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A Study of Relationship between the Total Output and Employment in Printing Industry in India

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Abstract

This paper takes a look into the relationship between the total value of output and the number of persons engaged in the printing industry in India. The study covers the period from 1980-81 to 2021-22. The Pearson Correlation

Coefficient is used to find out the nature of the relationship and the results obtained have been presented. It establishes that the relationship is a perfectly positive correlation between the two aspects of the industry.

Keywords: Printing Industry, Total Output, Persons Employed, India

Introduction

The relationship between the growth of the printing industry in India and the growth of employment in the industry is highly relevant as India is one of the fastest growing major economies of the world with highest growth among the countries of the world. The printing industry is one of the earliest and prominent contributors of the manufacturing industry in India and is one of the important providers of employment of skilled labour. Its contributions to the economic might of the country are commendable and noteworthy. The first printing press of India was established in 1556 at St. Paul's College in Old Goa by Francis Xavier, a Portuguese missionary. Thenceforth, it had grown phenomenally into a major industry. The printing industry is at the forefront of technological innovations and adoptions all through its existence in India.

The industry has spread all across India and has a number of clusters and in some cases as major industrial units. The range of its output is exhaustive and includes printing and service activities related to printing, printing of newspapers, printing of magazines and other periodicals, books and brochures, maps, atlases, posters etc., printing of postage stamps, taxation stamps, cheques and other security papers, printing of banknotes, currency notes, printing directly onto textiles, flexographic plastic, glass, metal, wood and ceramics, other printing activities like screen printing other than textile, service activities related to printing, book and other similar sheet binding on account of others, engraving, etching and block making etc. and other service activities related to printing.

The printing industry in India is classified by the National Industrial Classification (NIC) for all economic activities. The same has been revised a few times and the study is based on the classification of the industry according to the respective codes as classified in them.

- NIC Industrial Classification 1970: Divisions 2 and 3, Major Group 28, Group 284, 285, 286, 287, 288 and 289.
- NIC Industrial Classification 1987: Sections 2 and 3, Division 28, Group 284, 285, 286, 287, 288 and 289 and Class 285.1, 285.2, 285.3, 289.1, 289.2 and 289.9.
- NIC Industrial Classification 1998: Division 22, Group 222, Class 2221, Sub-classes 22211, 22212, 22213 and 22219 and Class 2222 and Sub-classes 22221 and 22222.
- NIC Industrial Classification 2004: Division 22, Group 222, Class 2221, Sub-classes 22211, 22212, 22213 and 22219 and Class 2222, Sub-classes 22221, 22222 and 22239.
- NIC Industrial Classification 2008: for all economic activities in Division 18, Group 181, Class 181, Sub-classes 18111, 18112, 18113, 18114, 18115 and Class 182 Sub-classes 18121, 18122, and 18129.

The GDP at Constant Prices of India has reached INR 150.218 trillion with a growth rate of 9.7% in 2021-22 and the manufacturing industry has contributed INR 17.098 trillion during the same period ^[1]. The printing industry, which is a

constituent of the manufacturing industry, has added a total output of INR 3.423 trillion employing 664944 persons. The industry has contributed about 13% of manufacturing output by value and 2.825% of net value added in the year 2021-22 [2].

Review of Literature

Several studies on economic performance of manufacturing industry and its contribution to economic development and employment generation has been carried out, with special reference to manufacturing industry and specific division or group of industry or industries have been carried out. Thavabalan P., *et al.* (2021) have analysed the proficiency of English for Business Communication with a view to understand the listening, reading and writing skills of the printing industry employees and concluded that relevant training can help the employees overcome the issue of communicating in English leading to better professional results for their growth [3].

Dattatreya Subash Kute and Puja Upadhyay (2016) studied the skill enhancement with regard to technical and essential skills in the changing times with the requirement of continuous learning. The research studied the enhancement of skills through training at different levels of employees in the commercial printing industry. It concluded that different levels of employee skills can be enhanced through training and in the commercial printing industry [4]. Sunderaraj R. and Mareeswaran K. (2017) have studied the human resource management practices of employees of printing industry in Sivakasi with special focus on how personnel are managed within the organisations including recruitment, traing and development, performance appraisal, rewarding, industrial relations and related oragnisational practices [5].

Nicholas Kingsley Graham and Issac (2015) have studied how employee development, empowerment and participation (EDEP) determine the quality programmes of printing firms. They have found that the EDEP are significantly related to quality achievement and participation has the greatest effect and contributes significantly to quality [6]. Vinay Kumar (2017) has studied the growth of MSMEs in India and their contribution in employment and GDP of India using Pearson correlation coefficient and found that the sector is growing at a good pace and providing increased employment opportunities [7].

Ali Yassin Sheikh Ali, *et al* (2013) have studied the working conditions and employee’s productivity in manufacturing companies in Somalia using Pearson correlation coefficient and found that there is a positive relationship between working conditions and employee productivity [8]. Marcel Behun, *et al.* (2018) studied the impact of the manufacturing industry on the economic cycle of select countries using cross-correlation to express the relation between the reference series and the time series of the cyclical indicators studied. The correlations are performed for the selected periods by applying the Pearson correlation coefficient, which reflects the linear dependence between the variables [9]. However, the author could not find any study on the relationship between the growth of the printing industry in India and its contribution in employment.

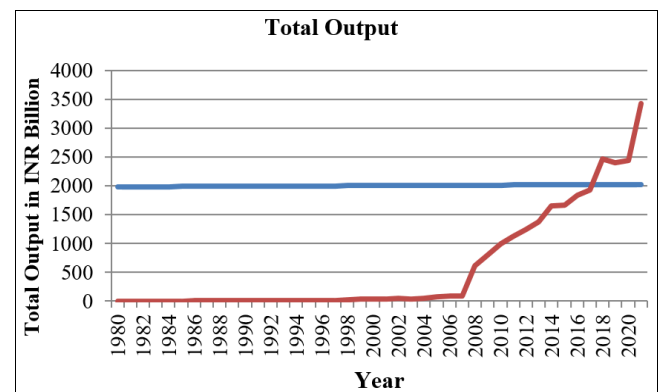
Objectives of the Study

- The study aims to understand the current status and growth of printing industry through its contribution to manufacturing output.

- The number of persons engaged by the printing industry over the study period.
- To find out the relationship between the industry’s total output and the number of persons engaged.

Research Methodology

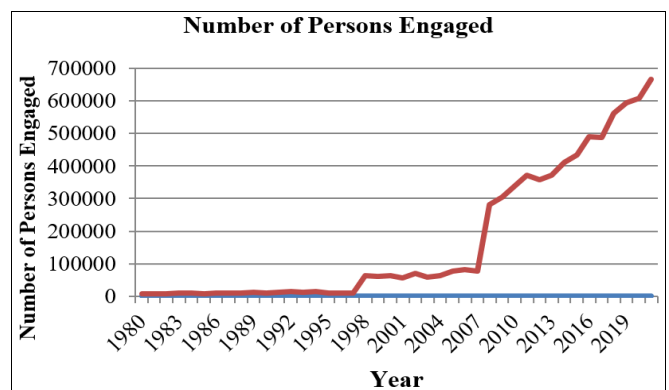
The study is based on the data sourced from the Annual Survey of Industries by Ministry of Statistics and Programme Implementation, Government of India [10], Handbook of Statistics on Indian Economy by Reserve Bank of India and Economic Survey of Government of India. The aim of the paper is to understand the level of employment and total value of output in the printing industry from 1980-81 to 2021-22. During the period of study the total value of output rose from INR 0.8461 billion to INR 3423.248 billion. The following figure illustrates the growth of total value of output of the printing industry during the period of study.



Source: Annual Survey of Industries [10]

Fig 1: Total Value of Output by the Indian Printing Industry from 1980-81 to 2021-22

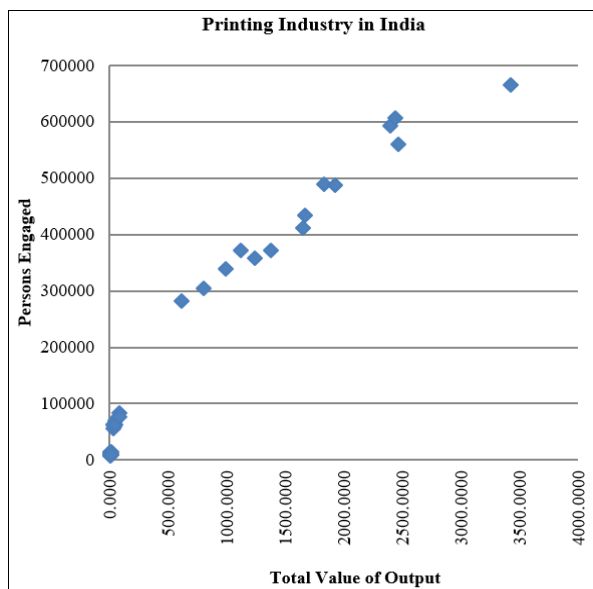
During the same period the number of persons engaged rose from 8908 to 664,944. The following figure illustrates the growth of total value of output of the printing industry during the period of study.



Source: Annual Survey of Industries [10]

Fig 2: Total number of persons engaged by the Indian Printing Industry from 1980-81 to 2021-22

The relationship between the total output of the printing industry and the total persons engaged is shown in the figure below.



Source: Annual Survey of Industries [10]

Fig 3: Total value of output and the number of persons engaged by the Indian Printing Industry from 1980-81 to 2021-22

The above details and data reveal that the printing industry’s total value of output has steadily increased over the four decades of the study period. However, the persons engaged have grown not in direct proportion. This has facilitated the industry to higher output with relatively less number of persons. This can be attributed to advancement in technology and increased skill levels of those engaged. The total output by the printing industry has increased by 37 times from 0.002 to 0.074 in proportion to the number of persons engaged during the period of study. The net value added by the printing industry has increased by 3 times from 0.0002 to 0.0007 in proportion to the number of persons engaged during the period of study. It is learnt from the above that there is a healthy positive relationship between the total output and the number of persons engaged in the industry under study.

Results and Discussion

The total output of the printing industry in India was INR 0.8461 billion in 198-81, which has increased to INR 3423.2479 billion in 2021-22. The contribution of the printing industry to total manufacturing output was 0.043% in 1980-81 and it is 13.367% in the year 2021-22. The printing industry has grown adopting newer technologies and appropriated newer opportunities for this growth. The total number of persons engaged has matched with the growth in output thereby providing employment. Correlation Coefficient for Total Value of Output and Persons Engaged of the printing industry is given Table 1 below.

Table 1: Total value of output and the number of persons engaged by the Indian Printing Industry from 1980-81 to 2021-22

Total Output of the Printing Industry		
Number of Persons Engaged in the Printing Industry	Pearson Correlation	.979
	Significance	< .05
	N	42
	R ² , the coefficient of determination	0.9584
	p-Value	< .00001
	Significance	< .05
	t-Value	-5.1841

Source: Annual Survey of Industries [10]

The correlation coefficient between the total output of the printing industry in India over the years and the number of persons engaged by the industry over the years is $r(40) = .979, p < .0001$, which is positive. The result is significant at $p < .05$ with degrees of freedom of r is 40 and is found to be positively correlated. The correlation coefficient shows that there is a perfect positive correlation between the total output and the number of persons engaged.

The purpose of this study was to examine the relationship between total output and the number of persons engaged in the industry. The data for a total of 42 years from 1980-81 to 2021-22 was considered. The mean for the total output was 584.18, with a standard deviation of 904.8281. The mean test score for the persons engaged was 169976.5, with a standard deviation of 209222.26. A paired-samples t-test was conducted to compare the means of the two groups. The p -value is 1×10^{-5} . This proves the observed result is statistically significant.

The t-test intends to find out whether there is significant difference between the means of the two groups of output and persons engaged with sample size of 42 which are independent. The t-statistic was -5.1841 with $p < .05$. The estimated t -value is -5.1841, which is not significant. The effect size for the difference between the groups was calculated using Cohen’s d , resulting in a value of 1.144977, which is considered a large effect. The result is significant at $p < .05$, which indicates statistical significance.

The results of this study indicate that there is a statistically no significant difference between the mean test scores of the total output and the number of persons engaged. These findings suggest that the study strategy there is a significant relationship between industry output and the number of persons engaged.

Conclusion

The total value of output of the printing industry has grown significantly over the study period of 42 years and has also contributed for the number of persons engaged in the industry and their relation is perfectly positive. The relationship is positive and significant. It is important to state that the industry employs literate, skilled and highly skilled manpower for its operations. However, the study has not considered the level of relationship with regard to the different skill levels and their relative output. Also the change in technologies and the efficiency of the skills acquired needs a detailed study.

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