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Manufacturing Sector in Tamil Nadu - An Analysis of Labour Productivity and Efficiency

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Abstract

Tamil Nadu stands out as a significant player in India's economic landscape, boasting the highest number of manufacturing industries and ranking as the second-largest state economy in the country. Notably, recent years have witnessed a remarkable surge in labour productivity growth within various Indian states, particularly in the manufacturing sector. To specifically gauge and comprehend labour productivity trends in the Tamil Nadu manufacturing industry, this study extensively collected secondary data on output and input factors from reliable government sources. Employing a rigorous analytical approach, the research harnessed a scatter plot to ascertain the correlation existing between wages and labour productivity. In addition to this, a simple linear regression model was applied to delineate and expound the relationship that wages share with productivity in the Tamil Nadu manufacturing sector. The results of this empirical analysis unveiled a positive relationship between the dependent variable (labour productivity) and the independent variable (wages). This observation underscores the importance of wages in influencing labour productivity, suggesting that measures aimed at enhancing wage structures can potentially contribute to increased productivity within the manufacturing sector in Tamil Nadu. In conclusion, this study not only sheds light on the existing dynamics of labour productivity in Tamil Nadu's manufacturing industry but also provides valuable insights and recommendations to stimulate and sustain further growth in this critical sector.

Keywords: Gross Value Added, Labour Productivity, Manufacturing Sector, Real Wage, Tamil Nadu.

1. Introduction

The labour market in Tamil Nadu, India, is one of the largest and most dynamic in the country. It is home to a wide range of industries, including agriculture, manufacturing, services, and tourism. The state has a young and well-educated workforce, which is a major asset.

However, the labour market in Tamil Nadu also faces some challenges. One of the biggest challenges is the informal sector, which employs over 90% of the workforce. Low wages, poor working conditions, and a lack of social security benefits are characteristic of the informal sector. Another challenge is the low productivity of the workforce. This is due to a few factors, including low levels of education and skills, inadequate infrastructure, and inefficient labour market regulations. The Tamil Nadu government has taken several steps to improve the labour market, such as investing in education and training, developing infrastructure, and simplifying labour market regulations. However, more needs to be done to address the challenges of the informal sector and low productivity. Despite the challenges, the labour market in Tamil Nadu is growing rapidly. This is due to several factors, including the state's young and growing population, rising educational attainment levels, and increasing urbanisation.

1.1 Key propensities in the labour market in Tamil Nadu

The manufacturing sector is the largest employer in the state, followed by the services sector. The agricultural sector is still important, but its share of the workforce is declining. The IT sector is growing rapidly and is a major driver of employment growth in the state. The tourism sector is also growing rapidly and is creating new jobs. Women's participation in the labour force is increasing, but it is still lower than the national average. There is a growing demand for skilled workers in the state. The Tamil Nadu government is working to create a more favourable environment for businesses and to promote job creation. The government is extending its support by increasing investment in education and training programs to improve the skills of the labourers.

The manufacturing industry is one of the vibrant sectors of the Tamil Nadu state economy, which contributes significantly to the state's industrial output. The manufacturing industry broadly includes the production of transportation parts, machinery and equipment, alloys and basic metals, metal products, and repair of capital goods. According to the Environment Information System, approximately 11 to 12 per cent of the country's total output is from the Tamil Nadu share of the industrial production and 15 per cent of the country's exports, excluding software exports. According to IBEF, Tamil Nadu is the fourth-largest state of India. It has a diversified manufacturing sector and features among the leaders in several industries, including automobiles and auto components, engineering, pharmaceuticals, garments, textiles, leather, chemicals, and plastics. It ranks first among the states in terms of the number of factories and industrial workers.

Productivity is a key source of economic growth and competitiveness. Economists use productivity growth to model the productive capacity of economies. This helps build better forecasts for business cycles, predict future GDP growth levels, and assess demand and inflationary pressures. Labour productivity is the ratio of output to labour input for a specific period. The input of labour may be taken as the number of workers or man-hours worked during the period. The ratio may be computed for one worker or group of workers in a unit of work or for the plant, depending on the need. Sometimes, labour productivity is also defined as a ratio of labour input to output, i.e., it is the input of labour time required for turning out one unit of output, and an increase in labour productivity means a reduction in this input. This is, in fact, the inverse of the ratio of the output of labour. The choice of the ratio to define labour productivity, whether by output/labour ratio or labour/output ratio, is a matter of convenience, but both will be used for the same interpretation, i.e., an increase in output/labour ratio or a decrease in labour/output ratio means an increase in labour productivity.

The International Labour Organisation explains that labour productivity is an important economic indicator that is closely linked to economic growth, competitiveness, and living standards within an economy. Labour productivity represents the total volume of output (measured in terms of Gross Domestic Product, GDP) produced per unit of labour (measured in terms of the number of employed persons or hours worked) during a given time reference period. The indicator allows data users to assess GDP-to-labour input levels and growth rates over time, thus providing general information about the efficiency and quality of human capital in the production process for a given economic and social context, including other complementary inputs and innovations used in production. The labour productivity ratio is simply output over input. The National Commission on Labour (1969) observed, "Any sustained improvement in wages cannot be brought about without increasing productivity. The urgency of improving productivity levels to sustain an increase in real wages cannot be overemphasised. It is, therefore, desirable to establish some positive relationship between productivity and wages in the interest of both employers and

employees." The development of a nation/state is based on the development of industries. The manufacturing sector has forward and backwards linkages with other sectors in the economy, not only in terms of output but also in terms of employment. Hence, the present study focused on labour productivity and wages in the manufacturing sector in Tamil Nadu.

2. Literature Review

Verdoorn, P. J. (2002) discussed the various determinants and mechanisms affecting labour productivity and its implications for economic performance. Enshassi, A., Mohamed, S., Mustafa, Z. A., & Mayer, P. E. (2007) explored the factors that influence labour productivity in construction projects specifically within the Gaza Strip. The authors investigate how local conditions and constraints impact the efficiency of labour in the construction industry. Durdyev, S., and Mbachu, J. (2011) examined on-site labour productivity within the New Zealand construction industry. It identified key constraints and provided measures to enhance labour productivity, focusing on the construction sector in New Zealand. Kornieva T, Varela M, Luís AL, Teixeira N. (2022) assessed labour productivity and the factors contributing to its improvement in the European Union and Ukrainian economies. The study investigated how various economic and institutional factors influenced labour productivity in those regions. Dale Jorgenson and Kevin Stiroh (2018) examined the trends and determinants of labour productivity in the US manufacturing sector from 1959 to 2016 and analysed factors such as technological advancements, changes in the workforce, and the impact of government policies on manufacturing productivity over this period. It investigated how various service industries have evolved and identified the key drivers of labour productivity growth in this sector. Factors like the adoption of information technology, shifts in consumer demand, and service sector regulations are discussed. Labour Productivity in the UK: An Industry-Level Analysis, 1997-2016 by the Office for National Statistics. This study likely delves into the labour productivity dynamics within various industries in the UK and provides insights into the disparities in productivity growth among industries, as well as any policy implications. It identified the areas where improvements are needed for economic growth. Australian Bureau of Statistics (2018) analysed labour productivity trends in the Australian economy spanning over two decades. It discussed the factors contributing to changes in productivity, such as resource allocation, technological innovation, and workforce skills. The National Bureau of Statistics of China's (2018) "Labour Productivity in the Chinese Economy" explored the evolution of labour productivity in China's economy from 1995 to 2016. It could discuss the impact of China's economic reforms, the shift from agriculture to industry and services, and the role of state policies in driving productivity changes. Understanding Chinese labour productivity is of global importance given its economic significance. Each of these papers likely conducts an in-depth analysis of labour productivity within its respective region and industry, providing insights into the factors influencing productivity growth and its implications for economic development and policy.

3. Objective

- To examine the relationship between labour productivity and wages in the Tamil Nadu manufacturing sector from 2008-09 to 2017-18.
- To identify the factors that contribute to labour productivity growth in the Tamil Nadu manufacturing sector.

4. Methodology

The data were gathered from the National Statistical Office and Annual Survey of Industries (ASI), Ministry of Statistics and Programme Implementation, Government of India, for the period 2008-09 to 2017-18. The study has taken State Gross Value Added (SGVA) as a measure of output. The SGVA constant price was used to find out the real value of SGVA for which two base periods were taken, for the first period between 2008-09 and 2010-11, the base year was 2004-05, and from 2012-13 to 2017-18, the base year was 2011-12. The total number of persons engaged was taken as a measure of input. The wholesale price index for the manufacturing industry and the Consumer Price Index for Industrial Workers (CPI-IW) were collected from the Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Government of India.

5. Measured variables utilised in the assessment

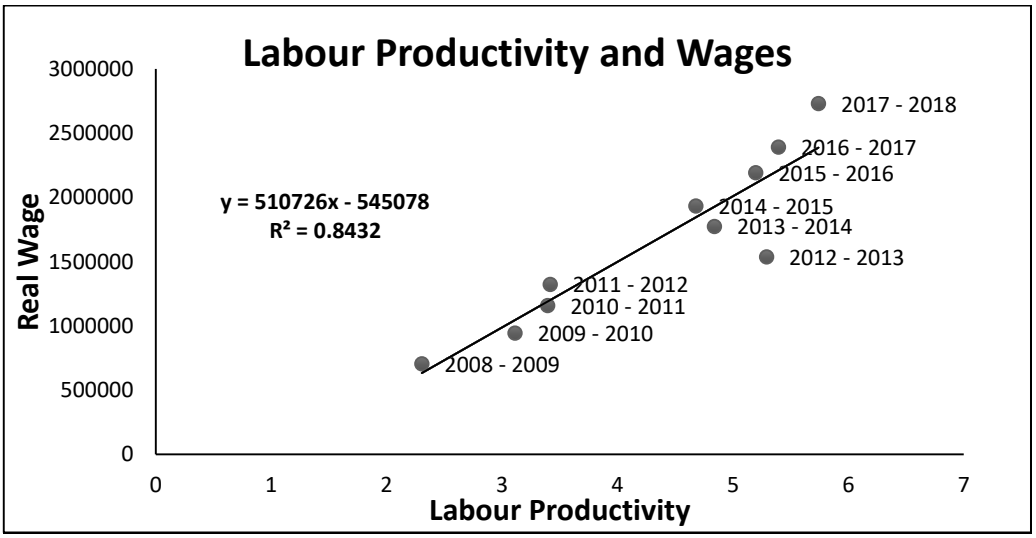
To measure the output level of the Tamil Nadu state manufacturing sector, the State Gross Value Added (SGVA) has been selected instead of the State Net Value Added, due to the presence of capital depreciation deductions. To eliminate the inflationary tendency in the values of goods and services, the State Gross Value Added at current prices was deflated using the general wholesale price index of 2004-05 and 2011-12 as the base years, as the data set spans from 2008-09 to 2017-18.

Labour productivity is normally measured by the total output to labour input for a specific time. Bagavathi Muthu (2016) 'The use of man-hours worked' is often regarded as a better measure as it includes the number of workers as well as the working hours in a day. However, it has been pointed out that the consumption of man–hours in ASI is carried out by multiplying the number of workers in a shift by eight and both by the actual duration of the shift and then aggregating such products across factories. So, the resultant series does not measure the actual man-hours worked. International Labour Organisation (1996) labour productivity represents the total volume of output (measured in terms of Gross Domestic Product, GDP) produced per unit of labour (measured in terms of the number of employed persons or hours worked) during a given time reference period. Hence, the total number of employees has been taken as a labour input.

To measure the wage rate of employees, the wages of workers were taken into consideration. To eliminate the appreciation and depreciation in the money value, the wage amount was deflated using the Consumer Price Index for Industrial Workers (CPI-IW). The ratio between the real wage and the total number of employees was used to calculate the wage rate. Then the relationship and the movements between wage rate and productivity were examined by keeping the wage rate as a dependent variable and labour productivity as an independent variable.

A scatter plot has been created to find the association between the dependent variable (y) and the independent variable (x).

Figure 1 Labour Productivity and Wages in the Tamil Nadu Manufacturing Sector from 2008-09 to 2017-18.



Source: Author's calculations based on Annual Survey of Industry.

The graph shows that there was a strong association between labour productivity and wages in the Tamil Nadu manufacturing sector. The wage rate increases when labour productivity rises. This reveals a positive relationship between labour productivity and the real wage, but labour productivity increases less than wages. Wages per employee increased from Rs. 7 lakhs in 2008-09 to Rs. 27 lakhs in 2017-18.

Although scatter plots provide the relationship between dependent and independent variables. The simple linear regression model was used to identify the simplest relationship of a straight-line or linear relationship. The sign of the linear regression coefficient explains whether the variables have a positive or negative correlation between each independent variable and the dependent variable.

Table 1 Simple Regression Results: Labour Productivity on Wages in The Tamil Nadu Manufacturing Industry

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-545077.640	348762.710		-1.563	.157
	Labour productivity (X)	510725.600	77871.921	.918	6.559	.000

Note: Wage (per employee); R2 = 0.843, adjusted R2 = 0.824; standard error of the estimate = 274932.8661; F = 43.014, $p < 0.001$.

Source: author's calculations based on the Annual Survey of Industry.

The analyses of labour productivity on wages from the period 2008-09 to 20017-18 are given in the table. The simple linear regression model yields the results of the analysis.

$Y = a + bx$

Wages = -545077 + 0.918 Labour Productivity

It indicates that an increase of Rs. 5,45,077 per person employed enhances labour productivity and raises wages by Rs. 5,10,725 per employee. The R^2 value was 0.843, the p-value was 0.000, and the F-value was 43.014, which was statistically significant.

The high labour productivity in the manufacturing industry will reduce the wastage that occurs during the production process, which also lowers the cost of production and increases the industry's profit. The most productive workers need to be appreciated with rewards and recognition to drive their effectiveness further. The least productive workers must be encouraged by providing enough training to gain more skills. The labourers must be given proper training, amenities, perks, and fringe benefits so that they can perform effectively, contributing to organisational growth, which will increase the industry's and the nation's output, as well as provide opportunities to showcase their skills effectively.

Recommendations

- Recognise and reward the most productive workers.
- Provide adequate training for the least productive workers.
- Invest in labourers by providing proper training, access to amenities, perks, and fringe benefits.
- Promote innovation and technological advancement. This can help to improve production efficiency and reduce costs.
- Invest in infrastructure. good roads, reliable electricity, and efficient ports are essential for the smooth functioning of the manufacturing sector.
- Create a skilled workforce. This can be achieved by expanding access to education and training programs.
- Support small and medium-sized enterprises (SMEs). SMEs play a vital role in the manufacturing sector, but they often face challenges in accessing capital and technology. By providing support to SMEs, the government can help boost their productivity and competitiveness.

Conclusion

The study analysed the impact of labour productivity on wages in the Tamil Nadu manufacturing industry. It revealed that there was a positive relationship between the variables. The manufacturing sector can have a greater impact on state economic development, and it can attract a larger population as a labour force, which provides more employment opportunities to a highly populated nation like India. Hence, this sector needs more attention for its sustainable development.

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