section concludes the paper with policy implications.

Background and Trend of Kenya's Export

Kenya's exports can be distinctly divided into two categories; the agricultural and manufacture components but generally, the structure is predominantly composed of primary agricultural commodities mainly tea, coffee and horticultural products. These three commodities together with articles of apparel and clothing accessories continue to be the leading export earners, accounting for over 49.7% of the total domestic export earnings in 2007 (Government of Kenya (GoK), 2008). Kenya's exporting performance has roots among other factors, in the efficiency of primary production. For instance Kenya is the 4th largest tea producer in the world after China, India and Sri Lanka.

Until the late 1980's, coffee exports contributed the largest share to total commodity exports. The fourfold increase in coffee prices between 1976 and 1978; and a minor boom in 1986 contributed to coffee export's notable performance (World Bank (WB), 1993); and during the boom years 1976-1978, real GDP grew, on average by 6.8%. However, the trend appears to have changed since the early 1990s with tea exports taking the lead. Coffee's performance has in the recent past continued to drop tremendously, even to a single digit percentage of total exports since 2000. Figure 1 shows the current widening gap between tea and coffee exports, while Figure 2 indicates the trends of the three major commodity exports.

Figure 1: Coffee and Tea exports gap

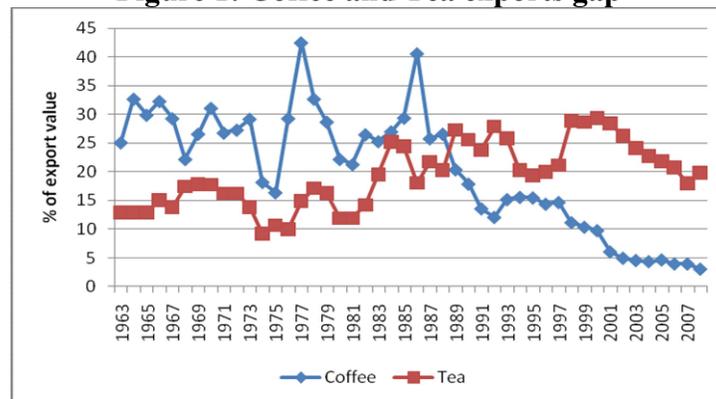
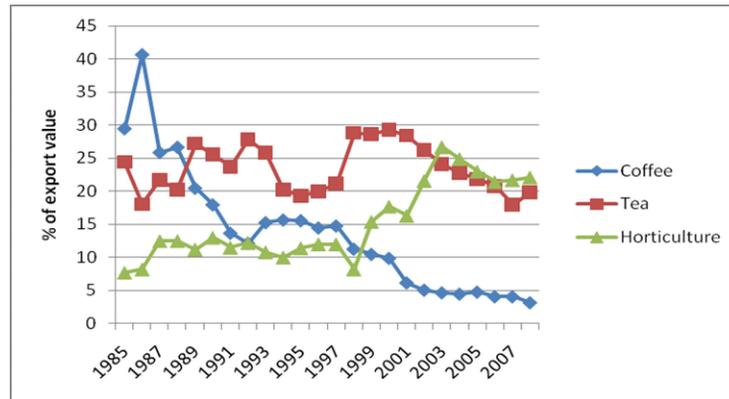


Figure 2: Top three commodity exports performance



Horticultural products have however, experienced rapid growth and are currently the leading export commodity accounting for about 20% of the total exports. This growth has placed Kenya among the top ten exporters of horticultural products, with the countries' total exports accounting for over 87% of the total value of the world's floriculture crops (Netherlands, Canada, USA, Ecuador, Kenya, Denmark, Germany, Belgium, Italy and Columbia).

Kenyan exports are expanding beyond the traditional markets, particularly with advances in economic integration such as COMESA and EAC. With liberalization, regional trade integration measures under EAC and COMESA have accounted for the dominant share of the increase in Kenya's exports, particularly in manufactured exports, with COMESA being the leading destination of Kenya's exports within the African region accounting for 69.5% share of the total exports to Africa in 2007. African region has continued to dominate the direction of Kenya's exports followed by the EU with the share of exports to the African region and the European Union in 2007 being 45.2% and 26.4% of the total exports respectively (National Economic and Social Council (NESC), 2007).

The performance of manufactured exports however, was poor in the 1980's. Its share of the total exports had not only remained minimal but had also been declining with the contribution to the country's total exports having declined to 13% in 1991 from 16% in 1976. Currently, the manufactured export performance has improved with its value standing at 37% of the total Kenyan exports and locally manufactured goods comprising 25% of Kenya's exports. The manufacturing sector in Kenya has its beginnings rather early in the colonial period, when an economic infrastructure linking Kenya to the world market emerged. Agriculture on the other hand, has always been described as the backbone of Kenya's economy. Exports from these two sectors are always influenced by many factors. Some of these factors are peculiar to either the commodity exports or to the manufactured exports.

A major impediment to the exports of manufactured items is poor product quality, and which makes most items internationally uncompetitive, except in regional markets (WB 1993). Similarly, the commodity exports also suffer from lack of value addition. Additionally, fluctuations in export prices and environmental factors are among other factors which account for the fluctuations of these exports' revenues.

Theoretical and Empirical Underpinnings

Theoretical Framework

The gravity model was first applied to international trade field by Tinbergen (1962) and Poyhonen (1963) in the early 1960s (Wall 1999: 34). They conducted the first econometric analyses of bilateral trade flows based on gravity-type equations, but they only provided empirical evidence without supplying any theoretical justification. The representation of trade flows provided in works such as that of Anderson (1979); Anderson and Van Wincoop (2003); and Bergstrand (1989) greatly contributed to the establishment of a theoretical foundation for the gravity model by showing that the gravity equation can be derived from a number of different international trade models.

The model has been widely used in the applied literature to evaluate trade flows, the impact of regional agreements, the impact of a monetary union, the impact of Foreign Direct investments (FDI) on trade flows, to simulate the trade potential and assess the export potential (Kandogan 2007: 337; Eita and Jordaan 2007-23: 1; Abdul Samad, et al. 2009: 58). It has also been used to explain social flows, primarily migration in terms of the “gravitational forces of human integration”.

The model is now enormously popular for analysis of a wide range of trade questions inter alia, who trades with whom, the spatial patterns of trade flows, and the unexploited trade potential, hence the gravity models have become one of the most popular empirical tools used for modeling bilateral trade flows. Ram and Prasad (2000) concluded that among the many studies using the gravity framework, a high percentage shares the research task of predicting trade potentials.

The gravity model derived its name from its passing similarity to Newtonian physics. The model was originally founded on Newton’s physical theory which states that two bodies attract each other in proportion to their masses and inversely by the square of the distance between them¹. The inclusion of distance in the model is to account for transport costs, which intuitively increase with distance. In a study by Wall (1999) the gravitational force is compared to large economic entities such as countries or cities which exert pulling power on people or their products.

The gravity model explains about the partner composition of trade, and therefore takes into account more traditional economic reasons for international trade. The model in its general form states that exports from country i to country j (the export destination country), are explained positively by their economic mass (proxied by income and population), and negatively to economic distance, and a set of dummies incorporating some kind of institutional characteristics common to specific flows (Eita and Jordaan 2007-23: 7). The model specifies the value of trade between two countries as a positive function of incomes of the countries and a negative function of the distance between them (Wall 1999: 35).

The empirical survey of the Gravity model

The equation used is similar in all studies and the survey follows from the work by Thursby and Thursby (1987) with the following general specification:

$$X_{ij} = \alpha_0 (Y_i)^{\alpha_1} (Y_j)^{\alpha_2} (N_i)^{\alpha_3} (N_j)^{\alpha_4} (D_{ij})^{\alpha_5} (A_{ij})^{\alpha_6} (P_{ij})^{\alpha_7} U_{ij}$$

Where X_{ij} is the value of the trade flow from country i to country j; Y_i and Y_j are the values of nominal GDP in i and j; N_i and N_j are the size of population in both countries; D_{ij} is the physical

¹ * Symbolically, $F = GM_1M_2/(dist_{12})^2$ where F= force of gravity which in trade is replaced with value of bilateral trade; the masses M_1 and M_2 with the trading partners’ GDP and G is the gravitational constant (Baldwin and Taglioni 2006: 2).

distance from the economic centre of country *i* to that of country *j*; A_{ij} is any other factor either aiding or hindering trade among *i* and *j*; P_{ij} is trade preferences among the countries, and U_{ij} is a log-normally distributed error term.

In the reviewed empirical studies, the standard variables of the gravity model (GDP, population and distance) have worked well. In most studies, some variables have been used over and above these standard variables. Below are some of these studies.

Insofar as the gravity model is viewed as reduced-form equation for trade volume (proxied by value) in which prices do not appear because they are endogenous (Oguledo and MacPhee 1994: 111), some authors among them Anderson (1979), Thursby and Thursby (1987), and Bergstrand (1985, 1989) share the view that the exclusion of price variables leads to misspecification of the gravity model. Studies by Thursby and Thursby (1987), Oguledo and MacPhee (1994) and Abdul Samad et al. (2009) included the price variables and found it to be statistically significant in explaining trade flows among countries.

In the case studies that have augmented the basic gravity model to analyse the export/trade enhancing impact of currency devaluation using the exchange rate variable, Thursby and Thursby (1987), Rahman (2003) and Abdul Samad et al.(2009) found the exchange rate term to be negative and significant. Rahman (2003) concluded that Bangladesh’s exports depended on its currency devaluation.

Since trade barriers are known to drive a wedge between supply and demand, tariffs and preferential arrangements have been used in some studies to predict the additional bilateral trade that would be a consequence of preferential treatment. In this sense, Thursby and Thursby (1987), Oguledo and MacPhee (1994) and Martinez-Zarzoso (2003) found preferential arrangement to be statistically significant and trade-enhancing.

Other studies have also considered the effects of regional trade arrangements e.g. the economic integration (trading blocs). This variable has reported positive results and significance to countries in the same economic region. Ram and Prasad (2000), Chan-Hyun (2001) and Martinez-Zarzoso (2003) found that regional trade arrangement had a positive and statistically significant effect on (bilateral) trade flows.

While testing for export promotion strategy using the gravity model to examine the systematic link between the presence of a foreign mission and a country’s exports to that country, Rose (2005) carried out such a study which gave evidence that creation of an embassy has a substantially larger impact on exports.

Other cultural factors have also been incorporated in the gravity model. Language dummy was included in the studies of Ram and Prasad (2000), Martinez-Zarzoso (2003) and Eita and Jordaan (2007) and the studies found that common language increased trade by economically and statistically significant amounts hence great importance in cultural similarities in bilateral trade.

Methodology

As noted earlier, our approach is to use the gravity model to estimate Kenya’s export equation. Tinbergen (1962) and Poyhonen (1963) specified the gravity model equation as follows:

$$Trade_{ij} = \alpha \cdot (GNP_i \times GNP_j)^{\beta_1} \dots\dots\dots 1) \\ (Dist_{.ij})^{\beta_2}$$

Where $Trade_{ij}$ is the value of the bi-lateral trade between country *i* and *j*, GNP_i and GNP_j are country *i* and *j*’s respective national incomes. $Dist_{.ij}$ is a measure of the bi-lateral distance between the two countries. α and β_s are parameters and a priori β_1 is positive and β_2 is negative. The

equation is the core gravity model equation which predicts the bilateral trade to be a function of income and a negative function of distance. The notion of distance does not only relate to the geographical distance (i.e. transportation costs), but also to other factors affecting transaction costs.

Model Specification

The estimating equation follows the simplest form of gravity model, the basic model and implies that exports X (from Kenya i to a set of some countries j ($j=1, \dots, N$; $N=25$)) are determined by the GDP and population of both Kenya and the importing country, the geographical component (distance) and specific bilateral features between Kenya and her individual trading partner. In addition to the basic model, an augmented gravity model equation will be estimated. The model is augmented in the sense that several conditioning variables that account for other factors that may affect bilateral trade have been included over and above the natural logarithms of income and distance. The basic and the augmented equations are formulated as follows;

The Basic gravity model

$$X_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} \varepsilon_{ij} \dots \dots \dots \quad 2)$$

Where i denotes the exporter and j the importer, X - is the export of goods; Y_i and Y_j are the GDP of the exporting and importing country respectively. N_i and N_j being the population of the exporting and importing country respectively. D is the distance in Kilometers between the economic centres. A - represents any other factor that influences exports from Kenya to the export destination country (regional and trade arrangements, economic partnerships, bilateral relationships etc), while ε_{ij} - is the stochastic disturbance term, assumed to be well behaved.

Logarithmic expression of the Basic model

$$\ln(X_{ij}) = \beta_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(N_i) + \beta_4 \ln(N_j) + \beta_5 \ln D_{ij} + \beta_6 \ln(A_{ij}) + \varepsilon_{ij} \dots \dots \dots \quad 3)$$

The A component augments the basic gravity model with those factors which account for some influence on export level. The augmented equation is specified as follows;

The Augmented gravity model

$$\ln(X_{ij}) = \beta_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(N_i) + \beta_4 \ln(N_j) + \beta_5 \ln D_{ij} + \beta_6 (\text{COMESA}) + \beta_7 \text{EU} + \beta_8 \text{EMBCON} + \varepsilon_{ij} \dots \dots \dots \quad 4)$$

COMESA is a binary variable that is unity if both i and j belong to the same preferential trade area; while the EU is a dummy variable that is unity if the trading partner is a member of the European Union and zero otherwise. EMBCON takes the value of 1 if Kenya has an Embassy/Consulate in country j , and zero otherwise.

The equation decomposition brings in the dummy variables for COMESA member countries and the EU in order to test the impact of regional agreements on the bilateral exports. The coefficients of the dummy variables are expected to be positive. These two dummy variables are potentially relevant in that they test their individual significance for entry and participation in a Free Trade Area (FTA) because the aim of such agreements being precisely to stimulate trade among the constituent countries. Moreover, trade related arrangements according to studies carried out, can generate a significant increase in trade. Secondly, the EU dummy is preferably chosen because it is the second dominant export destination and which accounts for over 20% of total exports.

Data and Empirical Results

The dataset of the study is based on a unique series collected from Economic Survey and Statistical Abstract (various issues) for export flow (value in Kshs '000) from Kenya to the 25 trading

were found to be irrelevant hence were dropped from the regression model (See Appendix Table 2 for the descriptive statistics of the model).

As was mentioned earlier, there are different models that can be estimated in the panel data. The results of the Pooled, fixed effects (FEM) and random effects (REM) regressions are presented in table 3 in the Appendix. Pooled model is specifically important because it is used as a baseline for comparison in testing for fixed effects. A significance test is done with an F-test. Should there be significant improvement in R-squared, then there are statistically significant country effects. As can be seen from the tabulated results (Appendix Table 3), the R-squared has improved by 23%, meaning that there are significant country effects.

In the face of Heteroskedasticity, autocorrelation or outliers to contend with, robust estimation may be performed. This was performed in order to obtain robust panel standard errors. The research question in the test is whether there are significant correlation between the unobserved and country-specific random effects and the regressors. The results of the Hausman test statistics are tabulated in Table 3 (Appendix). The null hypothesis was rejected in favour of fixed effects meaning that country-specific effects are correlated with regressors, and the random effects model would be inconsistently estimated. In a second test, Breusch and Pagan Lagrangian multiplier test for random effects, the null was again rejected in favour of the alternative. The study therefore adopted the fixed effects model as the model of choice.

Regression with the Fixed Effects Model

A joint test to see if all the dummies for all countries are equal to zero was performed and the null was rejected. Fixed effects therefore are needed. A second step regression (of equation 5) with the distance and the dummy variables as the explanatory variables and the individual effects as the dependent variable was conducted. These results are presented in Table 4 of Appendix.

Discussion of the Results

The regression results in Table 3 column 2 report the coefficients and the level of significance of the explanatory variables namely the importer's GDP and population. These two variables provide most of the explanatory power in the regression. The coefficients of these variables bear positive signs, consistent with the theoretical expectations. The positive coefficient for importer's GDP implies that as the income levels of the importing country increases, so does the country's demand for imports and which suggests that Kenya's exports increase by 1.25% as the importer's GDP increases by 1%. The importer's population is also statistically significant with a coefficient value of 1.94, suggesting that 1% increase in the importer's population increases Kenya's exports by 1.94%. To the importing country, this could imply that as its population grows, the demand for imports also goes up in order to sustain the needs of the growing population. The increased demand thus leads to increase in Kenya's exports.

The fixed effects explain 88% of the variations of Kenya's export to foreign markets. These estimated fixed effects are reported in Table 4A in the appendix. With regard to country-specific effects, the results show that these effects are strongly significant except for Denmark, Pakistan, Norway and The Netherlands. China, India, USA, Japan etc have the lowest propensity to Kenya's exports while Spain followed by Burundi, Uganda, Zambia, Malawi , Ireland etc possess the highest propensity.

The distance variable is significant at 5% and bears the anticipated negative sign as shown in Table 4. Distance was factored in as a proxy for transportation costs with an inverse relationship with exports. The relationship implies that the further away from Nairobi the importer is located,

the higher the transportation costs, and therefore less exports to that particular country. The coefficient value of -0.197 indicates that when the distance between Kenya and her trading partner increases by 1%, the value of exports to this destination decreases by approximately 0.2%.

The dummy variables reported positive signs and statistical significance even at 1%. The COMESA variable was found to be significant at 1%. Kenya's exports are 12.4 times higher when the bilateral trade is between a COMESA member State than a non-COMESA member (EXP 2.5177 = 12.4). Similarly, the EU dummy was also found to be statistically significant at 1%. The coefficient value of 2.4379 implies that exporting to EU member state is 11.4 times higher than non-EU member (EXP 2.4379 = 11.4). The trade arrangement variables are thus important and significant.

The estimated coefficient for embassy/consulate is 2.1602 implying that exporting to a country where Kenya has an embassy or consulate is 8.67 times higher because of an embassy/consulate (EXP 2.1602 = 8.67). This suggests that presence of an embassy/consulate in the importing country promotes Kenya's exports in that particular country.

After estimating the fixed effects model, the within sample potential was solved and then compared to the actual exports in order to determine if Kenya still has unrealized export potential. The results in Figure 1 in the Appendix show that Kenya still has greater unrealized export potential to Canada, France, Italy, Spain, UK etc.

Conclusion

We have established the theoretical justification of the gravity equation. In effect, the results show that Kenya's export volume is determined by the economic size (income) and population of the trading partner/importing country. The analysis show that geographical factors influence Kenya's exports negatively such that as the distance between Kenya and the export destination country gets large, so does the transportation costs. In this sense, it would only be profitable if Kenya has absolute advantage in exporting to such countries such that the gains outweigh these transportation costs.

Analysis however, also revealed that Kenya's potential exports to the neighbouring countries fall short of the actual exports. Exporting to neighbouring countries would therefore be more profitable since these costs are minimal. Kenya should therefore take advantage of the geographical proximity in order to increase exports and export more to COMESA member countries. However, where Kenya's exports have absolute advantage in the foreign market, then there is need to emphasize on value addition on these exportables since Kenya's exports highly depend on foreign demand (the importer's GDP and population).

Countries with big GDP and populations tend to import less from Kenya compared to those economies whose GDP and population are not as big. Big populations i.e. population of more than 100 million tend to import less from Kenya. These countries include China, India, Japan and USA. The analysis similarly indicated that Kenya's major trading partners are African countries. The analysis presented Spain, Burundi, Rwanda, Uganda, Zambia and Malawi to form the biggest markets for Kenya's exports. Sudan, Ireland, Israel and Netherlands are also major Kenya's export importers. In terms of unrealized/ unexploited export potential, the results indicated that Kenya has greater unrealised export to Canada, France, Italy and Spain and less unexploited potential to UK, Malaysia and Greece.

Since Kenya's export pattern is depicted by country-specific effects, it is important that these effects be sufficiently and adequately taken into account while setting out trade policies with regards to exports. Finally, Kenya embassies and consulates abroad should act as export promotion

centres with a redirected focus to economic matters in order to strengthen trade ties and hence export promotion.

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Appendix

Table 1: Unit Root Test Results

Variable	LLC	IPS	Decision
Exports	-8.764 (0.002)***	-2.070 (0.001)***	Stationary
Importer's GDP	-10.081(0.000)***	-2.583 (0.000)***	Stationary
Importer's Population	-2.879 (0.0699)*	-0.973	Stationary

Note: ***/**/* denote rejection of the null hypothesis at 1%, 5% and 10% significance level. In parentheses are probabilities.

Table 2: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Exports	1125	12.14455	2.200347	6.579251	17.44994
Importer's GDP	1125	24.77026	2.515243	18.64382	30.27719
Importer's Population	1125	16.95784	1.583268	13.86901	21.00995
Distance	1125	8.396777	.8654558	6.230482	9.482579
COMESA	1125	.08	.2714139	0	1
EU	1125	.1422222	.3494333	0	1
EMBASSY/CONSULATE	1125	.5297778	.4993345	0	1

Table 3: Pooled, Fixed Effects and Random Effects Regression Results

Dependent Variable: Exports

Variable	Pooled	Fixed Effects	Random Effects
Importer's GDP	0.93085175***	1.2533143***	1.2631316***
Importer's Population	-0.06990807*	1.9433284***	0.54219393***
Distance	-2.0340639***		-3.2421749***
COMESA	2.3030242***		1.7588596***
EU	1.0586365***		0.65682847***
EMBASSY/CONSULATE	0.67358697***		0.16633405*
N	1125	1125	1125
R-Squared	0.7167	0.88302	0.8632
Adjusted R-Squared	0.7152	0.88025	

Note: ***/**/* denote significance at 1%, 5% and 10% level.

Table 4: Fixed Effects Regression

Dependent Variable: Individual effects

Variable	Coefficient	t-statistics
Distance	-.19698612	(-2.88)**
COMESA	2.5177117	(13.23)***
EU	2.4379383	(26.00)***
EMB/CON	2.1602824	(23.93)***
	R-Squared	0.4962
	Adjusted R-Squared	0.4944

Note : ***/**/* denote level of significance at 1%, 5% and 10%.

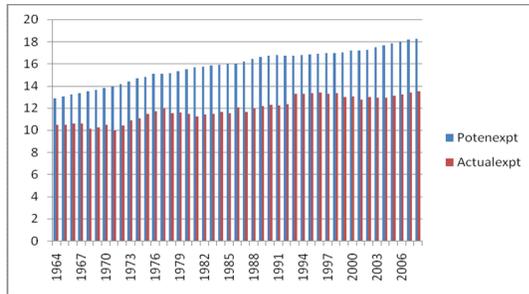
Table 4A

Countries included in the estimation and their fixed effects

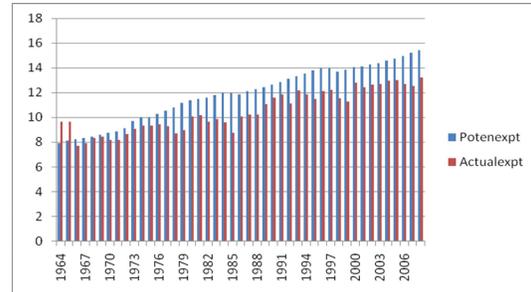
Burundi	6.757232***	Uganda	5.431143***
Canada	-4.004246***	United Kingdom	-3.358117***
China	-11.61***	USA	-9.720949***
Denmark	-.2843114	Norway	-.2784207
France	-5.750522***	Rwanda	-2.383729***
Zambia	4.232355***	Spain	6.902107***
Greece	-1.198469***	Sudan	-4.562415***
India	-9.758663***	Sweden	1.20528***
Ireland	2.492386***	The Netherlands	-.0571605
Israel	1.661348***		
Italy	-5.126216***		
Japan	-8.209229***		
Malawi	3.96236***		
Malaysia	-1.466816***		
Pakistan	-.2291181		

Figure 1. Actual and Potential Kenya's Exports (in Kshs'000)

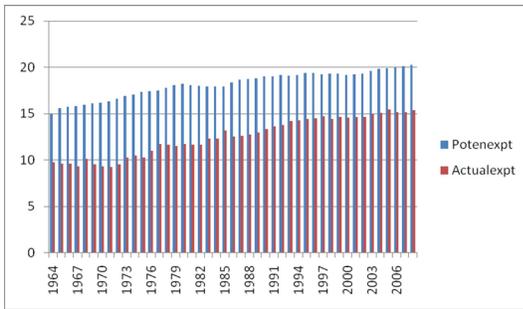
a) Canada



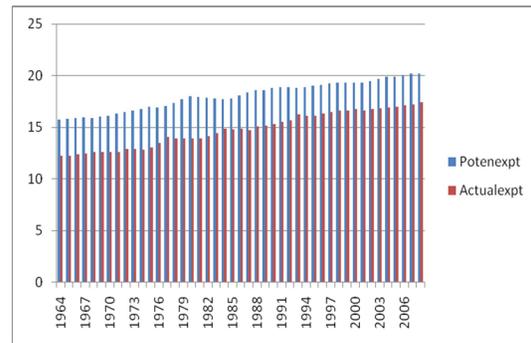
e) Malaysia



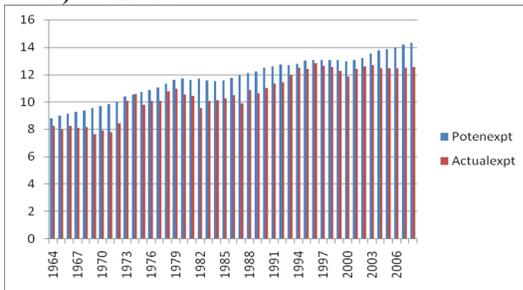
b) France



f) United Kingdom

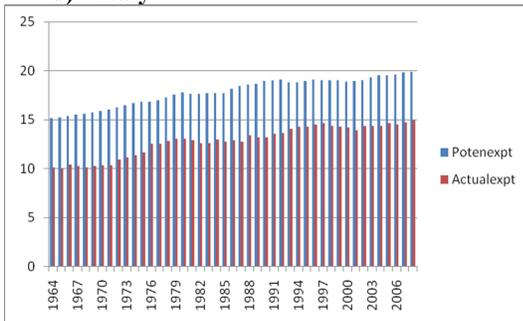


c) Greece



Where;
 Potenexpt - is the potential exports
 Actualexpt -is the actual exports.

d) Italy



Quality of Customer Service in Public Sector Banks in India

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Abstract: *India has passing through rapid economic transition. The past record of the country can only be marginal support to help it write new economic equation entitling it to the future. The Public Sector Banks (PSBs) have to prepare themselves for a fundamental economic transformation and to develop a new self-adjusting framework providing continuous opportunity for growth. Kurnool district is selected for the study, as it is one of the oldest districts of Andhra Pradesh forming a part of the Rayalaseema region. The district headquarters is located at Kurnool city, which was Capital of Andhra Pradesh state during 1953 to 1956. Kurnool city is the gateway of Rayalaseema. Out of 27 Public Sector Banks, 17 Public Sector Banks are having their branches in Kurnool district. Table given shows the details of 17 PSBs and their number of branches in Kurnool district. So, it would be useful to study the concept of customer service in Public sector banks located in Kurnool district. Many Strategies have been suggested to enhance the Quality of Customer Service. Besides the mentioned measures, experiences and interventions that all are used by Indian based successful companies, should be taken as role models in re-engineering and developing the existing PSBs for their improvement. It may be concluded that by changing the mind-sets of PSBs by implementing the above interventions, their public sector character can be sustained and their niche marketing activities, can also be continued for bringing balanced regional development in the country.*

Keywords: Quality of Customer Service, Customer Service, Customer Service in Banks, Customer Service in Public Sector Banks

Introduction

India has passing through rapid economic transition. The past record of the country can only be marginal support to help it write new economic equation entitling it to the future. The Public Sector Banks (PSBs) have to prepare themselves for a fundamental economic transformation and to develop a new self-adjusting framework providing continuous opportunity for growth. Competitiveness is the litmus test in the present era of globalization and Internationalization. Consumer demands are rapidly changing and a large population is asking for banking services of the highest quality. A customer driven bank provides unique attributes to products and services that are important to the customer. Such a bank dedicates itself to be capable of delivering the products and services at levels that not only meet but exceed customer's expectations. Customer satisfaction is the essence and goal of the bank. Goals, resource allocation, policies, procedures and management style are all focused at this objective and all other goals are subservient to it.

Review of Literature

Banking is a prime mover in the economic development of a nation and research is so essential to improve its working results. The management without any right policy is like "building a house on sand". It means an effective management always needs a thorough and continuous search into the nature of the reasons for, and the consequences of organisation. In line with this, some related earlier studies conducted by individuals and institutions are reviewed to have an in-

depth insight into the problem and exploring the reformation of banking policy. The main theme and essence of few relevant studies are presented below.

Banks begin to recognize that customer satisfaction measurement is no longer an option but an essential part of the management systems, perhaps as important as strategic planning¹.

For a bank to survive and to grow, it is imperative that for it, customer satisfaction is the objective and end result of effective customer relationship management. The goals of relationship management are to attract, retain and enhance customer relationships².

In the Indian context the first comprehensive study on customer satisfaction was undertaken by the National Institute of Bank Management in 19863. With the popularization of the marketing concept in the Indian banking system in late 1980s and early 1990s, as a philosophy to conducting business, resulted in banks to rethink in terms of the importance of customer satisfaction³. The gradual noting of the obvious connection between “meeting customer needs” and “customer satisfaction” took place. Customer perceived quality was defined as “meeting or exceeding customers expectations”⁴.

Indian Bank’s Association (IBA) conducted an all India survey to rate the customer service provided by all the 27 public sector banks aimed at fostering healthy competitive spirit amongst banks to improve upon their customer service. The objective of this study is to evaluate quality of service as perceived by the customers of public sector banks and identify areas where the banks need to improve for achieving higher levels of customer satisfaction. The study has been a massive one covering about 2500 bank branches and about 85,000 customers (respondents) at the all India level. Sample branches in all categories have been randomly chosen by IBA in proportion to the business/the number of branches in a particular category. In addition to bank rating at regional level and all India level, the survey results will also be used for rating each region on the basis of the customer service of all sample branches of the banks’ operating in the region.⁵

R.Anuradha stated that “the need for the change of Indian banks and the forces behind the change like Globalisation, Liberalisation, International Trade, IT revolution etc., The study also highlights various consequences that are to be faced by the Indian banks if they remain unchanged”.⁶

Rao’s study includes “bank category wise amount of loan given to various purposes in Belgaum district during 1997 – 1998. The study has listed various organisational, operational and co-ordinational problems in credit support.”⁷

K.Shiva Kumar and V.Samyoudha’s study includes “the ratings given by the respondents in a sample survey for various services namely customer responses towards counter services, pass-book services, cheque services, demand draft services, depository services, etc., The study states that customers are highly satisfied with the services that are provided by private sector banks when compared with public sector and co-operative banks.”⁸

Das and Ghosh’s sample study conducted “to know the performance of bank CEOs in the era of corporate governance, tried to identify the adaptability characteristics of CEOs in terms of technology. The study also states that CEOs of poorly performing banks are likely to face higher turnover than CEOs of well performing ones.”⁹

It is nearly fifteen years since reform process has been started in PSBs, it is necessary to know whether the reforms are being fruitful or not. The review of various studies and literature on Banking revealed that there are very few studies that covered the Quality of customer service. Hence, it is felt that, there is an imperative need to study the Quality of customer service.

Need For The Study

The fifteen years, which marks the era of liberalization and reforms in the country, has been eventful one for the Banking industry changing the face of the industry far beyond recognition. Technology has brought in substantial changes in Banking in terms of customer services and new product innovations. It is necessary to know whether the reforms are being fruitful or not. The review of various studies and literature on Banking revealed that there is not even a single study that covered the performance of banks in relation to Quality of customer service. Hence, it is felt that, there is an imperative need to study the Quality of customer service in Public Sector Banks (PSBs).

Objectives of The Study

The objectives of the study are:

1. To examine the factors influencing bank selection.
2. To evaluate the opinion of customers towards various services offered by PSBs.
3. To identify the types of loans and deposits held by customers.
4. To examine the infrastructure availability at PSBs.
5. To study the attitude of customers towards the Quality of customer service in PSB's.

Methodology and Sampling

To achieve the stated objectives, the researcher has used both primary and secondary data. The primary data are collected from the customers of 28 branches of various public sector banks available in Kurnool District through Structured Questionnaire.

The secondary data and information have been collected from various sources like Reserve Bank of India Reports and publications, Indian Bankers Association publications, National Institute of Bank Management publications, business newspapers, journals, magazines are also relied upon.

Kurnool district is selected for the study, as it is one of the oldest districts of Andhra Pradesh forming a part of the Rayalaseema region. The district headquarters is located at Kurnool city, which was Capital of Andhra state during 1953 to 1956. Kurnool city is the gateway of Rayalaseema. Out of 27 Public Sector Banks, 17 Public Sector Banks are having their branches in Kurnool district. Table 2.1 shows the details of 17 PSBs and their number of branches in Kurnool district. So, it would be useful to study the concept of customer service in Public sector banks located in Kurnool district.

Table 1 : Profile of PSBs in Kurnool district

S.No	Name of the PSB	No. of Urban Branches in Kurnool Dt.	No. of Rural Branches in Kurnool Dt.	Total No of Branches in Kurnool Dt.
1	Andhra Bank	10	15	25
2	Bank of Baroda	1	Nil	1
3	Bank of India	1	Nil	1
4	Canara Bank	3	4	7
5	Central Bank of India	2	1	3
6	Corporation Bank	3	Nil	3
7	Indian Bank	3	3	6
8	Indian Overseas Bank	3	Nil	3
9	Oriental Bank of Commerce	1	Nil	1
10	Punjab National Bank	1	Nil	1
11	Syndicate Bank	6	18	24
12	Union Bank of India	1	Nil	1
13	United Bank of India	1	Nil	1
14	Vijaya Bank	3	2	5

15	State Bank of India	17	35	52
16	State Bank of Hyderabad	3	1	4
17	State Bank of Mysore	1	Nil	1
Total Number of PSBs in Kurnool District.		60	79 139	

Source: Compiled from bank manuals.

The Kurnool district is divided in to three revenue divisions namely Kurnool, Nandyal and Adoni. There are 139 branches of 17 Public Sector Banks in Kurnool district. There are 69 branches in Kurnool division, 38 branches in Nandyal division and 32 branches in Adoni division. Table 2 shows the division wise status of PSBs.

Table 2 : Distribution of PSBs in Kurnool district

Revenue Division	Urban Branches	Rural Branches	Total Branches	Sample Branches
Kurnool	33	36	69	12
Nandyal	14	24	38	8
Adoni	13	19	32	8
Total	60	79	139	28

Source: Compiled from bank manuals.

A sample of 28 banks (20% Sample size) has been taken at random for the study. Since, Kurnool division has more number of banks and branches, 12 branches have been taken for the study. In the remaining two revenue divisions eight branches in each division has been taken for the study i.e., Eight branches in Nandyal division and Eight branches in Adoni division. The total comes to 28 branches (Table 2). While selecting those branches 50% (14 branches) of the branches are taken from Urban areas and the remaining 50% (14 branches) of the branches are taken from Rural areas. Samples of 25 customers are taken at random from the 28 branches. The total sample comes to 700 (Table 3).

Data Analysis and Interpretation

The primary and secondary data collected from different sources have been tabulated and interpreted meaningfully. The data has been analysed and various inferences and conclusions have been drawn from the data. The information has been represented in graphical method also.

Scope Of The Study

While there are private banks, foreign banks, co-operative banks and regional rural banks and public sector banks, only public sector banks have been chosen for the study. The scope of the study refers only to public sector banks. The period has been conducted in the year 2006.

Table 3: Showing the distribution of sample

KURNOOL REVENUE DIVISION				
S.No	Name of the Bank	Place / Mandal	Rural / Urban	Sample Size
1	Bank of India	Kurnool	Urban	25
2	Bank of Baroda	Kurnool	Urban	25
3	Punjab National Bank	Kurnool	Urban	25
4	Union Bank of India	Kurnool	Urban	25
5	United Bank of India	Kurnool	Urban	25
6	Oriental Bank of Commerce	Kurnool	Urban	25
7	State Bank of India	Kodumur	Rural	25
8	Canara Bank	Pyalukurthy	Rural	25

9	State Bank of Hyderabad	Nandikotkur	Rural	25
10	Indian Bank	Brahmanakotkur	Rural	25
11	Andhra Bank	B. Tandrapadu	Rural	25
12	Syndicate Bank	Orvakal	Rural	25
Sample in Kurnool Division 300				
NANDYAL REVENUE DIVISION				
1	State Bank of India	Nandyal	Urban	25
2	Indian Bank	Nandyal	Urban	25
3	Vijaya Bank	Nandyal	Urban	25
4	Indian Overseas Bank	Nandyal	Urban	25
5	Syndicate Bank	Sirivella	Rural	25
6	Central Bank of India	Bandi Atmakur	Rural	25
7	Syndicate Bank	Govindapalli	Rural	25
8	Syndicate Bank	Banaganapally	Rural	25
Sample in Nandyal Division 200				
ADONI REVENUE DIVISION				
1	State Bank of Mysore	Adoni	Urban	25
2	Corporation Bank	Adoni	Urban	25
3	Syndicate Bank	Adoni	Urban	25
4	Indian Bank	Adoni	Urban	25
5	State Bank of India	Pattikonda	Rural	25
6	State Bank of India	Alur	Rural	25
7	Indian Bank	Halaharvi	Rural	25
8	State Bank of India	Aspari	Rural	25
Sample in Adoni Division 200				
Total Sample Size : 700				

Limitations of the Study

In a study of this magnitude though meticulous care is taken in each and every aspect of study. Certain limitations are likely to be there in the study.

1. Some respondents were not aware of certain procedures and aspects of banking.
2. Few respondents were hesitant to give details about deposit and loans.
3. There might be a sense of bias crept in answers given by the respondents.

Analysis

Factors Influencing Bank Selection:

There are many factors, which influences the selection of a bank. The importance of those factors is collected and analysed.

Table 4: Factors influencing bank selection

Factors	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Branch Network	18	5.14	15	4.29	33	4.7
Staff Attitude	59	16.86	40	11.43	99	14.1
Interest Rates Offered	8	2.29	5	1.43	13	1.9
Proximity of the Branch	123	35.14	119	34	242	34.6
Minimum Balance Criteria	34	9.71	5	1.43	39	5.6
Ambience inside the Bank	0	0	5	1.43	5	0.7
Processing Time	0	0	18	5.14	18	2.6
Customised Service	52	14.86	74	21.14	126	18

Particular Scheme Offered	8	2.29	13	3.71	21	3
Easy Processing in Opening	16	4.57	29	8.29	45	6.4
Other Factors	32	9.14	27	7.71	59	8.4
Total	350	100	350	100	700	100

Source: Field Survey.

34% of the rural respondents rated for proximity of the branch as highly influencing factoring for opening an account, followed by 16% and 14% for Staff attitude and Customer services respectively. Whereas in Urban 34% of the respondents rated for Proximity of the Branch, as highly influencing factor, 21%, 11% and 8% of the respondents have rated for Customer services, Staff attitude and Easy Processing respectively. In short, 34.6% of the respondents rated for Proximity of the branch as highly influenced factor in selecting a bank and 14% for Staff Attitude.

Figure 1: Factors Influencing Bank Selection

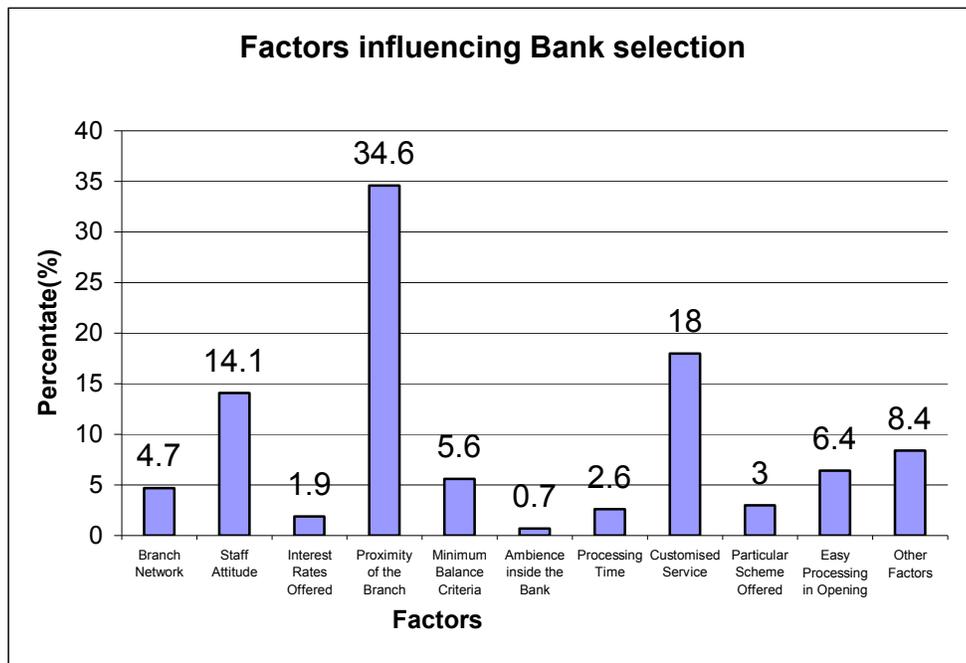


Table 5: Details of Deposit Holders

Factors	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Fixed Deposits	40	11.43	60	17.14	100	14.29
Recurring Deposits	25	7.14	5	1.43	30	4.29
No Deposits	285	81.43	285	81.43	570	81.42
Total	350	100	350	100	700	100

Source: Field Survey.

11.43 % of the rural respondents are having Fixed Deposits and 7.14% of the respondents are having Recurring Deposits. Where as in Urban 17.14 % of the respondents are having Fixed Deposits and 1.43% of the respondents are having Recurring Deposits.

To conclude with, 14.29% of the respondents are having fixed deposits and 4.29% of the respondents are having Recurring Deposits.

Generally banks offer loans for various purposes. The study reveals different types of loans and their share among total loans.

Table 6: Details of loan holders

Type of Loan	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Agricultural	92	26.29	5	1.43	97	13.86
General	16	4.57	6	1.71	22	3.14
PMRY	16	4.57	8	2.29	24	3.43
Business	8	2.29	13	3.71	21	3
Personal	33	9.42	8	2.29	41	5.85
Vehicle	9	2.57	25	7.14	34	4.86
Home	8	2.29	16	4.57	24	3.43
Minority	8	2.29	2	0.57	10	1.43
No Loan	160	45.71	267	76.29	427	61
Total	350	100	350	100	700	100

Source: Field Survey.

26.29% of the rural respondents are having Agricultural loans, followed by 9.42%, 4.57% and 4.57% for Personal loans, General loans and PMRY loans respectively. Where as in Urban, 7.14% of the respondents are having Vehicle loans and 4.57% of the respondents are having Home loans. To state with, 13.86% of the respondents are having Agricultural loans, 5.85% and 4.86% of the respondents have taken Personal loans and Vehicle loans respectively.

Opinion towards Bank Operations:

Opinion of the respondents is taken for various activities of Bank like Speed of transaction, Information help desk, Documentation procedures, Disbursements, Clearance of Local, Outstation and Overseas instruments, Overdraft operations, Credit facility, Response to Telephone queries, Language flexibility, Willingness to help customers, Providing knowledge about New products / services etc. Likert scale is used to measure the opinion of the respondents.

Table 7: Opinion towards the speed of transaction

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	25	7.14	70	20	95	13.57
Good	90	25.71	50	14.29	140	20
Satisfactory	123	35.14	55	15.71	178	25.43
Fair	8	2.29	31	8.86	39	5.57
Poor	17	4.86	61	17.43	78	11.14
Not Known	87	24.86	83	23.71	170	24.29
Total	350	100	350	100	700	100

Source: Field Survey.

35.14% of the rural respondents rated opinion towards speed of transaction as satisfactory, 25.71% rated as Good. Where in Urban, 17.43% of the respondents rated as Poor and 15.71% rated as Satisfactory. As a whole, 25.43% of the respondents rated their opinion as satisfactory and 20% as Good.

Table 8: Opinion towards information help desk

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	33	9.43	21	6	54	7.71
Good	109	31.14	96	27.43	205	29.29
Satisfactory	133	38	120	34.29	253	36.14
Fair	32	9.14	31	8.86	63	9
Poor	0	0	51	14.56	51	7.29
Not Known	43	12.29	31	8.86	74	10.57
Total	350	100	350	100	700	100

Source: Field Survey.

31.14% of the rural respondents rated their opinion towards Information Help desk provided by the banks as Good, 38% rated as Satisfactory. Where as in Urban, 34.29% of the respondents rated as Satisfactory and 27.43% rated as Good.

On the whole, 36.14% of the respondents rated their level of satisfaction as satisfactory and 29.29% as Good.

Table 9: Opinion towards documentation

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	49	14	71	20.29	120	17.14
Good	81	23.14	49	14	130	18.57
Satisfactory	101	28.86	79	22.57	180	25.71
Fair	48	13.71	71	20.28	119	17.01
Poor	8	2.29	19	5.43	27	3.86
Not Known	63	18	61	17.43	124	17.71
Total	350	100	350	100	700	100

Source: Field Survey

23.14% of the rural respondents rated their opinion Documentation as Good, 28.86% rated as Satisfactory. Where as in Urban, 22.57% respondents rated as Satisfactory and 20.29% for Excellent.

In its entirety, 25.71% of the respondents are rated their opinion towards Documentation as Satisfactory and 18.57% as Good.

Table 10: Opinion towards disbursements procedure

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	12	3.43	37	10.57	49	7
Good	18	5.14	28	8	46	6.57
Satisfactory	39	11.14	47	13.43	86	12.29
Fair	37	10.57	31	8.86	68	9.71
Poor	23	6.57	12	3.43	35	5
Not Known	221	63.15	195	55.71	416	59.43
Total	350	100	350	100	700	100

Source: Field Survey.

11.14% of the rural respondents rated their level of satisfaction towards Disbursements as Satisfactory, 10.57% rated as Fair. Where as in Urban, 13.43% respondents rated as Satisfactory and 10.57% as Excellent.

In short, 12.29% of the respondents rated their opinion towards Disbursements as Satisfactory and 9.71% of the respondents rated as Fair.

Table 11: Opinion towards the clearance of local instruments

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	17	4.86	30	8.57	47	6.71
Good	27	7.71	37	10.58	64	9.14
Satisfactory	33	9.43	25	7.14	58	8.29
Fair	25	7.14	42	12	67	9.57
Poor	17	4.86	39	11.14	56	8
Not Known	231	66	177	50.57	408	58.29
Total	350	100	350	100	700	100

Source: Field Survey.

9.43% of the rural respondents rated their opinion towards Clearance of Local Instruments as Satisfactory. Where as in Urban, 10.58% rated as Good..

In brief, 9.57% of the respondents rated their opinion towards clearance of Local Instruments as Fair and 9.14 % as Good.

Table 12: Opinion towards clearance of outstation instruments

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	9	2.57	19	5.43	28	4

Good	34	9.71	15	4.29	49	7
Satisfactory	39	11.14	43	12.29	82	11.71
Fair	47	13.44	57	16.28	104	14.86
Poor	11	3.14	41	11.71	52	7.43
Not Known	210	60	175	50	385	55
Total	350	100	350	100	700	100

Source: Field Survey.

13.44% of the rural respondents rated their opinion Clearance of Outstation Instruments as Fair, 11.14% rated as Satisfactory. Where as in Urban, it is 16.28% as Fair and 12.29% as Satisfactory.

To conclude with, 14.86% of the respondents rated their opinion towards Clearance of Outstation Instruments as Fair and 11.71% as Satisfactory.

Table 13: Opinion towards clearance of overseas instruments

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	8	2.29	19	5.43	27	3.86
Good	42	12	43	12.29	85	12.14
Satisfactory	23	6.57	37	10.57	60	8.57
Fair	41	11.71	52	14.86	93	13.29
Poor	36	10.29	29	8.29	65	9.29
Not Known	200	57.14	170	48.56	370	52.85
Total	350	100	350	100	700	100

Source: Field Survey

11.71% of the rural respondents rated their opinion towards Clearance of Overseas Instruments as Fair and 10.29% rated as Poor. Where as in Urban, 14.86% respondents rated as Fair and 12.29%, 10.57% for Good and Satisfactory respectively.

In its entirety, 13.29% of the respondents rated their opinion towards clearance of overseas instruments as Fair and 12.14% as Good.

Table 14: Opinion towards overdraft operations

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	7	2	19	5.43	26	3.71
Good	5	1.43	13	3.71	18	2.57
Satisfactory	8	2.29	23	6.57	31	4.43
Fair	24	6.86	68	19.43	92	13.14
Poor	44	12.57	30	8.57	74	10.57
Not Known	262	74.85	197	56.29	459	65.58
Total	350	100	350	100	700	100

Source: Field Survey

12.57% of the rural respondents rated their opinion towards Overdraft Operations as Poor and 6.89% rated as Fair. Whereas in Urban, 19.43% respondents rated as Fair and 8.57% as Poor. In short, 13.14% of the respondents rated their opinion towards Overdraft operations as Fair and 10.57% as Poor.

Table 15: Opinion towards credit facility

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	9	2.57	35	10	44	6.29
Good	25	7.14	10	2.86	35	5
Satisfactory	48	13.72	21	6	69	9.86
Fair	49	14	68	19.43	117	16.71
Poor	26	7.43	51	14.57	77	11
Not Known	193	55.14	165	47.14	358	51.14
Total	350	100	350	100	700	100

Source: Field Survey

13.72% of the rural respondents rated their opinion towards Credit facility as Satisfactory and 7.43% rated as Poor. Whereas in Urban, 19.43% respondents rated as Fair and 14.57% as Poor. In brief, 16.71% of the respondents rated their opinion towards credit facility as Fair and 11% as Poor.

Table 16: Opinion towards response to telephonic queries

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	25	7.14	19	5.43	44	6.29
Good	33	9.43	54	15.43	87	12.43
Satisfactory	22	6.29	37	10.58	59	8.43
Fair	48	13.71	41	11.71	89	12.71
Poor	8	2.29	62	17.71	70	10
Not Known	214	61.14	137	39.14	351	50.14
Total	350	100	350	100	700	100

Source: Field Survey

13.71% of the rural respondents rated their opinion towards response to Telephonic queries as Fair and 9.43% rated as Good. Whereas in Urban, 17.71% respondents rated as Poor and 15.43% as Good. To conclude with, 12.71% of the respondents rated their opinion towards response to Telephonic queries as Fair and 12.43% as Good.

Table 17: Opinion towards language flexibility

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	49	14	38	10.86	87	12.43
Good	151	43.13	105	30	256	36.57
Satisfactory	85	24.29	83	23.71	168	24
Fair	7	2	17	4.86	24	3.43
Poor	8	2.29	73	20.86	81	11.57
Not Known	50	14.29	34	9.71	84	12
Total	350	100	350	100	700	100

Source: Field Survey

43.13% of the rural respondents rated their opinion towards response to Language Flexibility as Good and 24.29% rated as Satisfactory. Where as in Urban, 30% of the respondents rated as Good and 23.71% as Satisfactory.

To state with, 36.57% of the respondents rated their level of satisfaction towards response to Language Flexibility as Good and 24% as Satisfactory.

Table 18: Opinion towards willingness to help customer

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	49	14	52	14.86	101	14.43
Good	104	29.72	67	19.14	171	24.43
Satisfactory	109	31.14	73	20.86	182	26
Fair	9	2.57	29	8.29	38	5.43
Poor	6	1.71	83	23.71	89	12.71
Not Known	73	20.86	46	13.14	119	17
Total	350	100	350	100	700	100

Source: Field Survey

31.14% of the rural respondents rated their opinion towards willingness to help customer as Satisfactory and 29.72% rated as Good. Where as in Urban, 23.71% respondents rated as Poor and 20.86% as Satisfactory.

As a whole, 24.43% of the respondents rated their opinion towards willingness to help customers as Good and 26% as Satisfactory.

Table 19: Opinion towards knowledge about new products

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	33	9.43	30	8.57	63	9

Good	98	28	51	14.57	149	21.29
Satisfactory	36	10.29	8	2.29	44	6.29
Fair	32	9.14	57	16.29	89	12.71
Poor	24	6.86	91	26	115	16.43
Not Known	127	36.28	113	32.28	240	34.28
Total	350	100	350	100	700	100

Source : Field Survey

28% of the rural respondents rated their opinion towards providing literature on new product/services as Good and 10.29% as Satisfactory. Where as in Urban, 14.57% respondents rated as Good and 16.29% for Fair. On the whole, 21.29% of the respondents rated their opinion towards providing literature on new products/services as Good and 16.43% as Poor.

Opinion towards Infrastructure & Basic Amenities:

Respondent’s opinion is recorded for various aspects of infrastructure and basic amenities in the areas like Parking space, Seating facilities, Lighting, Drinking water, Cleanliness, Ventilation, Toilets etc.

Table 20: Opinion towards parking space

Opinion	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Ex8cellent	33	9.43	27	7.71	60	8.57
Good	127	36.28	61	17.43	188	26.86
Satisfactory	65	18.57	68	19.43	133	19
Fair	57	16.29	121	34.57	178	25.43
Poor	68	19.43	73	20.86	141	20.14
Total	350	100	350	100	700	100

Source: Field Survey

36.29% of the rural respondents rated their opinion towards parking space at the banks as Good and 18.57% rated for Satisfactory. Where as in Urban, 34.57% respondents rated for Fair and 20.86% for poor parking space. In its entirety, 26.86% of the respondents rated their opinion towards parking space at the banks as Good and 25.43% as Fair.

Table 21:Opinion towards seating facilities

Opinion	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	41	11.71	99	28.29	140	20
Good	143	40.86	113	32.28	256	36.57
Satisfactory	75	21.43	93	26.57	168	24
Fair	83	23.71	45	12.86	128	18.29

Poor	8	2.29	0	0	8	1.14
Total	350	100	350	100	700	100

Source: Field Survey

40.86% of the rural respondents rated their opinion towards seating facility in the banks as Good and 23.71% rated for Fair. Where as in Urban, 32.28% respondents rated for Good and 28.29% for Excellent. In short, 36.57% of the respondents rated their opinion towards seating facility in the banks as Good and 24% as Satisfactory.

Table 22: Opinion towards lighting facilities

Opinion	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	59	16.86	103	29.43	162	23.14
Good	115	32.86	108	30.86	223	31.86
Satisfactory	143	40.85	111	31.71	254	36.29
Fair	33	9.43	28	8	61	8.71
Poor	0	0	0	0	0	0
Total	350	100	350	100	700	100

Source: Field Survey

40.85% of the rural respondents rated their opinion towards lighting facility in the banks as Satisfactory and 32.86% rated for Good. Where as in Urban, 31.71% respondents rated for Satisfactory and 30.86% for Good. In brief, 36.29% of the respondents rated their opinion towards lighting facility in the banks as Satisfactory and 31.86% as Good.

Table 23: Opinion towards drinking water & basic amenities

Opinion	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	8	2.29	65	18.57	73	10.43
Good	127	36.28	74	21.14	201	28.72
Satisfactory	91	26	71	20.29	162	23.14
Fair	91	26	61	17.43	152	21.71
Poor	33	9.43	79	22.57	112	16
Total	350	100	350	100	700	100

Source: Field Survey

36.28% of the rural respondents rated their opinion towards Drinking water facility in the banks as Good, 26%, 26% of the respondents rated for satisfactory and Fair respectively. Where as in Urban, 22.57% respondents are rated for Poor and 21.14% for Good. To conclude with,

28.72% of the respondents rated their opinion towards Drinking water facility in the banks as Good and 23.14% as Good.

Table 24: Opinion towards cleanliness

Opinion	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Excellent	33	9.43	97	27.71	130	18.57
Good	101	28.86	129	36.86	230	32.86
Satisfactory	169	48.28	105	30	2748	39.14
Fair	47	13.43	19	5.43	66	9.43
Poor	0	0	0	0	0	0
Total	350	100	350	100	700	100

Source: Field Survey

48.28% of the rural respondents rated their opinion towards Cleanliness of the premises in the banks as Satisfactory and 28.86% rated for Good. Where as in Urban, 36.86% respondents rated for Good and 30% for Satisfactory. To state with, 39.14% of the respondents rated their opinion towards Cleanliness of the premises in the banks as Satisfactory and 32.86% as Good.

Table 25: Overall satisfaction

Satisfaction Level	Rural		Urban		Total	
	Sample	Percentage(%)	Sample	Percentage(%)	Sample	Percentage(%)
Highly Satisfied	71	20.29	44	12.57	115	16.43
Moderate	263	75.14	245	70	508	72.57
Dissatisfied	10	4.57	61	17.43	77	11
Total	350	100	350	100	700	100

Source: Field Survey

75.14% of the rural respondents rated their overall satisfaction level as Moderate and 20.29% rated as Highly Satisfied. Where as in Urban, it is 72.57% and 16.43% respectively. In brief, 72.57% of the respondents rated their overall level of satisfaction as Moderate and 16.43% as highly satisfied.

Conclusion

The following are the strategies to enhance the Quality of Customer Service:

It is suggested to increase number of current accounts so as to enhance transactions and in turn profit.

Ambience inside the bank is to be maintained.

Measures to be taken to enhance customer loyalty.

Promote the habit of making deposits.

Locker facility should be provided in all the branches.

ATM facility should be made available to all the customers of all the branches.

Credit card facility should be made available to all the eligible customers of all the branches.

Collection charges, Draft Exchange, Loan Processing Fee, Cheque Book reissue charges are to be reduced.

Information Help Desk should be made useful to the customers.

Documentation procedure should be made simple.

Decrease the time taken for Disbursements.

Clearance of Local, Outstation and Overseas instruments should be made easy.

Over Draft facility and Credit facility should be provided to all the eligible customers of all branches.

Employees are supposed to help customers in completing the transactions and providing awareness towards New Products / Services.

Basic amenities like Parking space, Seating facilities, Lighting, Drinking water, Ventilation, Toilets and Cleanliness must be maintained in all the branches.

Reasons for Grievances should be analysed and solved immediately.

Awareness about Ombudsmen committee is to be created among customers.

Proper measures are to be taken to increase the Satisfaction level of the Customers.

Besides all the above mentioned measures, experiences and interventions that all are used by Indian based successful companies, should be taken as role models in re-engineering and developing the existing PSBs for their improvement. It may be concluded that by changing the mindsets of PSBs by implementing the above interventions, their public sector character can be sustained and their niche marketing activities, can also be continued for bringing balanced regional development in the country.

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Access to Credit and Technical Efficiency of Vegetable Growers in Mfantseman District of Ghana

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Abstract: The back bone of the Ghanaian economy is agriculture. The sector is the main source of staple food and vegetables. Even though most studies have investigated technical efficiency of some staple crops in Ghana, not much investigation has been carried out on technical efficiency of vegetable growers. The study estimates the technical efficiency of 100 vegetable (garden eggs, pepper and tomatoes) growers using the stochastic frontier function. Results indicate that mean technical efficiency is 0.748 with minimum and maximum values of 0.623 and 0.897 respectively. The study revealed that 40.2% of farmers produce at efficiency level of 0.71-0.75. A good mix of inputs improves vegetable production but does not significantly determine yield. Access to credit by farmers is an important source of technical efficiency. Policy implications drawn from the results include a review of agricultural loan policies from the government banks, private banks and microfinance institutions (MFIs) to increase credit access to smallholder vegetable growers.

Key words: technical efficiency, credit, vegetables, Mfantseman district, translog production function

Introduction

The backbone of Ghana's economy is agriculture. Agriculture employs more than 60% of the labourforce and is rural predominant. It also contributes significantly to gross domestic product (GDP) and foreign exchange earnings. For example in 2006 the sector contributed 39.9% to GDP and 41.1% of foreign exchange was derived from traditional and non-traditional crops (ISSER, 2007). In Ghana government agricultural development objective hinges on a demand-driven national agricultural strategy whose goals are development oriented, productivity enhancing and competitiveness (Asuming-Brempong et al 1991). A strong domestic and foreign demand for agricultural products is the hub around which a systematic, cost effective and sustained agricultural production revolves. In response to this and in the medium-term government seeks to provide food security for all by increasing the production of food crops and vegetables. Vegetables are a good source of proteins, minerals and vitamins, which are important for healthy life. They complement the food crops to make a better diet. Some medicinal properties are attributed to the roots and fruits of most vegetables such as garden eggs, pepper and tomatoes. The nutrients in some of these vegetable crops are described as carminative and sedative, and used to treat colic and blood pressure (Grubben and Denton, 2004). Due to the medicinal advantages of vegetables the composition of food budgets for most households is shifting from the consumption of grains and other staple crops to vegetables. This means that demand for vegetables and vegetable products has the potential to increase giving farmers the advantage to increase production if they can be technically efficient.

Technical efficiency at the farm level is the ability of the farmer to produce the maximum output from his or her resources. A farmer is technically efficient if he or she produces a level of output higher than another under the same farming conditions. Recently food security has been threatened by soaring food prices, escalating oil prices, climate change, land degradation and access to credit. Emphasizing on the latter brings to fore the potential role that access to credit can play in farming activities. Access to credit enables farmers to pursue farm activities on timely basis. They are also able to acquire inputs and labour at less cost. Hence lack of credit facility may affect productivity and efficiency of farmers in general and vegetable growers in particular.

One reason why it is alleged that farmers do not have access to credit is that of high risk nature of agriculture and the level of production inefficiency. Production inefficiency has the effect of discouraging many financial institutions supplying credit to the agricultural sector even though the sector is the back bone of developing economies including Ghana. Many interventions have been put in place to assist farmers during past and present regimes to increase productivity in agriculture generally and for that matter vegetable crop with provision of credit as a major component. For example in 2005/2006 the government of Ghana and the Millennium Challenge Corporation (MCC) in the United States signed a 5-year agreement totaling \$547 million called Millennium Challenge Account (MCA) to support the agricultural sector. The project which is on pilot basis covers six areas including:

1. Farmer and enterprise training in commercial agriculture
2. Irrigation development
3. Land tenure facilitation
4. Improvement of post harvest handling and value chain services
5. Rehabilitation of feeder roads and
6. Improvement of credit services for on-farm and value chain investment.

Emphasizing on the latter brings to bear the need for enhancing credit in the agricultural sector. Unfortunately the MCA of MCC focuses on providing access to credit to farmers in only 23 districts in the northern, Afram basin, and southern horticultural intervention zones in Ghana. In spite of these initiatives, production of vegetables and vegetable products still seems to be insufficient to meet the demand of Ghanaians. Available statistics show that importation of vegetable and vegetable products increased by US\$ 1,729,000 between 2001 and 2002 and US\$ 531,000 between 2003 and 2004 (WTO, 2005). This confirms the fact that Ghana is a net importer of vegetable and vegetable products. The problems associated with low productivity of vegetable crops are numerous. Prominent of agricultural constraints are marketing and distribution, poor farming methodology, lack of storage facilities, high cost of inputs and inadequate credit facility among others. The importance of credit facility in agriculture has long been recognized. For example it is also on record that access to credit improves farmers' technical efficiency and productivity in Nigeria (Idiong, 2007) and Cameroun (Binam, Tonye, Wandji, Nyambi & Akoa, 2004). Unfortunately in some parts of Africa according to Tshibaka (1992a), credit to smallholder farming activities has been marginalized for a long time. The picture is not different in Ghana as credit to the agricultural sector continues to decline. Credit to the agricultural sector has dropped dramatically over the last ten years. Similarly, government spending on agriculture has been declining. For example in 1998, 25% of government spending was directed towards agriculture. By 2006, this figure had reduced to 7%. Lending to the agricultural sector by deposit money banks (DMB) shows a decline trend of 9.4%, 7.7%, 6.7%, 5.4%, and 4.9% for 2003, 2004, 2005, 2006 and 2007 respectively (ISSER, 2008). In Ghana it is becoming clear that decline in agricultural credit is consistent with decline in agricultural productivity of vegetable production is no exception.

No study which we are aware of has determined the technical efficiency of vegetable farmers in Ghana even though little has focused on some staples and selected tree crops (see for example Seidu, 2008; Binam, Gockowski & Nkamleu, 2008). Therefore, policy formulation has been hampered by this lack of relevant empirical studies at the farm level. The policy question therefore is: What is the current level of technical efficiency of vegetable farmers and is access to credit an important factor of technical efficiency?

Given the importance of vegetable crops in the Ghanaian economy, the estimation of technical efficiency will facilitate answering questions on the current farm level efficiency in vegetable production, and factor(s) that are holding back smallholders from increasing their productivity. An understanding of the relationships between efficiency, policy indicators and farm-specific practices would provide policy makers with information to design programmes that can contribute to increasing vegetable potential among farmers. The objectives of the current study are to determine the inputs and input mix which most significantly influence vegetable production, measure the level of technical efficiency among vegetable farmers and identify farmer characteristics that significantly influence the level technical efficiency of selected vegetable production. In this regard the rest of the paper is organized as follows: the next section reviews related previous work, section three discusses methodology, section four presents results and discussion. The paper concludes with policy implications and limitations of the study in section five.

Review of Literature

Technical efficiency refers to the ability of a production unit to deliver a higher output level with the same physical inputs under similar conditions. Seidu (2008) alludes to the fact that an important aspect of technical and allocative inefficiency in a developing country's agriculture is the prevalence of subsistence needs. In the literature, there is an argument that inefficiency can also result from socio-economic, demographic or environmental factors. However, farm-specific efficiency or inefficiency is normally attributed to farmer characteristics. These variables may normally measure information status and managerial competence of farmers. Ali and Byerlee (1991) have isolated skills such as education, technical knowledge and extension contacts, as well as factors which are exogenous to the farm set up, such as credit, input markets or tenancy as key in this respect. Kalirajan (1981) has also argued that individual farmer variability and not random variability is the major cause of yield variability. Byiringiro and Reardon (1996) investigated the effects of farm size, soil erosion and soil conservation investments on land and labour productivity and allocative efficiency in Rwanda. They concluded that there is a strong inverse relationship between farm size and land productivity. Furthermore, for small farms, there was evidence of inefficiency in the use of land and labour, the cause being attributed to factor market access constraints. Ecological issues also appeared to have paramount implications for sustainable agricultural production. Tadesse and Krishnamoorthy (1997) found that 90% of the variation in output among paddy farmers in Tamil Nadu, India, was largely due to differences in technical efficiency. The mean technical efficiency was calculated as 83%. Tadesse and Krishnamoorthy recommended that for small paddy farmers to follow the efficient resource use pattern; there is the need to provide them with more land and extension services. Most studies dealing with agricultural production argue that schooling or the level of education of a farmer helps the farmer in the use of production information leading to increased yield. Pudasaini (1983) documented that education contributed to agricultural production in Nepal through both worker and allocative effects. The author found that even though education enhances agricultural production mainly by improving farmers' decision making ability, the way in which it is done differs from environment to environment. Thus, in a technologically dynamic agricultural system, education improves farmers' allocative ability, enabling them to select improved inputs and optimally allocate existing and new inputs among competing uses. On the other hand, in traditional agriculture, it enhances their decision making ability mainly by increasing their ability to better allocate existing farm resources. Kumbhakar et al. (1991) investigated the determinants of technical inefficiency in United States dairy farms. The stochastic frontier approach was used involv-

ing a single-step maximum likelihood procedure. Results showed that levels of education of the farmers were crucial determinant of technical efficiency. Rauf (1991) has also estimated the relationship between education and technical efficiency using a Cobb Douglas production. Results showed ample evidence of positive effect of education on technical efficiency.

In a study of technical efficiency of waterleaf farmers in Ethiopia, Udoh and Etim (2006) found that labour, organic manure and irrigation were the most important production factors. The calculated mean technical efficiency was 65%. Amara et al (1999) examined the technical efficiency of potato farmers in Quebec and showed that the farmers were on the average 80% efficient. They also identified farming experience and the adoption of conservation technologies as the most important variables for increasing technical efficiency.

In a study by Battese and Coelli (1992) to estimate and measure the technical efficiency of paddy farmers in India the authors employed the stochastic frontier production model but realised that the frontier function was not significantly different from the traditional average response function. Adesina and Djato (1997) used profit function to determine the relative efficiency of women farmers. Research results provided evidence that there was no significant difference between efficiency of women and men. Demir and Mahmud (2002) focused on finding the factors responsible for technical inefficiency in Turkey. It was found that rainfall and land quality have a positive effect on output and efficiency.

The direction of study of Chavas et al (2005) was investigating the technical, allocative and scale efficiencies of farm households in the Gambia. Using non-parametric measurements the authors found that the mean technical efficiency at the household level ranged from 0.895 to 0.995 meaning that farm households were very efficient. Battese et al (1996) concerned themselves mainly with the measurement of technical inefficiency in wheat production in Pakistan. They concluded that the adoption of new technology and better extension services to wheat farmers were important factors in improving efficiency. Parikh et al (1995) used stochastic cost frontier to estimate cost inefficiency by farms cultivating a range of vegetables in Pakistan and found that mean cost inefficiency was 11.5 % in the study region.

An implicit assumption of the production frontier is that all farmers are producing in a technically efficient manner. Any deviation from the frontier is assumed to be due to random effects. The estimation of the frontier assumes that the boundary of the production is defined by the best practice farmers. Some white noise is accommodated since the estimation procedures are stochastic, but additional one-sided disturbance parameters will represent any other reasons why farmers would be away from the most efficient boundary.

Three quantitative approaches have been developed for measuring production efficiency of firms and they are parametric, non-parametric, and productivity indices (Coelli et al 1998). Under the parametric approach, the stochastic frontier analysis (SFA) and data envelope analysis (DEA) are the most commonly used methods. Both methods estimate the efficient frontier and calculate a firm's technical efficiency relative to it. The SFA approach requires that a functional form be specified for the frontier production function. The DEA approach uses linear programming to construct a piece-wise frontier that envelops the observations of all firms. The frontier shows the best performance observed among the firms and it is considered as the efficient frontier. An advantage of the DEA method is that multiple inputs and outputs can be considered simultaneously, and inputs and outputs can be quantified using different units of measurement. Moreover, DEA allows calculating scale efficiency. However, a strong point of SFA in comparison to DEA is that it takes into account measurement errors and other noise in the data. This point is very important for studies of less developed economies as data generally include mea-

surement errors (Morrison 2000). Since the SFA is suitable in taking care of measurement errors, in this study the SFA is used.

Methodology

The Study area and sample frame

Mfantiman is one of the districts in the Central region of Ghana. The district capital, Saltpond is a semi-commercial town. The major occupations of the people in the district are trading, fishing, and farming. A total of about 9,413 hectares of land is under vegetable cultivation by more than 1000 vegetable farmers. Vegetable production is not on large scale. Most farmers depend on the natural rains for cultivation meaning irrigation farming is not prominent in the area. Vegetables have a relatively well-developed marketing channel that links actors at different spatial locations from rural communities to national, regional and international destinations. The district is linked up with many urban towns in Ghana simply because of the vegetable production. This market or value chain has developed over the years to cover domestic demand. Occasionally, the vegetables are traded across borders with neighboring countries. There is also strong network among vegetable producers in the district. Financial institutions that operate in the district include Ghana Commercial Bank (GCB), Mfantiman Community Bank (MCB), Teachers Cooperative Credit Union (open to the community), Christian Aid Rural Network (CRAN), Kakum Rural Bank (KRB), and individual 'susu' operators. Farmers in the area complain about lack of access to credit. The study population consists of all households who grow vegetables in the Mfantiman District in the Central Region.

Household is defined as a group of persons who live together in the same house or compound, share the same house-keeping arrangements and are catered for as one unit (Population and Housing Census 2000). For lack of records we could not get the total number of vegetable growers in the district. The Ministry of Agriculture (MoFA) office at the district helped us to identify the farmers. The sample was generated using the purposeful and stratified sampling techniques. In all 100 farmers were randomly selected and interviewed. It is likely that in selecting the farmers some selection biases might have occurred because the extension officers identified the farmers themselves. More efficient farmers might have been selected or otherwise and this has probable effect of affecting our results. This notwithstanding, the simple random sampling is assumed gave respondents equal chance of been selected into the sample.

Theoretical and Analytical Model

Factor input combination to a very large extent determines how efficient a farmer is. Farmers' level of technical efficiency is not only determined by availability of inputs and input combination but also farmer characteristics such as educational background, knowledge in the application of farm tools and insecticides among others. Therefore following the study of Aigner et al (1977) and Meeusen and van den Broeck (1977); the model for the i th farmer is a simple production function written as:

$$Y_i = f(X_i; \beta_i) + E_i \quad \dots \dots \dots (1)$$

$i = 1, 2, 3, \dots \dots \dots N$ and $E_i = V_i - U_i$

The above equation gives the observed level of output measured in terms of revenue that each farmer gets from the sale of their output.

Where:

Y = Output of the i th farmer measured as price multiplied by quantity.

X= Vector of inputs used by the farmer

V-U= Composite error term

V = Random variable assumed to be independently and identically distributed.

This composite error term caters for random factors such as weather that is outside the control of the farmer. This component also allows for variation in the frontier across farmers and possibly across time on the basis of random events. U=Random variable that accounts for technical inefficiency and assumed to be independently distributed as truncation of the normal distribution with mean μ and variance σ . It includes factors that are assumed to be controllable by the farmer. In simple terms, it represents factors that limit the farmer from reaching his potential output. Using the SFA, the farmer level stochastic production frontier that represents the maximum level of output is expressed as:

$$Y^* = f(X, \beta) + e^v \quad | \quad u = 0 \quad \dots\dots\dots (2)$$

Equation two above gives the technically efficient level of farmers. In other words Y^* is the frontier level of output assuming that there are no inefficiencies in production.

On the other hand if there is inefficiency in production, the production function is expressed as:

$$Y = f(X, \beta) + e^{v-U} \quad \dots\dots\dots (3)$$

Equation three defines the actual level of output of farmers. If farmers are technically efficient, it is expected that $Y^* = Y$. The ratio of equation 3 and 2 thus gives the level of technical efficiency. From above, technical efficiency is mathematically expressed as:

$$TE = \frac{f(X, \beta) + e^{v-U}}{f(X, \beta) + e^v} \quad \dots\dots\dots (4)$$

From equation 4 above, $TE = e^{-U}$, which implies that inefficiency of farmers is embedded in the U. It must be emphasized that the difference between the unobserved output (Y^*) and the actual output (Y) measures the level of technical efficiency or inefficiency. The implication is that technical efficiency parameter is isolated from U. If $U = 0$, it means that $Y^* = Y$, the farmer is perfectly technically efficient since production is on the frontier. However, if $U > 0$ it means Y less than Y^* and the farmer is not efficient.

A Cobb-Douglas production function is fitted to the stochastic frontier production function and estimated. The estimated function is of the form:

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \varepsilon$$

In a translog functional form, the estimated function is of the form:

$$\ln Y = \alpha_0 + \alpha_1 \ln X_1 + \alpha_2 \ln X_2 + \alpha_3 \ln X_3 + \alpha_4 \ln X_4 + \alpha_5 (\ln X_1)^2 + \dots\dots\dots + \alpha_8 (\ln X_4)^2 + \alpha_9 (\ln X_1)(\ln X_2) + \dots\dots\dots + \alpha_{14} (\ln X_3)(\ln X_4)$$

Where :

Y = Output of farmers in Ghana cedis.

X_1 = physical inputs in Ghana cedis (**Cap**)

X_2 = Quantity of fertilizer and seeds in Ghana cedis (**Fs**)

X_3 = Farm hours in cost per man-hour in Ghana cedis (**Fhrs**)

X_4 = Land under cultivation in acreage (cost per land hired) (**Acres**)

Using the OLS we estimate farmer and institutional characteristics that influence technical efficiency. This is done by regressing the farmer and institutional characteristics on the efficiency score generated during the first stage regression. Our methodology draws on most of the studies in technical efficiency for example Idiong (2007):

$$TE = \beta_0 + \beta_1 \Pi_1 + \beta_2 \Pi_2 + \beta_3 \Pi_3 + \beta_4 \Pi_4 + \beta_5 \Pi_5 + \beta_6 \Pi_6 + \beta_7 \Pi_7 + e$$

Where:

TE = Technical Efficiency

P = estimated parameters

Π_1 = Experience of farmer (years of farming)

Π_2 = Educational level of farmer (years of schooling)

Π_3 = Household size

Π_4 = Age of farmer

Π_5 = Sex (female=1, male=2)

Π_6 = Access to extension services (1=extension services, 0 = no extension services)

Π_7 = Access to credit (with credit=1, without credit=0)

Following the works of Idiong (1991), Krasachat (2000) and Kumar (2003) it is expected that all factors that enter the production function will influence output positively. In the case of technical efficiency experience in farming, access to credit, sex, farmer's age, education, and use of fertilizer are expected to influence technical efficiency.

Data

Cross-sectional data on vegetables produced by farmers were collected using 100 questionnaires. The main vegetable crops included in the study are tomatoes, egg plant and pepper because these are the crops that are predominant in the study area. Data on inputs such as farm implements, quantity of fertilizers, and insecticides used, quantity of seeds, farmer knowledge of input use and combination, cultural practices, land size under cultivation and extension services were collected. Agricultural extension officers in the district administered the questionnaires. The study was carried out in six communities in the Mfanstiman District where there are more than 1000 vegetable farmers. The six communities in which the survey was carried out include Ekumfi, Mankesim, Saltpond, Baafikrom, Abonko and Essarkyir. Data was collected during the harvesting of period September-November 2008. The distribution of respondents across the selected communities is shown on Table 1.

Table 1: Distribution of Respondents

Community	Number of farmers	Percentage
Ekumfi	15	15.5
Mankesim	30	30.9
Saltpond	20	21.0
Baafikrom	10	10.0
Abonko	10	10.0
Essarkyir	15	12.6
Total	100	100.0

Source: Field Survey (2008)

Results and Discussion

In the Mfanstiman district males (57.7 %) dominate in vegetable cultivation as compared to women (42.3%). This tells us that men are more involved in vegetable production than women. The youth is less engaged in agriculture. This has been the perception over the years in Ghana. This is a worrisome situation as seen in Table 2.

Table 3 shows that more farmers are involved in the cultivation of pepper than the other crops. The plausible reason may be that it is relatively easier to grow pepper than the others which require more tending and attention. The distribution by sex also clearly appears to follow the general trend. In other words, there are more males than females engaged in each crop except garden

eggs. It is also noted that 42 farmers (43.3%) cultivate multiple crops. Farmers in the area practice mixed cropping. They cultivate multiple crops on the same piece of land during each season. This is why inputs are used for the cultivation of the crops at the same time making it difficult to estimate technical efficiency for each crop. Yield for each farmer was aggregated for the reason just mentioned. Also farmers do not keep any proper records on their farm produce. Prices of egg plant, tomatoes and pepper based on standard measurements were obtained from the regional agricultural office, regional statistical service and the market respectively.

Table 2: Age and sex Distribution of farmers

Sex of farmer	Age in years				Total
	18-15	26-40	41-50	50+	
Male	1(1.8%)	20(35.7%)	20(35.7%)	15(26.8%)	56
	0	3(6.8%)	22(50.0%)	19(43.2%)	44
Total	1(10.0%)	23(23.0%)	42(42.0%)	34(34.0%)	100

Source: Field Survey (2008).

Table 3: Crop Cultivation by sex

Sex	PP only	GEGS only	TTS only	TT&GEGS	GEGS&PP	PP&TT	All crops	Total
Male	16	10	6	9	8	3	6	56
Female	10	12	4	2	5	4	8	44
Total	26	22	10	11	13	7	14	100

Source: Field survey (2008) PP=pepper, GEGS=garden eggs, and TTS=tomatoes

In the district the most popular crop under cultivation is hot pepper followed by egg plant and tomatoes. The survey result also indicates that 42 farmers (43.3 %) cultivate more than one crop. It is likely that hot pepper is popular because its cultivation requires less resources and attention, and can withstand harsh weather conditions. Another reason assigned by the respondents is that pepper is like a perennial crop that can be harvested season after season. On the other hand garden eggs and tomatoes require more resources to cultivate and they die off after a short time. For example tomatoe plant dies off after the fruits are harvested. Unlike tomatoes, pepper is easier to preserve. Also comparing garden eggs and tomatoes, respondents said garden eggs can be preserved locally by chopping and drying them. Farmers might consider this before they cultivate since ready market may not be assured. It must be emphasised here that farmers must be supported in the cultivation of vegetables that can be preserved at no cost. In Ghana for example the preservation of pepper is costless since one can just boil and dry it. Pepper can also be dried in earth oven.

Table 4: Quantity³ of Yield, Input and Technical efficiency

Yield/inputs	Minimum	Mean	Maximum
Yield (kg)	1000	2165.7	12,150
Hoe	2	5	15
Cutlass	5	8	18
Rake	2	7	14
Mattock	1	3	6
Acreage of land	0.5	1.95	8
Fertilizer (kg)	45	83.20	600
Seed (gm)	100	400.63	5,220
Technical efficiency	62.32	74.80	89.56

Source: Field Survey (2008)

² Quantity of all inputs and yield are for the season under study only.

At least every farmer uses some quantity of fertilizer (see Table 4). Maximum fertiliser usage is 600 kg as against average usage of 83.20 kg. Since farmers do not measure their farm vis-à-vis fertiliser usage it was difficult measuring average usage of fertiliser per acre. However it could be estimated that on the average, a farmer uses 83.20 kg of fertilizer on 1.95 acre of land. The average yield per 1.95 acre of land cultivated is 2165.7 kg for each crop. On the average most farmers operate at the level of 74.8% efficiency. Figure 1 shows the distribution of technical efficiency scores. Majority of our farmers (40.2%) produce at efficiency level of between 71% and 75% whereas 31 famers (31.9%) produce at efficiency level of between 76% and 80%. In general vegetable growers in the district lie behind other farmers in some African countries. As mean technical efficiency of farmers in the district is 74.4%, it is 73-77% in Cameroon, 79% in Ethiopia (Seyoum et al, 1998), about 76% in Lesotho (Mochebelele and Winter-Nelson, 2000) and about 76% in La Cote d'Ivoire (Binam et al, 2004). On the other hand the mean technical efficiency in the district is far higher than that of Ugandan farmers (65%) as reported by Heshmati and Mulugeta (1996).

Empirical evidence from the frontier function

In this section we explain the technical efficiency of our sampled farmers. In view of the fact that the farmers engage in the cultivation of more than one crop, our regression analysis was based on aggregated output in value terms matched against the cost of inputs as used in similar studies (see Grazhdaninova and Lerman 2004; Zhang and Xue 2005). In the first stage of our analysis, we endeavoured to determine the type of production function suitable for vegetable production. Cobb Douglas and the translog production functions were run. The results for the Cobb Douglas production were spurious so we discarded them and concentrated our interpretation on the translog function.

A null hypothesis $H_0: \gamma = \beta_1 = \beta_2 = \dots = \beta_7 = 0$, which specifies that the technical inefficiency effects are not present in the model that is vegetable farmers are efficient and have no room for efficiency growth. The hypothesis is rejected as gamma parameter (Table 5) is 0.7375 and significant at 5 percent probability level, which means about 96 per cent of the disturbance term is due to inefficiency. Thus the inclusion of the technical inefficiency term is a significant addition to our model. In addition, a stochastic translog production frontier is estimated as a test of robustness in the choice of functional form. The form of this model encompasses the Cobb-Douglas form, so test of preference for one form over the other can be undertaken by analyzing significance of cross terms in the translog form.

The results indicate that with the exception of fertilizer and hybrid seed ($LnFs$), individual inputs do not influence yield though some positive relationships are observed. The use of hybrid seed and application of fertilizer is significant at 10% and positive. The reason why physical input ($LnCap$), farm hours ($LnFhrs$) and size of land under cultivation ($LnAcres$) are significant individually might be due to importance of co-operant factor theory effect. Again the square of the inputs are not significant except hybrid seed and fertilizer usage ($LnFs^2$) which is significant at 10% and also positive. This means it is only when these inputs or factors are combined in their right proportion that good result could be obtained. A mix of capital, fertilizer and seeds; farm hours, fertilizer and seeds; land size under cultivation and capital inputs; and lastly capital inputs and farm hours have significant effects on yield. The analysis shows that a combination of physical inputs, fertilizer and seeds has a positive impact on yield probably because these inputs are normally co-operant factors which aid production. The estimated value for the interaction between farm hours and fertilizer and seeds is surprisingly negative. This means that an increase in any of these factors would result in a decline in yield. The effect of interaction of land under

cultivation and physical inputs (hoe, cutlass, rake and mattock) on vegetable yield is equally unexpected. The measured elasticity shows that a unit increase in the mix of area under cultivation and physical inputs draws about 0.31 unit decline in vegetable yield. This is so probably because the mixture of the factors is not being chosen properly.

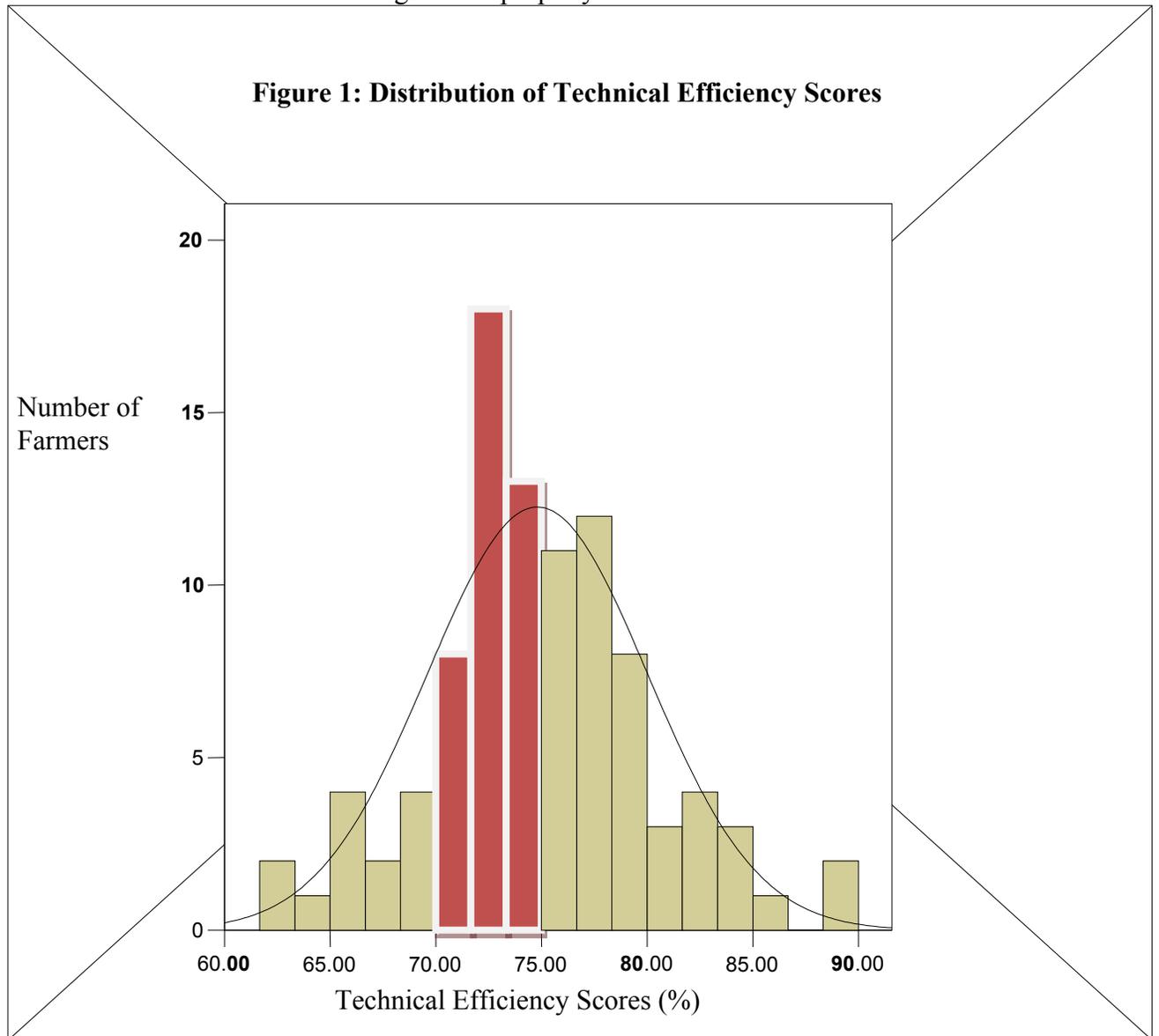


Table 5: Production function (dependent variable: *ln yield*)

Variable	Parameter	Co-efficient	Z-value	Probability value
Production Function				
$\ln Cap$	α_1	0.15	1.45	0.16
$\ln Fhrs$	α_2	0.11	1.02	0.21
$\ln Acrs$	α_3	-0.16	-1.57	0.14
$\ln Fs$	α_4	0.17	1.84	0.09***
$\ln Cap^2$	α_5	0.13	1.35	0.19
$\ln Fhrs^2$	α_6	0.20	1.12	0.11
$\ln Acrs^2$	α_7	-0.12	-1.47	0.14
$\ln Fs^2$	α_8	0.17	1.84	0.09***

lnFhrslnCap	α_9	0.15	2.61	0.01*
lnAcrslnCap	α_{10}	0.16	2.32	0.02**
lnFslnCap	α_{11}	-0.31	-1.72	0.09***
lnFhrslnFs	α_{12}	-0.23	-2.16	0.03**
lnAcrslnFs	α_{13}	-0.09	-0.79	0.43
lnAcrslnFhrs	α_{14}	0.73	2.36	0.02**
Inefficiency Model				
Farmer experience	β_1	0.152	1.51	0.14
Schooling	β_2	-0.183	-2.02	0.05*
Household size	β_3	-0.253	-2.95	0.00*
Age	β_4	0.086	0.87	0.39
Sex	β_5	0.145	1.54	0.13
Extension services	β_6	-0.368	-4.22	0.00*
Access to credit	β_7	-0.250	-2.92	0.00*
Variance Parameters				
Total variance		1.09	2.07	0.04**
Gamma		0.7375	120.23	
Log likelihood		-129.75		

*Significant at 1%, **significant at 5%, ***significant at 10%

Under normal farming conditions it is expected that the more hours spent on the farm by farmers, the more they are able to do more farm activities all things being equal. It is absolutely in consonance with our expectation that the estimated co-efficient portrays a positive relationship between good mix of farm size, farm hours and vegetable yield. Thus a unit increase in the combination of farm area and farm hours leads to about 0.73 unit increase in output. The combined effect of capital input and farm hours on vegetable yield is also positive. This means that an increase in this mix draws an increase in vegetable production. In real terms a unit increase in the input mix leads to about 0.16 unit increases in vegetable yield.

From the second stage regression results (see Table 5) the inefficiency model rather surprisingly shows that farming experience is insignificant and negative and therefore a source of inefficiency. This result is inconsistent with Burki and Terrel (1998) and Amara et al (1999) in their studies in Pakistan and Quebec respectively where farming experience was a source of technical efficiency. It can be argued that farming experience normally becomes an important factor when combined with education. In our sample, majority of the vegetable growers have spent fewer years in school even though education is statistically significant. Age is positive and not significant meaning that advancement in age is a source of technical inefficiency. This is not surprising because in Ghana the youth despise farming as they see it as a vocation for the less fortunate individuals. Sex appears in the inefficiency model with negative sign and also insignificant. Again another source of inefficiency in vegetable production is sex. Household size appears very significant meaning the size of farmers household is a source of technical efficiency. Educational level measured in years of schooling is significant and negative meaning it is a source of technical efficiency. This is not consistent the result of Chirwa (2007) in a study in southern Malawi on maize farmers where level of education was statistically insignificant farm level efficiency. In this study however, well educated farmers are able to produce vegetables efficiently. Such people are able to apply fertilizers and other chemicals by following the instructions on the labels.

Farmers whose level of education is low become technically inefficient in vegetable production even though they may be efficient in the production of some staples such as cassava. Access to extension services is a source of farm level technical efficiency among vegetable growers. This is in line with the traditional agricultural practices where farmers who receive advice from agricultural extension officers are able to adopt better cultural practices to increase yield. Extension

services provided by the extension officers in the district include guidance on application of fertilizer and insecticide, best farming practices and general advisory services.

Another important source of technical efficiency among vegetable growers in the district is access to credit (which is the main policy variable) because the coefficient is negative and the *t*-value (2.92) is very significant at 1%. In fact credit is an input from which other inputs are derived. For example to purchase fertilizer, hire labour; acquire capital (including hoes, mattock, rake etc) one needs money to do that. If there is no credit leakage (100% use of credit) farmers become very efficient since all necessary inputs are acquired on time. This finding disagrees with Zeller and Meyer (2002) in Malawi. In Malawi it was observed that access to credit had no significant real effect on farming efficiency. The argument was that credit must go with better farming technology (Zeller and Meyer 2002). In Ghana however, access to credit does matter in terms of vegetable growing. The implication is that credit either in terms of input or physical cash is very significant in improving the level technical efficiency among vegetable growers. The relatively low levels of technical efficiency among smallholder maize farmers in the district point to the need to pursue policies that enhance the organization of farming systems in Ghana.

Conclusion

In this paper we have estimated the technical efficiency of vegetable growers in the Mfanstiman district in the central region of Ghana. The findings indicate that access to credit is a source of technical efficiency. The positive relationship between access to credit and technical efficiency suggests that if farmers follow good practices, credit will significantly influence technical efficiency of vegetable production. As a policy direction credit institutions should make credit accessible to smallholder vegetable growers. Government banks like Agricultural Development Bank (ADB), Ghana Commercial Bank (GCB), and National Investment Bank (NIB) should extend credit to vegetable farmers in rural and urban areas. For government banks the credit directives which used to be in force before the financial needs to be revisited. Private commercial banks and microfinance institutions need to make credit accessible to vegetable growers. Such credit in order to ensure high recovery rate should not be priced high. Unlike some staples and other tree crops, vegetables have shorter gestation period meaning credit risk is not likely to be high.

There is the need to develop innovative financial products to meet the credit needs of vegetable farmers. The onus is on credit institutions to employ staff with knowledge in agricultural extension services to assist farmers who receive credit facilities in the form of inputs. There is also the need for the government to create agricultural development fund (ADF) which will disburse credit in the form of inputs to farmers since most inputs are significant in determining vegetable production. Even though the creation of ADF is in the pipeline, the process must be speed up. The Agricultural Credit Programme (ACP) of the Millennium Challenge Compact (MCC) in Ghana should be extended to cover more districts since the current coverage of 23 districts is not adequate. Focus should also be directed to vegetable production because credit requirement for vegetable production is not as huge as staple and tree crop production. Mandatory credit allocation to the agricultural sector in general may also be implemented so that the sector is not crowded out of the credit market. Banks and other financial institutions need to organize small holder farmer groups to facilitate access to finance in agriculture which will at the same time reduce default and risk associated with lending to farmers.

The survey indicates that vegetable growers have advanced in age. There is therefore the need to encourage the youth to go into agriculture. The government of Ghana should strengthen the

national youth employment programme (NYEP) especially youth in agriculture. The teaching and learning of agriculture should be strengthened in schools because agriculture is the backbone of the economy.

The study is not without limitations. Ideally we should have disaggregated the yield for all the vegetables grown by the farmers. Unfortunately since the farmers do not keep records on each crop, they could not recall separate yields for each crop. Farmers in the district practice mixed cropping so inputs are used for all the crops at the same time, technical efficiency could therefore not be estimated separately for each crop. The study concentrated in a particular district within central region of Ghana, the result cannot therefore be generalized for the whole country but it provides some evidence in Ghana even though it is limited in scope. Finally access to credit was captured as a dummy variable but credit is always given in quantum amounts. Further study should consider the use of credit amount.

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Consumer Perception, Attitudes and Awareness of Green Products: A Study of Consumer Goods

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Abstract: *The past decade has witnessed to the rapid growth in consumer's consumption in almost all consumer goods category. This excessive demand causes environmental deterioration through over-consumption and utilization of natural resources. The growing global public concern for preservation of the environment has given rise to a perception that customer purchases may be somewhat influenced by their attitude toward environmentally safe products. The purpose of this study is to measure attitudes of the consumer toward eco-friendly products and green marketing and examine perception and awareness of the consumers about green marketing. The paper analyses the attitudes of consumers' toward green marketing, environmental issues and examine the relationship between demographic and attitudes of consumer toward environment and eco-friendly products. The consumer attitudes toward green marketing were measured on four marketing approaches i.e. green product, willingness to pay (WTP) more for eco-friendly products, less polluting environment place/ distribution channel and eco-friendly promotion campaign.*

Keywords: Eco-friendly, Green Products, Consumer Behaviour, Green Marketing

Introduction

Efforts to identify environmentally friendly consumers can be traced back to the early 1970s. Berkowitz and Lutterman (1968), as well as Anderson and Cunningham (1972), were pioneers in studying the profile of socially responsible consumers. Since the 1960s, environmental issues have gained importance in business as well as public policy discourses. Green marketing incorporates a broad range of activities, including product modification, changes to the production process, packaging changes, as well as modifying advertising (Michael Jay Polonsky and Mintu-Wimsatt, A.T 1995). Researchers defined green marketing in various ways; Polonsky and Rosenberger (2001) defined that "green marketing is a holistic, integrated approach that continually re-evaluates how firms can achieve corporate objectives and meet consumer needs while minimizing long-term ecological harm". Peattie (2001) stated that "green marketing has been used to describe marketing activities which attempt to reduce the negative social and environmental impacts of existing products and production systems, and which promote less damaging products and services". The product that will not pollute the earth or deplete natural resources called green product (Shamdasami et al., 1993). These are the products that have more environmentally sound content or packaging in reducing the environmental impact (Elkington and Makower, 1988; Wasik, 1996). In other words, green product refers to product that incorporates the strategies in recycling or with recycled content, reduced packaging or using less toxic materials to reduce the impact on the natural environment.

Environmental problem is a global issue in the today's society; the causes of environmental problems are related directly or indirectly to the patterns of production by industries, consumption and behaviour of the consumers (Said, Ahmadun, Paim & Masud, 2003). Consumer's perception of the firm's corporate strategies toward environmental issues is expected to contribute to the formation of the overall perception about green products (D'Souza, Taghian et al, 2005). The environmental strategies adopted by a company demonstrate the company's green reputation by way of being socially responsible and responsive to environmental concerns. Firms are often faced with the challenge to balance their consumers' environmental concerns with their cash

flow, profitability (Berry, and Rondinelli, 1998), and find innovative measures to sustainable corporate environmental issues. No doubt, they also have to manage their firm's resources towards environmental impacts effectively and efficiently, and restructure their business and their market offerings around environmental issues.

Studies confirm that consumers increasingly make purchases on the basis of a firm's role in society (Forte and Lamont, 1998). The consumers were becoming more concerned about their everyday habits and the impact on the environment (Krause, 1993). The consumers translated their environmental concern into actively purchasing green products commitment (Martin and Simintiras, 1995).

Consumers who are aware of and interested in environmental issues are called green consumers (Soonthonsmai, 2007). Green consumers usually organized petitions, boycotted manufacturers and retailers and actively promote the preservation of the planet (Fergus, 1991). (Phillips, 1999), reported that 87% of adults are concerned about the condition of the natural environment 80% believe that protecting the environment will require major changes in current life-styles (Ottman, 1996) and 75% consumers consider themselves to be environmentalists (Osterhus, 1997). Consumers' awareness of environmentally friendly products has increased in the past few years. However, concern for the environment continues to be tempered by economic concerns. Although many consumers take steps to conserve energy and resources in their own homes, they are motivated as much by the desire to save money as by the desire to save the environment-80% conserve energy, 74% purchase energy-saving appliances, 68% limit water use. Nonetheless, 2010 saw significant shifts in two forms of environmental activism that are not economically motivated- the percentage of consumers opting not to use plastic bags jumped from 39% to 45% and the percentage checking corporate environmental policies increased from 23% to 28%. (www.cottoninc.com). Consumers have a positive attitude towards the environment, they demand green products, and they attempt to read environmental labels and with regards to green products, the consumers are not willing to compromise on quality but are willing to pay a higher price, quality should be strongly emphasized. (Clare D'Souza, Siva Muthalay, Mehdi Taghian and Francisco Pereira, www.wbiconpro.com).

On the basis of the findings of these literatures the objectives of the study are as follows:

Objectives

- To investigate the consumer perception towards eco- friendly products in Consumer Goods category and their impact on purchasing decision.
- To evaluate consumer attitudes and perception regarding eco-friendly Consumer goods.
- To examine the relationship between demography and consumer attitudes toward green marketing.

Methodology

Measures

A structured questionnaire was used to gather the data required for this research. The instrument included items to measure customers' perception on government responsibility in regulating and protecting the environment, developed by, Chen and Chai (2010). The items to measure perceptions of corporate responsibilities, product packaging, product ingredients not being harmful to environment, as well as customers' purchase intentions if products were somewhat higher in price and somewhat lower in quality in comparison to alternative products was also devel-

oped. The consumer awareness of environmental issues was measured with the help of a tool developed by, Haytko and Matulich (2008), All measurements were subjective assessments by the respondents using a seven-point Likert-type scale ranging from “Strongly Agree to Strongly Disagree”. The variables i.e. Attitudes toward green Marketing was measured with the help of eight items, Attitudes toward Environmental Protection was on ten items, Awareness of consumers about Green Marketing was measured on four items, Consumer Perception about green marketing strategy of the marketers was measured on seven items and Buying Decision was measured on four dimensions; high cost-low cost, good quality-inferiority product in all thirty three items were constructed for the purpose. Besides these items demographic information were also collected. AMOS structural modeling was used to estimate the measure of respondents overall green performance and buying decision.

Sampling: Data was collected from the Post Graduate students of VBS Purvanchal University, Jaunpur (UP). A structured questionnaire was distributed to the students in their classes and they were asked to record their views about the eco-friendly products.

Sample Size: Total 250 questionnaires were distributed and 238 questionnaires were found suitable for the analysis, the questionnaires, which were incomplete, were rejected.

Sample Profile:

Age: A great majority (77%) of the respondents were crossed the teen age group they were from 20 to 25 age group, while one fifth (20%) of the respondents were from teen age group i.e. up to the age of 20 years.

Gender: More than half (52%) of the respondents were male.

Education: More than half (56%) of the respondents were from Science stream, and 29% of the respondents were from MBA stream and 4% were from MCA, while rest 11% were from Arts stream.

Occupation: Less than half (41%) of the respondents were belonging to Government servants family, around one fourth (24%) of the respondents were from business families and 30% of the respondents were from farmers family while only 5% of the respondents were belonging to private servants families.

Income (Family): One third (33%) of the respondents were from low income group i.e. monthly income up to Rs. 10000=00 only, and around one fourth (26%) of the respondents were from middle income group i.e. Rs. 20000 to 30000. only 10% of the respondents were from high income i.e. more than Rs.30000 per month.

Marital Status: Almost all (93%) of the respondents were unmarried.

Family Size: More than half (54%) of the respondents were from large families having more than five members in their family and around one third (37%) of the respondents were having medium size family i.e. three to five members in the family and only 9% of the respondents were having small family size i.e. up to three members in the family.

Reliability and Validity

Scale reliability was assessed by using the alpha method for Attitudes toward green Marketing Cronbach's alpha = .5175, number of items = 8. For Attitudes toward Environmental Protection Cronbach's alpha = .7023, number of Items = 10. Awareness about Green Marketing Cronbach's alpha = .6605, number of Items = 4. For Consumer Perception Cronbach's alpha = .8097, number of Items = 7. And overall scale reliability Cronbach's alpha = .7757, number of Items = 33, n= 238.

Item analysis

All the thirty marketing strategy of the marketers and buying decision were found significant p three items of all five dimensions i.e. attitudes toward green marketing, attitudes toward environmental protection, awareness about green marketing, consumer perception about green <.000.

Results

Attitudes toward green Marketing: The majority of the respondents were agree with the items; Green products are valuable to society, I am ready to pay more prices of eco-friendly products, I will prefer promotion campaign that protect environment, I will prefer those places/distribution channels which are not cause to environment pollution and Biodegradable products are useful to the society, as the mean value of these items is more than 6. and the items; I will buy eco-friendly products which are lower in quality in comparison to alternative products, I will purchase recycled products even they are more expensive and I never compromise with the environmental value when I go for purchase of domestic products were having mean value more than 5, it is clear that the consumers are ready to pay more price for those products which are causing less environmental pollution, the willingness to pay (WTP) capacity of the consumers is confirmed as reported by (Laroche et. al.2001) (Table-1). The total mean score of the variable is 49.3193, with 6.40271 (Table-6).

Attitudes toward Environmental Protection

The respondents were agree with all the items of this variable, as the mean value of all the items are more than 6, (Table-2). The result indicates that the environmental issues are very important to the people as the whole world is thinking of preventive measures for environmental pollution and global warming, the total mean value of the scale is 64.7647, 6.96066 S.D. (Table-6).

Awareness about Green Marketing: The majority of the respondents was agree with the statement that I understand the environmental phrases and symbols on product packages, the mean value of the item is 6.05, with 1.72 S.D. and .112 S.E., the mean value of rest of the items; I am aware of recycling programs in the area, I feel that I am very knowledgeable about environmental issues and I am aware about the Government policy on environmental issues is less than 6, the awareness level of the consumers about green marketing is not extremely high, the reason may be emerging and new concept for the common people (Table-3). The total mean value of the variable is 22.1933, and S.D. is 5.67068 (Table-6).

Consumer Perception about Green Marketing Strategy of the Marketers

The respondents were not agree in a good amount as the mean value of almost all the items is less than 5, except the item; Companies are maximizing their profit through eco-friendly marketing policy, the mean value of the item is 5.27 with 1.99 S.D. and .130 S.E. (Table- 4). The result indicates that the consumers are not having good perception about the policies or strategies for environmental protection adopted by the corporate houses, the total mean value is 31.5798 and S.D. is 11.84249 (Table-6).

Buying Decision:

The majority of the respondents are agree with the statement that I would like to purchase those products which are costlier but causing less environmental pollution, the mean value of the item is 6.29, with 1.57 S.D. and .101 S.E. it is confirmed with the statement that I would not like to purchase those products which are cheap but causing environmental pollution as the mean value of the item is 5.25, the S.E. is 2.45 and .158 S.E. It supports the theory of WTP which

states that consumers are ready to pay more prices for those products which are causing less environment pollution. The consumers are not keen to purchase those products which are inferior in quality but causing less environmental pollution (Mean value 5.54) and the products which are good in quality but causing environmental pollution, the mean value is 4.76.

Table-1: Attitudes toward green Marketing

S. No.	Name of the Item	Mean	S.D.	S.E.	Chi Square
1	Green products	6.71	.982	.064	900.18
2	Willingness to Pay	6.42	1.41	.091	669.66
3	Environmental Promotional campaign	6.71	.956	.062	693.51
4	Pollution Free Distribution Channels	6.40	1.50	.097	902.58
5	Product Quality of Eco-friendly Products	5.70	2.12	.137	306.45
6	Biodegradable products	6.63	1.09	.070	838.47
7	Recycled products	5.28	2.32	.150	279.00
8	Environmental value	5.47	2.30	.149	258.55

Table-2: Attitudes toward Environmental Protection

S. No.	Name of the Item	Mean	S.D.	S.E.	Chi Square
1	Contribution to Environmental Protection	6.51	1.42	.092	819.51
2	Environmental Responsibility	6.37	1.70	.110	613.51
3	Household waste	6.33	1.52	.099	796.47
4	Deterioration of Environment	6.67	.090	.058	764.05
5	Environment Priority	6.40	1.33	.086	603.10
6	Government Subsidy	6.59	1.19	.077	798.13
7	Environmental Rules	6.64	1.15	.075	859.64
8	Pollution Control	6.21	1.52	.099	641.41
9	Environmental issues	6.64	1.08	.070	818.70
10	Use of Natural Resources	6.41	1.35	.087	635.98

Table-3: Awareness about Green Marketing

S. No.	Name of the Item	Mean	S.D.	S.E.	Chi Square
1	Awareness of Recycling	5.45	2.18	.141	269.93
2	Environmental Phrases and Symbols	6.05	1.72	.112	557.17
3	Knowledge about Environmental Issues	5.34	2.05	.133	166.47
4	Government policy	5.34	2.08	.135	268.00

Table-4: Consumer Perception

S. No.	Name of the Item	Mean	S.D.	S.E.	Chi Square
1	Marketers Efforts	4.28	2.64	.171	178.16
2	Companies Priority	4.11	2.62	.170	225.88
3	Product Label Information	4.32	2.56	.166	209.17
4	Product Label Information Accuracy	4.75	2.52	.163	253.64
5	Product label Information Adequacy	4.36	2.47	.160	116.25
6	Maximizing Profit	5.27	1.99	.130	166.47
7	Eco-friendly marketing practices	4.50	2.46	.160	171.76

Table-5: Buying Decision

S. No.	Name of the Item	Mean	S.D.	S.E.	Chi Square
1	Purchase of Costly products	6.29	1.57	.101	460.40
2	Purchase of Cheap Products	5.25	2.45	.158	410.11
3	Purchase of Inferior Quality Products	5.54	2.10	.136	376.70
4	Purchase of Quality Products	4.76	2.55	.165	278.58

Table-6: Green Performance

Name of the Variables	Mean	SD	1	2	3	4
Attitude towards Green Marketing	49.31	6.40	1			
Attitudes toward Environmental Protection	64.76	6.96	.395*	1		
Awareness about Green Marketing	22.19	5.67	.357*	.415*	1	
Perception	31.57	11.84	.038	-.072	.269*	1

Relationship of Green Performance and buying decision

Consumer buying decision was categorized into four category like; costly products, cheap products, inferior quality products and good quality products, the relationship of buying decision under these four categories was analyzed with consumer attitude towards green marketing, consumer attitude environmental protection, consumer awareness about green marketing, consumer perception about green marketing strategies of the marketers. It was found that the attitude towards green marketing and perception about green marketing strategies of the marketers were having a significant correlation with the products which are costly but causing less environmental pollution; it confirms the findings of (Laroche et. al.2001) and (Heidt Tania von der, and Rose Firmin 2009) willingness to pay more (WTP) for environmentally safe products found. This factor contributes 12% in the purchase decision of a consumer. On the other hand the correlation with the cheap products causing environmental pollution was also having significant relationship and it contributes 10.6% in the purchase decision of a consumer.

The relationship with the buying behaviour of the inferior quality products and good quality products were also studied and the correlation with the purchase of inferior quality products was not significant relationship with the attitudes toward green marketing consumer perception about green marketing strategies of the marketers, as it is contributing only 3.1% in the buying decision of a consumer, however purchase of good quality products seems to have significant relationship with the attitudes toward green marketing consumer perception about green marketing strategies of the marketers, it contributes 7.1% in the buying decision of a consumer, this finding indicates that consumers are not going to purchase those products which are low in quality and safe for environment (D’Souza Clare, Siva Muthalay, Mehdi Taghian and Francisco Pereira www.wbiconpro.com).

The consumers are not going to compromise with the quality of the products for the sake of the eco-friendly products. There should be quality norms otherwise merely environmental friendly can not make the marketers to survive in the globally competitive market.

Table-7: Correlation Green Performance and buying decision

Green Performance	Costlier less pollution	Cheap causing pollution	Inferior quality causing less pollution	Good quality causing pollution
Attitude towards Green Marketing	.311**	.279**	.108	.204**
Environmental Protection	.075	.225**	.065	.097
Awareness	.144*	.041	.047	.032
Perception	.159*	-.006	.129*	.144*

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Green Performance

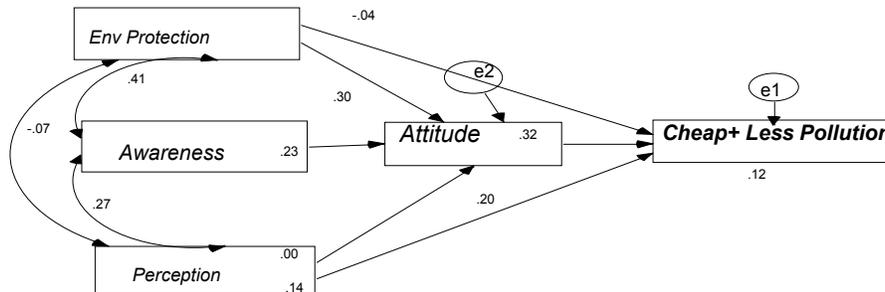
Heidt Tania von der, and Rose Firmin (2009) found that consumer’s green orientation and collectivist values are key drivers of green performance and it can be used to predict consumer willingness to pay more for environmentally safe products. The attitudes toward green marketing is having significant correlation with environmental protection and consumer awareness with the environmental issues, with it was not having significant correlation with the consumer perception about green marketing strategies of the marketers. Environmental protection was having significant correlation with the variable; attitudes toward green marketing and consumer awareness of environmental issues, but this variable does not seen any significant correlation with consumer perception about green marketing strategies of the marketers. Consumer awareness of environmental issues was having significant correlation with the variables; attitudes toward green marketing, environmental protection and consumer perception about green marketing strategies of the marketers. While the variable; consumer perception about green marketing strategies of the marketers was having significant correlation with consumer awareness of environmental issues, at 0.01 level (Table-8 & figure-1)

Table-8: Regression coefficients for different buying decisions

Buying Decision	Predictor	R ²	Beta	t	F	VIF
Costlier less pollution		.1			7.942**	
	Attitude towards Green Marketing	20	.320	4.648**	*	1.2
	Environmental Protection		-.045	-.630		52
	Awareness		.011	.146		1.3
	Perception		.141	2.162*		74
Cheap causing pollution		.1			6.924**	
	Attitude towards Green Marketing	06	.253	3.655**	*	1.2
	Environmental Protection		.183	2.527*		52
	Awareness		-.135	-1.825		1.3
	Perception		.034	.520		74
Inferior quality causing less pollution		.0			1.833	
	Attitude towards Green Marketing	31	.098	1.362		1.2
	Environmental Protection		.057	.754		52
	Awareness		-.050	-.650		1.3
						74
						1.4
						24

	Perception		.143	2.090*		1.1
						28
Good quality causing		.0			4.464**	
Pollution	Attitude towards Green Marketing	71	.210	2.973**	*	1.2
						52
	Environmental Protection		.076	1.030		1.3
						74
	Awareness		-.121	-1.606		1.4
						24
	Perception		.174	2.592*		1.1
						28

Figure-1: Structural Equation Model for Green Marketing



Model fit Indices: $\chi^2 = 0.022$, $df = 1$, $p > .883$, $CMIN/df = .847$, $RMR = 0.017$, $GFI = 1.000$, $AGFI = 0.999$, $NFI = 1.000$, $TLI = 1.067$, $CFI = 1.000$, and $RMSEA = 0.000$ (Bollen & Long, 1993)

Conclusion

It is clear from the data that consumers are having positive feeling about all the variables of green performance; attitudes towards the green marketing, attitudes toward environmental protection, consumer awareness of green marketing, consumer perception about green marketing strategies of the marketers. The consumer buying decision of costly green products was having significant relationship with the attitudes towards green marketing and consumer perception about green marketing strategies of the marketers. This finding confirms the WTP theory and brand sensitivity of the consumers, as the finding shows that consumers are not going to compromise with the quality of the products for the sake of environmental issues. The marketers should focus on the eco-friendly marketing approach in the process of product development, pricing, promotional campaign and distribution plan but at the same time should not compromise with the quality of the product.

The relationship of environmental protection and consumer awareness of environmental issues does not have any relationship with the buying decision of a consumer. This trend this indicates that an environmental activism or knowledge of environmental issues are not necessary to buy or consume a green products. A person without the temperament of an environmental activism or knowledge of environmental issues can make purchase decision of eco-friendly products because the environmental pollution and global warming issues are very common in today's society and each and every citizen of the society is aware of this issue. The marketers should make their green marketing plan for considering the values of each and every consumer.

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