INFLUENCE OF SOCIO-ECONOMIC FACTORS ON THE PRODUCTIVITY OF HOUSEHOLD INDUSTRY: A CASE STUDY OF BAMBOO-WORK INDUSTRY IN JALPAIGURI DISTRICT, WEST BENGAL

Nuruzzaman Kasemi*

Abstract

Household Industries play a vital role in the development of a developing economy like India. These industries not only raise the per capita income and standard of living of the people by providing employment opportunities but also reduce the disparities in the economic structure. Bamboo-work industry is an ancient household industry of India. An overwhelming majority of the Bamboo-work industrial unit is found in the district of Jalpaiguri, in West Bengal. Productivity of Bamboo-work industry involves a process which is accounted for the actions and reactions of numerous social and economic factors. Some of these factors directly determine the above mentioned process while some others operate indirectly. Seven factors have been identified for the productivity of Bamboo-work industry of the study area which has dominant influence. Using multiple regression model the paper attempts to examine how productivity of this industry is influenced by these identified factors. The study is based on field survey of 63 industrial units of Bamboo-work industry. The empirical analysis suggests some policy measures for the development of this industry in the study area.

Key words: Bamboo-work Industry, Factors, Productivity, Multiple Regression, Policy

Introduction

Household Industries play a vital role in the development of a developing economy like India. These industries not only raise the per capita income and standard of living of the people by providing employment opportunities but also reduce the disparities in the economic structure. Besides, the promotion of household industries provides an opportunity for the optimum utilisation of local resources to serve the local needs. However, household industries form an integral part of the structure of the Indian economy (Sinha, 1988). Bamboo-work industry is an ancient household industry of India. The industry is traditional in nature and the industrial activities are mostly carried on household basis. An overwhelming majority of the Bamboo-work industrial unit is found in the district of Jalpaiguri in West Bengal. These are mostly concentrated in rural areas. The artisan himself is the proprietor and works on his own initiative and with his own capital. Members of the family work together in a systematic way promoting division of labour in the production process to ensure to the best as far as the quality and quantity of the product are concerned. For a large number of units, the craft is not main industry, as it is mostly seasonal. The

*Assistant Professor, Department of Geography, Birpara College, P.O. Birpara, Dist. Jalpaiguri (WB); E-mail: nkasemi@gmail.com

tempo of production rises during October to March. The income of the artisan is therefore, irregular and subject to seasonal variation. The employment of additional labour is occasional and the artisan generally works with the help of his family. The process of production is by means of hands with no power and the production centre is the artisan's house. The skill of the artisan is hereditary. As scientific and technical knowledge is lacking due to illiteracy and poverty, the techniques of production remain inferior and the products lack standardization. The market of the products is mainly local and partly extended to urban areas. In addition to this, middlemen play a powerful role in marketing these indigenous products. They usually place orders with the artisan and collect materials at less than the market price. The competition from the substitutes is very keen and is a major problem for the development of this sector (Lakhsman, 1966).

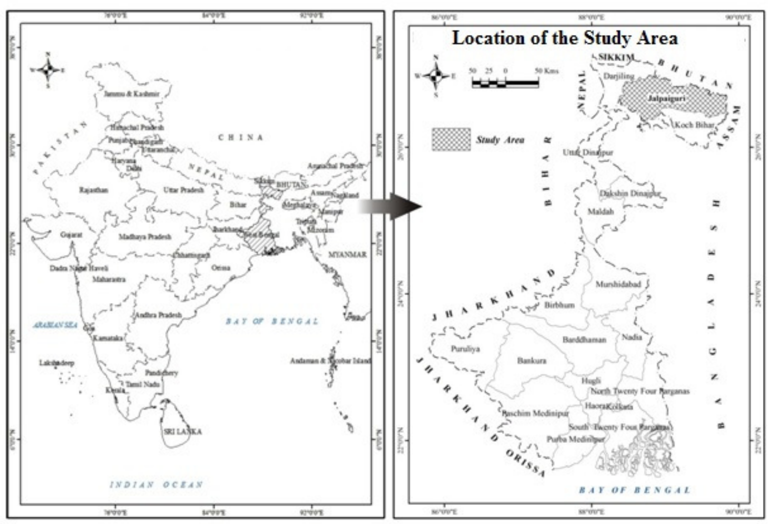

Fig.1 Location of the Study Area

Productivity of Bamboo-work industry involves a process which is accounted for the actions and reactions of numerous social and economic factors. Some of these factors directly determine the above mentioned process while some others operate indirectly (Sao, 2009). Seven factors have been identified for the productivity of Bamboo-work industry of the study area which has dominant influence. Using multiple regression model the paper attempts to examine how productivity of this household industry is influenced by these identified factors. Based on the empirical analysis some policy measures have been suggested for the development of this household industry in the study area.

Study Area

District Jalpaiguri, one of the districts of West Bengal, situated in the northern part of the state has been chosen as the study area. It is extended between 23º 16' N to 27º00' N latitude and between 88º 04' E to 89º 53' E longitudes covering an area of 6227 km^2 (Fig. 1). The total population of the district, as per the Census 2011 is 3,869,675 out of which male and female account 1,980,068 and 1, 889,607 respectively.

Objectives

The study intends to examine the influence of identified socio-economic factors on the productivity of Bamboo-work industry. Based on the results some policy measures will be recommended for the development of the sector.

Database and Methodology

The study is based on detailed field survey of 63 industrial units of Bamboo-work industry which covers 21 villages of Jalpaiguri district in the state of West Bengal, India. The dataset has been prepared from these sample units.

Multiple regression analysis, a general linear model, is a multivariate statistical technique used to examine the influence of the identified factors or variables on the productivity of Bamboo-work industry. In order to determine whether a linear relationship is present between the productivity and the independent variables, scatter diagrams were plotted showing the dependent variable (productivity) and each independent variable separately. These diagrams help to visually determine whether a linear relationship exists between the dependent and independent variables indicating the direction, linearity and strength of each relationship (independently).

Because simple linear regression is limited to one variable at a time and does not demonstrate possible interaction among independent variables, multiple regression analysis has been done in order to examine relationship and influence of each variable on productivity of Bamboo-work industry (Hair et. al., 2009). Multiple regression analysis included eliminating the variables which have confidence intervals that straddled zero (Harnett and Horrell, 1998). If a slope coefficient is zero (0), then regardless of the value of that independent variable, the dependent variable is constant. Therefore, a slope coefficient is zero (0) indicates that, this particular value will have no effect on the dependent variable in the resulting model. If zero is contained in the confidence interval, the variable is not useful in the resulting model. These are considered 'bad' variables (Harnett and Horrell, 1998; Lind, et.al., 2008) and have been removed in an iterative process (one at a time). Once the 'bad' variables were eliminated, the best model is selected by examining the standard error of the resulting model while retaining as many variables as possible. Finally, the regression equation was estimated from the data (in order to predict productivity based on the independent variables remaining in the final regression model), as well as upper and lower boundaries for confidence intervals, the standard error of the estimate and the coefficient of determination in the final multiple determination (R^2). These figures will help to determine the relationship between the dependent and independent variables.

Based on the computed data collected from the field survey the model has been constructed using statistical software SPSS-17. The method of least square has been used to estimate the equation. The identified factors / variables are symbolically expressed as follows:

Productivity per unit as defined by total revenue from sale minus cost of goods and services bought in Rs.

X_1 Standard mandays as defined by total man-hours worked per unit / 8 (taking as standard shift hour)
X_2 Age of the workers (in code taking a 5 point scale (1-5)
X_3 Experience level of the workers (in code taking a 3 point scale (1-3)
X_4 Educational level of the workers in code taking a 5 point scale (0-4)
X_5 Percentage of finished products sold to customer
X_6 Value of capital per unit in Rs.
X_7 Maximum distance (km) covered for purchase of raw materials

Table1. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.981[a]	.962	.958	1885.83170

a. Predictors: (Constant), X_1, X_2, X_3, X_4, X_5, X_6,X_7 b. Dependent Variable: Y

Table 2. Anova

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	5.373E9	7	7.676E8	215.828	.000[a]
Residual	2.098E8	59			
Total		66			

a. Predictors: (Constant), X_1, X_2, X_3, X_4, X_5, X_6,X_7 b. Dependent Variable: Y

Table 3. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1(Constant)	6889.243	1918.770		3.590	.001	3049.792	10728.694
X_1	8.739	2.924	.114	2.988	.004	2.887	14.590
X_2	69.642	27.196	.131	2.561	.053	15.223	124.061
X_3	158.001	60.705	.125	2.603	.012	36.531	279.471
X_4	155.130	51.605	.177	3.006	.004	51.868	258.391
X_5	206.638	64.320	.178	3.213	.002	77.933	335.342
X_6	.756	.167	.252	4.526	.000	.422	1.090
X_7	-78.169	20.712	-.141	-3.774	.000	-119.614	-36.724

a. Dependent Variable: Y

Results and Analysis

Scatter diagrams (Fig.2) have been created which are plotted the dependent variable against each independent variable in order to visualize the relationships between the variables and indicate such attributes as strength, direction etc. Results indicate all variables have a linear relationship. The strong positive correlation (r) of 0.899 is found in the variable educational level of the workers (X_4), and the R^2 value of 0.809 for this variable reveals that 80.9 per cent of the variation in productivity can be explained by the variation in the said variable. The lowest correlation (r = -0.739) is found in the variable distance covered for the purchase of raw materials (X_7), where only 54.60 per cent (R^2 = 0.546) of the variation in the dependent variable can be explained by the variation in this independent variable. This variable demonstrates a negative correlation with the dependent variable. The negative correlation is logical because an increase in the distance brings about an increase in transport cost which ultimately results in a decrease in productivity.

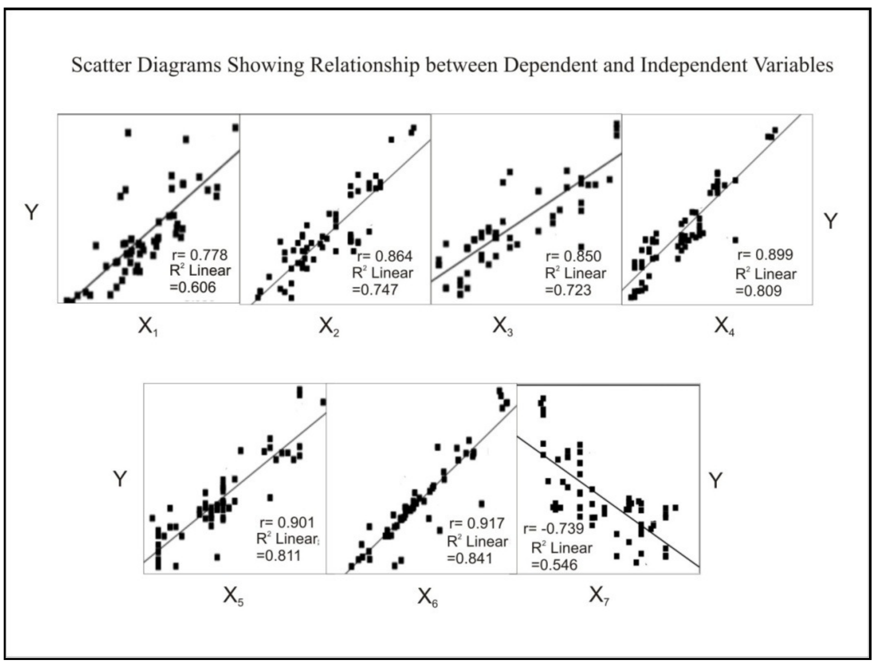

Fig. 2

From table 1 the coefficient of determination (R^2) value is found to be 0.962. It reveals that 96.2 per cent of the variability of the independent variable is accounted for by the model. Since this R-squared value is very high the regression model appears to be very useful. As with simple regression, it is necessary to look for the p-value of the F-test to see if the overall model is significant. From the anova (Table 2) p-value (0.000) is found to be less than the alpha level (0.05) which indicates a good fit of the overall model. In other words it can be said that the model is statistically significant and all the independent variables have a relationship and reliably predict the independent variable.

The coefficients from table 3 were used to develop the following equation-

$$Y \text{ predicted} = 6889.243+8.7398X_1+ 69.642X_2+158.001X_3+155.130X_4+206.638X_5 +0.756\, X_6-78.169X_7$$

The model reveals the amount of increase in productivity that would be predicted by 1 unit increase in the predictor. It can be said that the independent variables which are not significant, their coefficients are significantly different from 0. The following features have been revealed by the model:

The coefficient for standard mandays (X_1) is 8.739. It tells that for every unit increase in standard mandays, an 8.739 unit increase in productivity is predicted, holding all other variables constant. The coefficient is statistically significantly different from 0 if we use alpha of 0.05, because its p-value is 0.004 which is smaller than chosen alpha (0.05). Age of the workers (X_2) has also an increasing impact on productivity. Its coefficient value is found to be 69.642. This coefficient is not statistically significant since it is not significantly different from 0, because its p-value is found to be 0.053 which is larger than alpha. Coefficient for experience level of the workers (X_3) is 158.001 and has a favourable impact on productivity. The coefficient is statistically significant as it is significantly different from 0. Its p-value (0.012) is less than alpha (0.05). The educational level of the workers (X_4) has a coefficient value of 155.130 and is also positively related to productivity. This coefficient is statistically significant since it is significantly different from 0, because its p-value (0.004) is smaller than alpha (0.05). The coefficient for percentage of finished products sold to customer (X_5) is 206.638 and is found to be statistically significant as its p-value (0.002) <alpha (0.05). Value of capital (X_6) has a coefficient of 0.756 and is statistically significant because it is significantly different from 0 and has a p-value of 0.000 which is less than alpha (0.05). Distance (km) covered for the purchase of raw materials (X_7) has negative influence on productivity because an with increasing distance transport cost increases resulting an increase of production as well as productivity.

The Beta coefficients, known as the standardized regression coefficient are used to compare the relative strength of the various predictors within the model. These coefficients are all measured in standard deviations. From the model, value of capital (X_6) has the largest beta coefficient of 0.252 indicating that this variable has the highest impact on productivity of Bamboo-work industry than the other variables, while standard mandays (X_1) has the smallest Beta of 0.114 indicating a very low impact on the said predicted variable. The other important variables having influence next to the value of capital are percentage of finished goods sold to customers (X_5) and educational level of the workers (X_4) as revealed by their respective Beta coefficients of 0.178 and 0.177.

Conclusion and Policy Recommendations

The study reveals that all the variables have significant influence on productivity of Bamboo-work industry in the study area. All the variables positively influenced the productivity of this industry except distance (km) covered for purchase of raw materials (X_7). The adverse impact of this variable is obvious because increasing distance for purchase of raw materials increase the cost of production.

The study suggests the need of a rational policy for the development of the sector in terms of productivity increase. As per the empirical results capital, percentage of finished goods sold to the customer and education are important factors of production in Bamboo-work industry. In order to raise productivity, the basic recommendation is the improvement of skill through training and education of the artisans. The experienced and educated entrepreneurs can handle problems more professionally and competently (Remi et. al., 2010). However, the exposure to formal education is imperative as transfer of learning can be better facilitated to make acceptance of innovative technique. The government, through District Industries Centers (DICs) and other organization should make a comprehensive policy plan for such training, technical support and education. Workshops and training programmes can be organized in different blocks or at least in the clusters of this industry for the benefits of the workers. The industry suffers from scarcity of raw materials throughout the year. The wide dispersal of the artisans and their weak financial position necessitates that their small requirements of raw materials need to be made available at the needed time and at their doorsteps. As such it is recommended that a common organization should handle the raw material problems at the block and district levels. Since inadequate capital is a problem of the sector, loan should be provided to the entrepreneurs. Co-operative banks, commercial banks and rural banks can play an important role in this connection. There is an immediate need for cooperative societies organized on the sound footing so that they give a lead in the manufacture of the quality and standard products and make the artisans cooperative minded (Bhattacharya, 1980).

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