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Environment Friendly Industrial Growth for Sustainability (With Special Reference to Handicraft and Cottage Industry in Odisha)

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Abstract

Any country's environmental problems are related to the level of its economic development, the availability of natural resources and the lifestyle of its population. In India, the rapid growth of population, poverty, urbanization, industrialization and several related factors are responsible for the rapid degradation of the environment. Environmental problems have become serious in many parts of the country, and hence cannot be ignored. 80% of the total population of Odisha, a state of Eastern India depends on agriculture. But most of them are small and marginal farmers. 48% farmers households are indebted. The state, in reality, is the second poorest state in India today, next only to Bihar. Industrialization is the only alternative to develop the economic status of the state but the darker side of it is environmental pollution. Hence if the growth of industry can be accelerated along with environmental protection then a balance can be maintained. So this paper examines the growth of cottage industries in the state of Odisha through different statistical analysis as this is an eco-friendly industry and simultaneously a prospective area for the growth of indigenous talent.

Keywords: *time series; natural dye; environment; sustainability; industrialization; cottage industry*

Introduction

In Odisha 80% of the total population depends on agriculture. But most of them are small and marginal farmers and 48% farmers households are indebted. Odisha has rich mineral resources, a coastline, and for tourists, there are places of historical value, a rich heritage, mangrove forests, deep jungles. But not really been able to exploit the resources it has and remained one of the backward states of India. According to Economic Survey report for the year 2013-14, tabled in the Parliament by the Union Finance minister Arun Jaitley, the state is, in reality, the second poorest state in India today, next only to Bihar. So many people from Odisha migrate to other states for livelihood.

In 2013-14, the Gross State Domestic Product (GSDP) growth rate dropped to 2.21%. This slowdown caused a negative growth of 9.78% in the agricultural sector and also affected several other sectors. So today, Odisha stands at a Crossroad. It cannot completely depend on agriculture as this sector is in a declining trend.

Industrialization is the only alternative which can foster economic growth as employment can be generated through it. But the darker side of industrialization is environmental pollution which is the biggest concern of present time, worldwide. So if industrialization can be encouraged after taking proper care of mother Earth then this will be a very welcome step.

There is a good scope of a lot of industries like chemical, cosmetic, electronic, entertainment, fishing, food, leathermaking, manufacturing, petroleum, pharmaceuticals, plastic pulp, handicraft and cottage industries and many others. The handloom sector constitutes a distinctive feature of the rich cultural heritage of Odisha and plays a vital role in the economy and cultural identity of the country. Handloom Sector, next to the agriculture provides massive employment to the rural artisans. So far as our State is concerned, it has a rich tradition of producing handloom products. Even the skill and knowledge imbibed over the generation, has given the Odisha hand-woven textiles an unparalleled depth, range, strength, and vigor. Handloom cloth is one of the richest and resilient media of ethnic expressions. It is an ancient industry and is a source of livelihood for many villages in Odisha. Hand-woven fabrics are well-sought after both nationally and globally, weavers currently remain marginalized and often impoverished. The well-set power loom industry has further added to their woes. Handlooms represent a decentralized dispersed means of livelihood scattered over the state, environmental consonance, employment generation, skill enhancement,

cultural integrity, and sustainability. The fabrics and dyes used in the handloom industry are environment-friendly and often unique to a region. Almost all the synthetic colorants being synthesized from petrochemical sources through hazardous chemical processes poses threat towards its eco-friendliness. Hence, worldwide, growing consciousness about the organic value of eco-friendly products has generated renewed interest of consumers towards the use of textiles (preferably natural fiber product) dyed with eco-friendly natural dyes. Turmeric acts as a good natural dye as it has a good curcumin content and the turmeric produced in Kandhamal district of Odisha is certified to have an international standard. Artisan, Craftsmen and ethnic communities are practicing the process of vegetable dyeing generation after generation following old traditional methods. One of the major imperative to use natural dye is that no standardized form is available till now. Hence there is plenty of scope for rapid development in terms of agricultural production, processing and application techniques of this color on textiles. This again invites the growth of dyeing industry which gives a path to the agricultural produce and protection of the environment. This paper makes a humble attempt to study the growth of cottage industries in Odisha. For the purpose, it uses descriptive statistics and time series analysis through SPSS.

Review of Literature

Sustainability in traditional Handlooms, Nallaval Chinnaswamy Balaji, Monto Moni, Indian Institute of science, Centre for Sustainable Technologies, Bangalore comprehensively evaluates and forecasts sustainability in the context of traditional handlooms in India.

Dyeing of Textiles with Natural Dyes Ashish Kumar Samanta and Adwaita Konar Department of Jute and Fibre Technology, Institute of Jute Technology, University of Calcutta, India has tried to show that natural dyes are better than synthetic dyes and textile industries across the globe have started concentrating on this aspect.

Batik on handlooms Scott, October on fabric with natural dye, Sankar Roy Maulik, Lina Bhowmik & Khusbu Agarwal; Indian journal of traditional knowledge, vol-13(4), October 2014, pp-788-794 explains that a greater emphasis on natural dye in textile industry could make a valuable contribution to environmental sustainability in the 21st century.

A Review of Handloom Export Units In India Prof. (Dr.) Kuldeep Singh¹ and Dr. Monica Bansal² ¹Principal, JCD Institute of Business Management Sirsa ²Assistant Professor, Department of Commerce, Panjab University Rural Centre, Kauni describes the strength of Handloom lies in the introducing innovative designs, which cannot be replicated by the Power loom sector. Thus, Handloom forms a part of the heritage of India and exemplifies the richness and diversity of our country and the artistry of the weavers.

Research Theory

Approved list of handicrafts

The following craft has been approved as Handicraft Industries

| | | | |
|-----------------------|------------------------|----------------------|----------------------|
| 1. Applique | Metal Craft | Brass and Bell Metal | Horn Work |
| 2. Art Leather | Natural fiber craft | Cane and Bamboo | Tribal Jewellery |
| 3. Art Textiles | Paddy Craft | Sabai Grass Craft | Theatrical Dress |
| 4. Artificial Bonsai | Palm leaf Decorative | Clay Toys | Gopa Craft |
| 5. Artistic Foot-ware | Palm-leaf Engraving | Seashell work | Embroidery |
| 6. Artistic Mat | Paper Mache | Cloth Flower | Terracotta & Pottery |
| 7. Batik Printing | Betel-nut craft | Silver Filigree | Dhokra Casting |
| Lacquer Work | Patta & Tasar Painting | GemStone Processing | Stone Carving |

Handloom Industry

The Handloom Industry in Orissa is the largest cottage Industry providing employment and sustenance to 4 % of the population of the State. Right from producing superior artistic fabrics of excellence, this Industry also produces utility fabrics for the common masses at a cheaper cost. However, in face of teething competition in open market, the strengthening of the Industry and its diversification is the continuous need for its survival is being provided by Govt. assistance in different forms. To achieve this end, different schemes have been formulated and are working under the Textile Directorate of the state. The demographic picture of weaving sector is ST-1 % (6552), SC-30 % (123544) others –69 % (288165) having 1.19 lakh number of looms in the state. Of which 88186 nos of looms have been

brought under the cooperative fold and developmental activities are mostly being undertaken in this organized sector under the Directorate of Textiles. During 8th & 9th, five-year plan the following schemes were implemented by Directorate of Textiles through Zonal offices and all such assistance are being provided to the PWCS.

Product Range Product wise Important Clusters with high Concentration of Weaver

| | |
|--|---|
| (A) Silk tie-dye, Silk Bomkai & Cotton Bomkai Saree | Dist. - Boudh & Sonapur Blocks - 6 Looms - 6773 With a production potential of Rs. 4063.80 lakh |
| (B) Cotton tie-dye Saree and Furnishing | Dist. - Bargarh, Sonapur, Bolangir & Nuapada Blocks - 8 Looms - 8045 With a production potential of Rs. 3816.60 lakh |
| (C) Tasar thana Saree and Furnishing | Dist. - Bargarh, Jajpur, Balasore & Naptha Blocks - 3 Looms - 2424 With a production potential of Rs. 1163.52 lakh |
| (D) Khandua Silk Saree | Dist. - Cuttack Blocks - 2 Looms - 2255 With a production potential of Rs. 1217.70 lakh |
| (E) Berhampur Silk Saree Joda | Dist. - Ganjam Blocks - 1 Looms - 609 With a production potential of Rs. 292.32 lakh |
| (F) Single count Fine Cotton Saree (60s & above) | Dist. - Jagatsinghpur Blocks - 2 Looms - 2234 With a production potential of Rs. 804.24 lakh |
| (G) Medium Variety Cotton (40s to 60s) | Dist. - Jajpur, Khurda, Bargarh, Bolangir, Ganjam & Nayagarh Blocks - 10 Looms - 5563 With a production potential of Rs. 2003.47 lakh |
| (H) Coarse Variety Cotton (upto 40s) | Dist. - Bolangir, Cuttack, Khurda, Kendrapara, Nayagarh, Puri, Nuapara, Kalahandi, Kandhamal, Balasore, Bhadrak & Sambalpur, Sonapur Blocks - 36 Looms - 17220 With a production potential of Rs. 5166.00 lakh |

Objective

To study the growth pattern of cottage industries in Odisha and employment generated through it.

To find out the consistency of units established, the investment made and employment generated by the state government of Odisha in the last decade.

Research Method

Area of the survey: Odisha

Type of Data: Secondary

Source: Directorate of Handicrafts and cottage industries, Odisha

Odisha economic survey 2014-15

Analysis: Descriptive statistics

Results and Analysis

Data

Table 1

| Year | Number of units established during the year | Investment in crore | Employment generated(no of person) |
|---------|---|---------------------|------------------------------------|
| 2000-01 | 22,431 | 40.65 | 37,641 |
| 2001-02 | 26,196 | 61.72 | 36,937 |
| 2002-03 | 25,041 | 61.34 | 39,528 |
| 2003-04 | 23,287 | 67.87 | 39,743 |
| 2004-05 | 18,277 | 48.41 | 30,052 |
| 2005-06 | 13,363 | 39.42 | 22,734 |
| 2006-07 | 13,063 | 53.32 | 20,605 |
| 2007-08 | 9,011 | 38.3 | 15,368 |
| 2008-09 | 9,294 | 34.83 | 16,279 |
| 2009-10 | 14,539 | 37.55 | 28,305 |
| 2010-11 | 7,884 | 26.29 | 12,431 |
| 2011-12 | 7,293 | 30.31 | 9,187 |
| 2012-13 | 1,027 | 2.96 | 1393 |
| 2013-14 | 1,204 | 3.45 | 1507 |

Data analysis

Descriptive

Table 2
Descriptive Statistics

| | N | Range | Minimum | Maximum | Mean | | Std. | Variance | Skewness | | Kurtosis | |
|--------------------|-----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|------------|-----------|------------|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| UNITS | 14 | 25169 | 1027 | 26196 | 13707.86 | 2233.75 | 8357.91 | 7.0E+07 | .061 | .597 | -1.095 | 1.154 |
| INVEST | 14 | 64.91 | 2.96 | 67.87 | 39.0300 | 5.2230 | 19.5428 | 381.921 | -.532 | .597 | .003 | 1.154 |
| EMPLOYME | 14 | 38350 | 1393 | 39743 | 22265.00 | 3610.84 | 13510.54 | 1.8E+08 | -.138 | .597 | -1.244 | 1.154 |
| Valid N (listwise) | 14 | | | | | | | | | | | |

ACF

MODEL: MOD_1.

Variable: UNITS Missing cases: 1 Valid cases: 14

Variable: INVEST Missing cases: 1 Valid cases: 14

Variable: EMPLOY Missing cases: 1 Valid cases: 14

Analysis 1

Autocorrelations: UNITS

Auto- Stand.
Lag Corr. Err. -1 -.75 -.5 -.25 0 .25 .5 .75 1 Box-Ljung
Prob.

| | Pr | Aut | Stand. | | | |
|------|-------|------|--------|--------|-------|--------|
| 1 | .764 | .241 | . | ↔***** | ***** | 10.062 |
| .002 | | | | | | |
| 2 | .483 | .231 | . | ↔***** | * | 14.425 |
| .001 | | | | | | |
| 3 | .251 | .222 | . | ↔***** | . | 15.709 |
| .001 | | | | | | |
| 4 | .047 | .211 | . | ↔* | . | 15.757 |
| .003 | | | | | | |
| 5 | .020 | .200 | . | * | . | 15.767 |
| .008 | | | | | | |
| 6 | -.070 | .189 | . | *↔ | . | 15.905 |
| .014 | | | | | | |

Plot Symbols: Autocorrelations * Two Standard Error Limits.

Total cases: 15 Computable first lags: 13

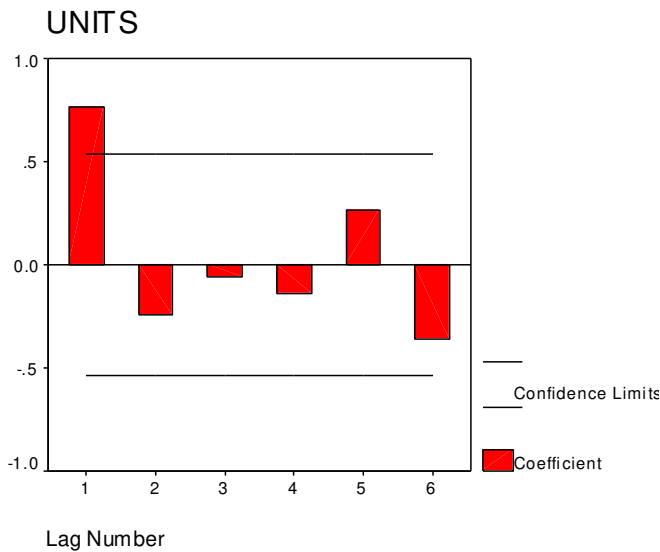
Partial Autocorrelations: UNITS

| Lag | Pr | Aut | Stand. | | | |
|-----|-------|------|--------|--------|-------|--|
| 1 | .764 | .267 | . | ↔***** | ***** | |
| 2 | -.242 | .267 | . | *****↔ | . | |
| 3 | -.059 | .267 | . | *↔ | . | |
| 4 | -.137 | .267 | . | ***↔ | . | |
| 5 | .264 | .267 | . | ↔***** | . | |
| 6 | -.357 | .267 | . | *****↔ | . | |

Plot Symbols: Autocorrelations * Two Standard Error Limits.

Total cases: 15 Computable first lags: 13

CHART-1



Analysis 2

Autocorrelations: INVEST

| Lag | Auto-Corr. | Stand. Err. | -1 | -.75 | -.5 | -.25 | 0 | .25 | .5 | .75 | 1 | Box-Ljung Prob. |
|-----|------------|-------------|----|------|-----|------|------|--------|-----|-----|---|-----------------|
| 1 | .643 | .241 | | | . | | | ↔***** | *** | | | 7.126 |
| 2 | .367 | .231 | | | . | | | ↔***** | . | | | 9.640 |
| 3 | .242 | .222 | | | . | | | ↔***** | . | | | 10.836 |
| 4 | .062 | .211 | | | . | | | ↔* | . | | | 10.923 |
| 5 | .044 | .200 | | | . | | | ↔* | . | | | 10.972 |
| 6 | -.149 | .189 | | | . | | ***↔ | . | | | | 11.598 |

Plot Symbols: Autocorrelations * Two Standard Error Limits.

Total cases: 15 Computable first lags: 13

Partial Autocorrelations: INVEST

| Lag | Pr-Aut-Corr. | Stand. Err. | -1 | -.75 | -.5 | -.25 | 0 | .25 | .5 | .75 | 1 |
|-----|--------------|-------------|----|------|-----|------|--------|--------|----|-----|---|
| 1 | .643 | .267 | | | . | | | ↔***** | ** | | |
| 2 | -.079 | .267 | | | . | | **↔ | . | | | |
| 3 | .066 | .267 | | | . | | ↔* | . | | | |
| 4 | -.179 | .267 | | | . | | ****↔ | . | | | |
| 5 | .143 | .267 | | | . | | ↔*** | . | | | |
| 6 | -.385 | .267 | | | . | | *****↔ | . | | | |

Plot Symbols: Autocorrelations * Two Standard Error Limits.

Total cases: 15 Computable first lags: 13

CHART-2

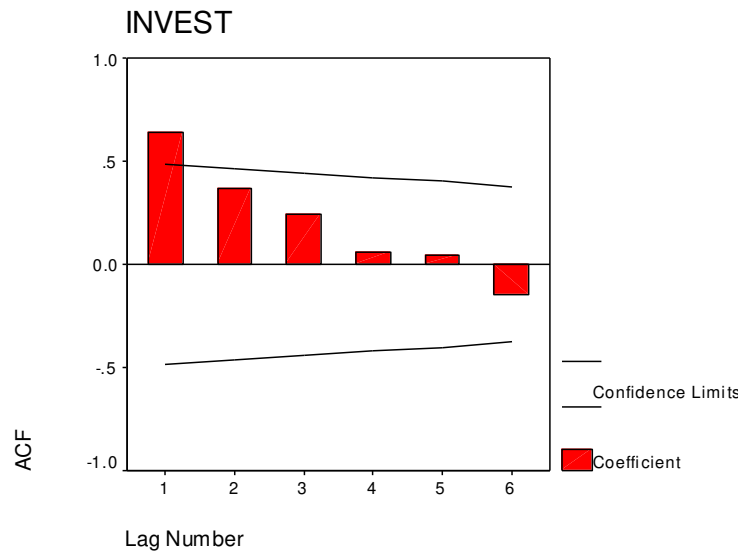
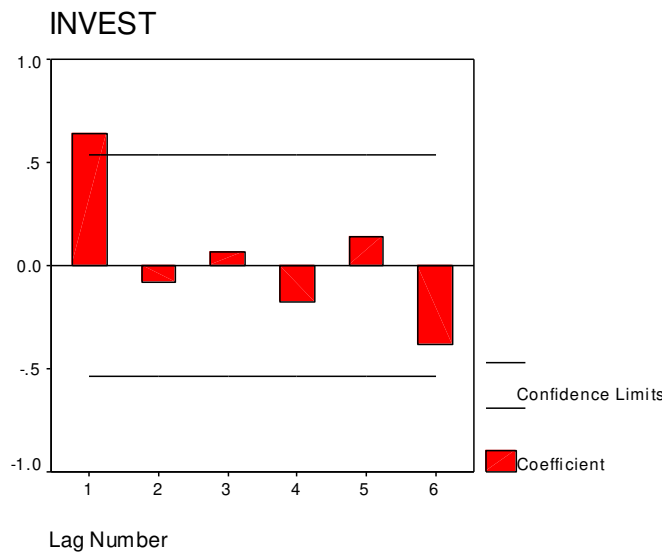


CHART-3



Analysis 3

Autocorrelations: EMPLOY

| Lag | Auto-Corr. | Stand. Err. | -1 | -.75 | -.5 | -.25 | 0 | .25 | .5 | .75 | 1 | Box-Ljung Prob. |
|------|------------|-------------|----|------|-----|------|----|--------|-------|-----|---|-----------------|
| 1 | .721 | .241 | | | . | | | ↔***** | .**** | | | 8.965 |
| .003 | | | | | | | | | | | | |
| 2 | .452 | .231 | | | . | | | ↔***** | | | | 12.783 |
| .002 | | | | | | | | | | | | |
| 3 | .219 | .222 | | | . | | | ↔**** | . | | | 13.760 |
| .003 | | | | | | | | | | | | |
| 4 | .017 | .211 | | | . | | * | | . | | | 13.766 |
| .008 | | | | | | | | | | | | |
| 5 | .039 | .200 | | | . | | ↔* | | . | | | 13.803 |
| .017 | | | | | | | | | | | | |
| 6 | -.012 | .189 | | | . | | * | | . | | | 13.807 |
| .032 | | | | | | | | | | | | |

Plot Symbols: Autocorrelations * Two Standard Error Limits.

Total cases: 15 Computable first lags: 13

Partial Autocorrelations: EMPLOY

| Lag | Pr-Aut-Corr. | Stand. Err. | -1 | -.75 | -.5 | -.25 | 0 | .25 | .5 | .75 | 1 |
|-----|--------------|-------------|----|------|-----|------|--------|--------|------|-----|---|
| 1 | .721 | .267 | | | . | | | ↔***** | .*** | | |
| 2 | -.142 | .267 | | | . | | ***↔ | | . | | |
| 3 | -.109 | .267 | | | . | | **↔ | | . | | |
| 4 | -.125 | .267 | | | . | | ***↔ | | . | | |
| 5 | .288 | .267 | | | . | | ↔***** | | . | | |
| 6 | -.222 | .267 | | | . | | ****↔ | | . | | |

Plot Symbols: Autocorrelations * Two Standard Error Limits.

Total cases: 15 Computable first lags: 13

CHART-4

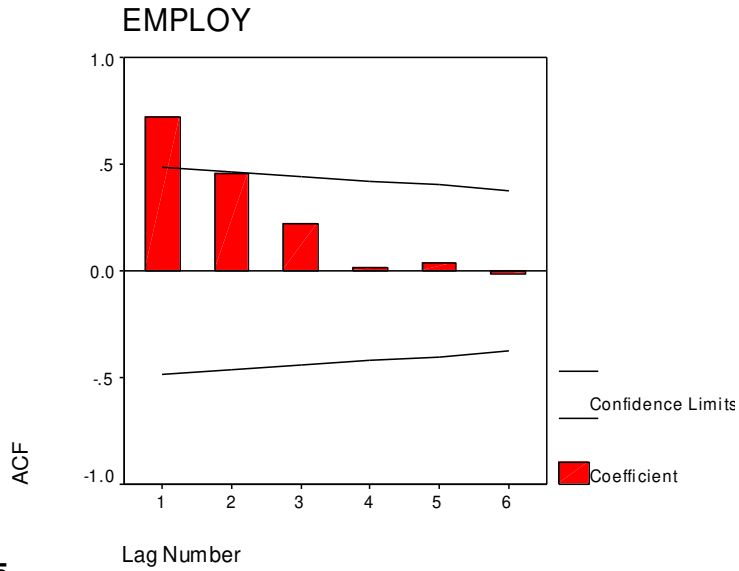
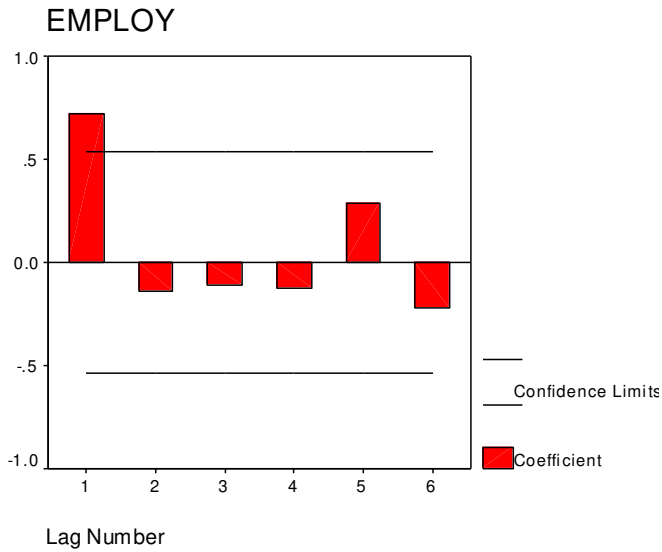


CHART-5



Analysis 4

Y=a+bt

Time is transformed to another variable X by the equation

$X=2(t-2006.5)$

So the equation is **Y=a+bX**

The two equation to find out the value of a and b are

$\sum Y=na+b\sum X$

$\sum XY=a\sum X+b\sum X^2$

Solving these two equations we have

$$a=13707.85$$

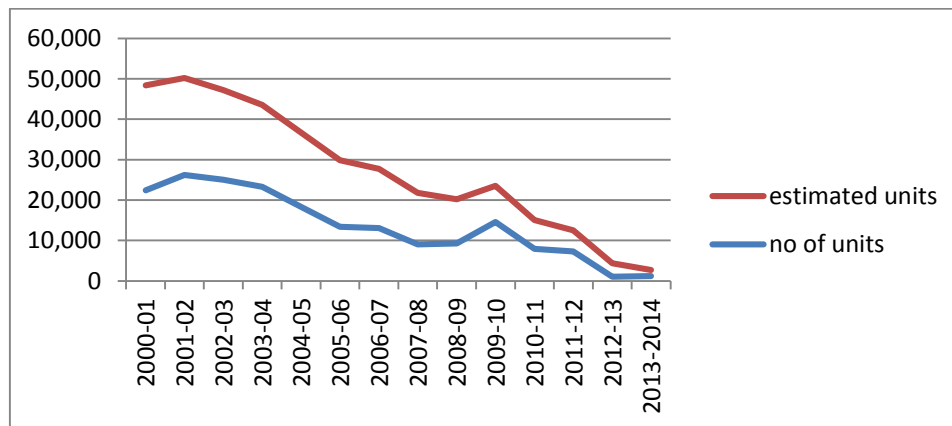
$$b=-939.90$$

Hence the equation is $Y=13707.85-939.9X$

Table 3

| Year (t) | Number of Units (Y) | $X=2(t-2006.5)$ | X^2 | XY | Y(estimated) |
|----------|---------------------|-----------------|-------|--------|--------------|
| 2000-01 | 22,431 | -13 | 169 | 291603 | 25926.55 |
| 2001-02 | 26,196 | -11 | 121 | 288156 | 24046.75 |
| 2002-03 | 25,041 | -9 | 81 | 225369 | 22166.1 |
| 2003-04 | 23,287 | -7 | 49 | 163009 | 20286.3 |
| 2004-05 | 18,277 | -5 | 25 | 91385 | 18407.35 |
| 2005-06 | 13,363 | -3 | 9 | 40089 | 16527.75 |
| 2006-07 | 13,063 | -1 | 1 | 13063 | 14647.75 |
| 2007-08 | 9,011 | 1 | 1 | 9011 | 12767.95 |
| 2008-09 | 9,294 | 3 | 9 | 27882 | 10888.15 |
| 2009-10 | 14,539 | 5 | 25 | 72695 | 9008.35 |
| 2010-11 | 7,884 | 7 | 49 | 55188 | 7128.55 |
| 2011-12 | 7,293 | 9 | 81 | 65637 | 5248.75 |
| 2012-13 | 1,027 | 11 | 121 | 11297 | 3368.15 |
| 2013-14 | 1,204 | 13 | 169 | 15652 | 1489.31 |

CHART-6



X-axis -year

Y-axis-number of units established

Analysis-5

$$Y=a+bt$$

Time is transformed to another variable X by the equation

$$X=2(t-2006.5)$$

So the equation is $Y=a+bX$

The two equation to find out the value of a and b are

$$\sum Y=na+b\sum X$$

$$\sum XY=a\sum X+b\sum X^2$$

Solving these two equations we have

$$a=38.31$$

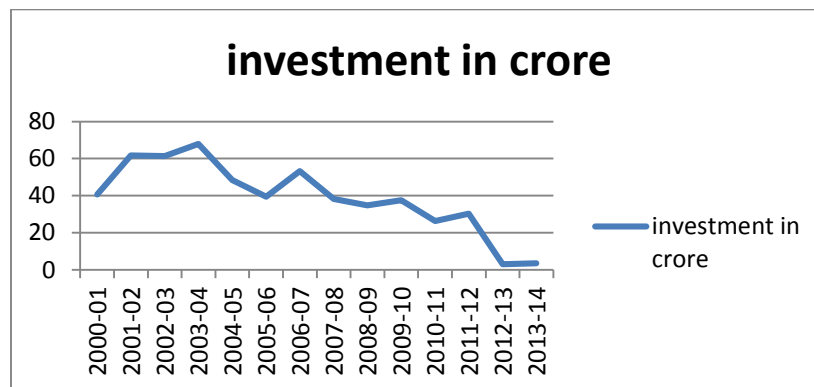
$$b=-1.95$$

Hence the equation is $Y= 38.31-1.95X$

Table 6

| YEAR(T) | Investment In Crore | $X=2(t-2006.5)$ | X^2 | XY |
|---------|---------------------|-----------------|-------|---------|
| 2000-01 | 40.65 | -13 | 169 | -528.45 |
| 2001-02 | 61.72 | -11 | 121 | -678.92 |
| 2002-03 | 61.34 | -9 | 81 | -552.06 |
| 2003-04 | 67.87 | -7 | 49 | -475.09 |
| 2004-05 | 48.41 | -5 | 25 | -242.05 |
| 2005-06 | 39.42 | -3 | 9 | -118.86 |
| 2006-07 | 53.32 | -1 | 1 | -53.32 |
| 2007-08 | 38.3 | 1 | 1 | 38.3 |
| 2008-09 | 34.83 | 3 | 9 | 104.49 |
| 2009-10 | 37.55 | 5 | 25 | 187.75 |
| 2010-11 | 26.29 | 7 | 49 | 184.03 |
| 2011-12 | 30.31 | 9 | 81 | 272.79 |
| 2012-13 | 2.96 | 11 | 121 | 32.56 |
| 2013-14 | 3.45 | 13 | 169 | 44.85 |

Chart-7



X-axis -year

Y-axis-investment in crores

Analysis 6

$$Y=a+bt$$

Time is transformed to another variable X by the equation

$$X=2(t-2006.5)$$

So the equation is $Y=a+bX$

The two equation to find out the value of a and b are

$$\sum Y=na+b\sum X$$

$$\sum XY=a\sum X+b\sum X^2$$

Solving these two equations we have

$$a=22265$$

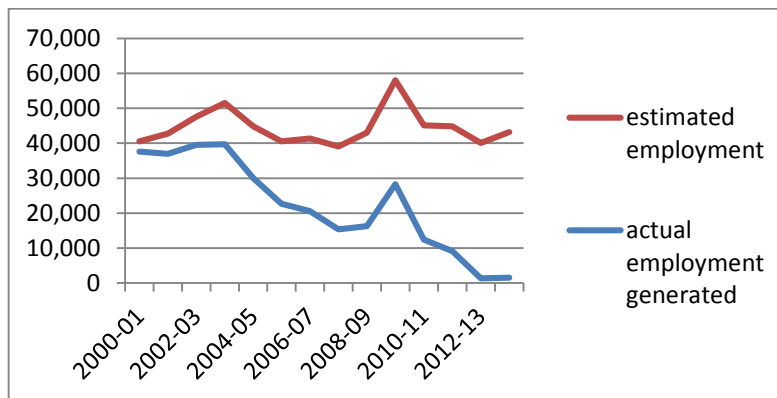
$$b=1492.65$$

Hence the equation is $Y= 22265+1492.65X$

Table 7

| Year(t) | Employment generated (no of person) | $X=2(t-2006.5)$ | X^2 | XY | Y (estimated) |
|---------|--|-----------------|-------|---------|---------------|
| 2000-01 | 37,641 | -13 | 169 | -489333 | 2860.55 |
| 2001-02 | 36,937 | -11 | 121 | -406307 | 5845.85 |
| 2002-03 | 39,528 | -9 | 81 | -355752 | 8031.15 |
| 2003-04 | 39,743 | -7 | 49 | -278201 | 11816.45 |
| 2004-05 | 30,052 | -5 | 25 | -150260 | 14801.75 |
| 2005-06 | 22,734 | -3 | 9 | -68202 | 17787.05 |
| 2006-07 | 20,605 | -1 | 1 | -20605 | 20772.35 |
| 2007-08 | 15,368 | 1 | 1 | 15368 | 23757.65 |
| 2008-09 | 16,279 | 3 | 9 | 48837 | 26742.05 |
| 2009-10 | 28,305 | 5 | 25 | 141525 | 29728.25 |
| 2010-11 | 12,431 | 7 | 49 | 87017 | 32713.55 |
| 2011-12 | 9,187 | 9 | 81 | 82683 | 35698.65 |
| 2012-13 | 1393 | 11 | 121 | 15323 | 38684.15 |
| 2013-14 | 1507 | 13 | 169 | 19591 | 41667.15 |

Chart-8



X-axis -year

Y-axis-employment generated

Findings

This horizontal line (and its mirror image on the negative side) defines the critical limits or 95% confidence interval. If a bar goes beyond the horizontal line, then it is significant. If the bar lies beyond this range, then the partial correlation coefficient is statistically significant and autocorrelation between the present and lagged values of the variable is indicated.

The first-leg partial auto-correlation is above the critical limit in a number of cottage industries established, the investment made and employment generated which indicates the presence of non-stationarity.

From chart-6 it is found that the actual number of units established and the estimated number of units show a declining trend but they chase each other very closely but from chart-8 it can be seen that there is a wide gap between the employment generated by the cottage industries and the estimated employment though in this case also

they show a declining trend. To sum up, it is found that all the three variables i.e. a number of units established, the investment made and employment generated show a declining trend.

Conclusion

Industrialization is the panacea for Odishan economy to strike a balance between growth and employment and an alternative avenue for the disguised unemployed in the primary sectors. Cottage industry, handloom industry, in particular, realizes all these objectives without much adverse impact on the environment. Moreover, while vegetable dyeing is used, replacing the chemical dye is the most acceptable dictum of the day to have environmental friendly growth. But it is seen that much care has not been taken in this area. Large-scale industries create a lot of pollution but it is being created but time has come when these type of cottage industries should be promoted which generates a lot of employment without affecting the environment leading to sustainability. Sustainable industrialization is a process of development that (1) will set and meet wealth generation and production objectives (2) will build capacity and set conditions for "triple bottom line" financial, social and environmental objectives; and (3) will provide for institutional reform and commitment to innovation in order to meet developmental objectives. It will depend upon the interplay of government and business, community, and other stakeholders to set objectives, guidelines, regulations, and incentives. New metrics will be needed in order to achieve both sustainable industrialization and its link to a well-off environmentally region.

Acknowledgments

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