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ANALYSIS OF LABOUR PRODUCTIVITY-WAGE LINKAGES IN THE TEXTILE INDUSTRY: EVIDENCE FROM HARYANA

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ABSTRACT
This research paper looks at growth, labour productivity, and wage associations with the textile industry in the state of Haryana and in the NIC-131 and NIC-139 sectors. The trend, correlation, and regression methods has been used to analyse secondary data on the Annual Survey of Industries (2008-09 to 2021-22) of the survey. Both sectors reported a rise in employment and NIC-139 had a higher growth. Real wages and NVA recorded peak growth of 1.05% and 1.13% in NIC-131 (2016–17), while NIC-139 showed 0.58% wage growth (2011–12) and 0.81% NVA growth (2012–13). Correlation findings show that there are positive significant relationships between wages and NVA (r= 0.924 in NIC-131 and r= 0.976 in NIC-139). Regression results show labour productivity significantly affects wages (β=0.497, R^2=0.67 in NIC-131; β=0.382, R^2=0.55 in NIC-139). The textile industry in Haryana greatly depends on labour productivity that influences the rate of wage growth and development.

KEYWORDS: *Textile manufacturing, labour productivity, engagement, NVA, Wage*
JEL Code: L6, L67

1 INTRODUCTION

Haryana is a growing economy in India. Developed robust textile centres in Haryana such as Panipat, Gurugram, Faridabad, Hisar and Sonepat. Production of in cotton Haryana is the fourth largest in India and shares approximately six per cent of the country. Easy accessibility of raw materials provides Haryana with a competitive advantage in the textiles sector, which provides employment to approx. one million people in Haryana. That is why readymade garments cotton are one of the major exports of Haryana. The textile industry is a labour-intensive industry, it provides large employment after agriculture not only in Haryana but also in India. Trained and Untrained workers are working in textiles Manufacturing. It is a significant contribution to the economy. Haryana is a textile hub across the whole value chain. The district of Panipat is famous for handloom products terry towels etc. Gurugram is a hub of manufacturing readymade garments. Faridabad is the industrial hub of Haryana and is famous for fabric manufacture. Sonipat is famous for technical textiles. Bhiwani is the centre of non-woven textiles. The textile industry is the focus sector for Haryana and has the probability of creating high worth and revenue realization. The government of Haryana has a set of incentives by the Enterprises Promotion Policy 2015 to encourage the textile sector. Haryana has set up cluster-based progress tactics to encourage industries in textiles and handloom. According to, the Statistical Abstract of Haryana 2022-23 Cotton production was 223285 lakh in 2010-11 and 883670 lakh in 2022-23.

Growth in Engagement, Labour productivity and Wages in the manufacturing of Textile

The relationship between earnings and labour productivity in the textile industry shows a positive but moderate correlation, indicating that wage rates are moderately associated with productivity levels. (Norina, et al 2019).The paper analyses the progress and relationship between labour productivity and earnings in Indian textile manufacturing, a significant employment sector after agriculture in India. (Ahlawat & Renu, 2018).Higher wages due to unionization in Indian cotton mills led to increased labour productivity, countering the notion that low productivity was solely due to union resistance. (Gupta, 2016). Low wages in Indian cotton mills due to surplus labour led to low productivity. Unionization increased wages, prompting managers to enhance productivity by employing fewer workers per machine in unionized mills. (Gupta, 2010). The paper analyzes factors influencing labour productivity in textile enterprises but does not specifically address the relationship between labour productivity and wage rates in the textile industry. (Tukhtabaev, 2021). The study focuses on the association between real wage rate and labour efficiency in the industrial division in India, not specifically in the textile industry. (Chakraborty, 2018). The study shows that wages significantly affect labour productivity in PT. Delta Merlin Sandang Textile, while incentives do not. Wage structuring methods include performance-based and seniority-based. (Rauuf, et al 2022). The paper discusses the relationship between labour efficiency and export competitiveness in Indian textile manufacturing, emphasizing the importance of productivity-based wages to enhance competitiveness. (Dhiman & Sharma, 2019).Wage rates in the textile industry are influenced by direct and indirect aspects leading to disparities among workers, as discussed in the study on South India's global production system. (Ramamurthy, 2021). Hourly wage rates and piece rates in the textile industry show high similarity, with time rates resembling disguised piece rates due to close output monitoring, leading to work intensification and exploitation. (Chand, 2012). Increased female presence in the textile industry empowers women economically but also exposes them to gender-based violence,

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harassment, and poor working conditions, highlighting gender disparity in employment. (Li, 2023). Gender diversity in the Tanzanian textile industry influences employee performance, with affective engagement positively influencing adaptive, contextual, and task performance, partially mediated by gender diversity. (Amsi, 2022). The study explores gender differences in employment in India's unincorporated textile sector, highlighting states with high female ownership and employment, particularly in weaving industries. (Swami & Padma, 2015). The research highlights gender disparity in the textile industry, where women face low wages, poor working conditions, occupational health issues, and discrimination in employment based on age and gender. (Sivasubramanian, 2019).

2. OBJECTIVES OF THE STUDY

1. To analyse the progress and structure of the workforce involved in the textile industry in Haryana.
2. To investigate the progress in engagement, net value added and wages by textile manufacturing in Haryana.
3. Examine the correlation between the progress of net value added, man-days, real wages and entire engagement in textiles manufacturing in Haryana.
4. To study the effect of labour productivity on wage rate in textile manufacturing in Haryana.

3. HYPOTHESIS OF THIS STUDY

H01: The labour productivity does not affect the wage rate in the NIC industry code 131.
H02: The labour productivity does not affect the wage rate in the NIC industry code 139.
H03: The rise of real wages, NVA, man-days, and entire engagement in Haryana's textile sectors do not significantly correlate with each other.

4. MATERIALS AND METHODS

The present study is based on secondary information. The data has been extracted from an annual industry survey (ASI) published by the Ministry of Statistics and Programme Implementation (MOSPI). The information is analysed in two industry groups and the classification of textile manufacturing in both groups in the three-digit code based on the National Industrial Classification (NIC-2008). As per National Industrial Classification, the first group of industry Code-131 includes the following Spinning, Weaving and Finishing of Textiles

As per National Industrial Classification, the second group of industry Code-139 include Manufacture of Other Textiles
The data from 2008-09 to 2021-22 are included in this research. The Pearson correlation coefficient has applied to indicate the correlation among real wages, employment, man-days working, and net value added. To identify, the influence of labour productivity on wage rate is examined through simple linear regression analyses. The following formula has been used to calculate Labour productivity and Wage rate:

$$\text{Wage rate} = \frac{\text{Total emoluments}}{\text{No. of people engaged}}$$

$$\text{Labour productivity} = \frac{\text{Net value added}}{\text{No. of people engaged}}$$

5. RESULTS AND DISCUSSION

Table 1 analyses the arrangement of workforces involved in the textile manufacturing information from 2008-09 to 2021-22. This period trend of male and females workers is growing but indicates a males' participation is more in association with females in the industry. In other words, gender disparity exists in the textile industry. In NIC- code-131 first group of industry workers indicate an upward trend from 2008-09 to 2021-22, with a peak in 2016-17 and after that a slight decline.

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Table 1. Arrangement of Workforces Involved in Textile Manufacturing in Haryana

Group	Years	No. of Person Engaged	Workers		Employees other than workers		Unpaid
			Men	Women	Supervisory and Managerial	Other Employees	Family Members/ Proprietor etc.
NIC-131 Spinning weaving and finishing of textiles	2008-09	15228	9667	586	1174	1687	59
	2009-10	15423	9771	499	1757	1527	41
	2010-11	14097	9355	596	1659	1246	96
	2011-12	16543	10914	577	1663	1934	46
	2012-13	13812	8623	863	1906	1290	42
	2013-14	19595	10419	912	3195	3443	202
	2014-15	18845	11177	713	1810	2454	157
	2015-16	15889	10059	946	1688	1634	255
	2016-17	31799	23103	1198	1946	2399	198
	2017-18	19870	11514	1268	1895	1893	286
	2018-19	21490	13506	978	1954	1631	235
	2019-20	23666	13382	1142	2029	2428	241
	2020-21	24749	13741	1703	1862	2128	264
	2021-22	26220	13724	1760	1719	2093	304
NIC-139 Manufacture of other textiles	2008-09	18686	10920	445	1707	2530	28
	2009-10	23458	15430	201	1895	1527	42
	2010-11	23131	13369	235	1960	2243	47
	2011-12	27235	14136	309	2610	3092	67
	2012-13	24063	13822	364	2339	3128	98
	2013-14	25881	15225	405	2569	3053	182
	2014-15	38409	20306	985	3178	4592	164
	2015-16	34395	18998	750	3083	4015	164
	2016-17	44059	26429	1413	4303	4694	211
	2017-18	48187	28180	1020	4265	5402	228
	2018-19	52970	29205	1654	5107	6172	298
	2019-20	52910	28856	1754	4679	5782	201
	2020-21	58205	30884	2544	4859	5537	251
	2021-22	75856	33488	2557	5357	6303	237

Source: Collected from ASI from 2008-09 to 2021-22 by MOSPI

Women workers generally increase over the period, with fluctuations. Supervisory and managerial have increased, showing growth in higher-level employment. NIC-139 (manufacture of other textiles) workers show significant growth, mainly visible from 2014-15 onwards. Women workers indicate progressively growing. Supervisory and managerial indicate a stable increase, reflecting progress in managerial roles. In NIC-139, there is a visible decay in unpaid workers over time, signifying a shift towards paid employment.

Overall Growth**:** Both groups of industries indicate an overall rise in the number of workers and other employees over the years.
The data advocates a positive growth trend in textile manufacturing employment in Haryana, with rises in both worker numbers and managerial positions.

Table 2 provides insights into the progress of the textile manufacturing in Haryana, NIC-code-131, real wages experienced a peak growth rate of 1.05 per cent in 2016-17 and a decline of -0.31 per cent in 2017-18. Man -days per employee fluctuate over time. High growth of 1.10 per cent in 2016-17 and significant negative growth of -0.50 per cent in 2016-17. Employment growth was most prominent in 2016-17 with an increase of 0.83 per cent and a decline in subsequent years. NVA high growth of 1.13 per cent in 2016-17 and a decline of -0.40 per cent in 2017-18. Several factories grew from 273 in 2008-09 to 516 in 2021-22.

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Table 2. Growth of Textile industry in Haryana

NIC131	Year	Real wage	Man-days per Employee	Total employed	NVA	Real wage	Man-days per Employee	Employment	NVA	No. of factory
	2008-09	15576	355.14	15228	44935	-	-	-	-	273
	2009-10	14668	312.46	15423	28194	-0.06	-0.12	0.01	-0.37	291
	2010-11	15658	308.01	14097	38371	0.07	-0.01	-0.09	0.36	404
	2011-12	22544	309.68	16543	57676	0.44	0.01	0.17	0.50	410
	2012-13	20411	312.84	13812	37022	-0.09	0.01	-0.17	-0.36	339
	2013-14	25619	322.89	19595	57247	0.26	0.03	0.42	0.55	447
	2014-15	30815	314.99	18845	63781	0.20	-0.02	-0.04	0.11	471
	2015-16	30062	156.56	34395	46080	-0.02	-0.50	0.83	-0.28	460
	2016-17	61669	328.09	31799	98132	1.05	1.10	-0.08	1.13	473
	2017-18	42387	319.78	19870	59159	-0.31	-0.03	-0.38	-0.40	525
	2018-19	48418	312.75	21490	84539	0.14	-0.02	0.08	0.43	481
	2019-20	53325	307.83	23666	89812	0.10	-0.02	0.10	0.06	463
	2020-21	48541	277.18	24749	86674	-0.09	-0.10	0.05	-0.03	515
	2021-22	57461	301.75	26220	122956	0.18	0.09	0.06	0.42	516
NIC139	2008-09	18329	305.14	18686	39818	-	-	-	-	152
	2009-10	21257	301.85	23458	50486	0.16	-0.01	0.26	0.27	198
	2010-11	23050	303.57	23131	48438	0.08	0.01	-0.01	-0.04	226
	2011-12	36345	305.01	27235	71539	0.58	0.00	0.18	0.48	303
	2012-13	29108	302.2	24063	129242	-0.20	-0.01	-0.12	0.81	336
	2013-14	37387	303.07	25881	93060	0.28	0.00	0.08	-0.28	324
	2014-15	57489	301.56	38409	133724	0.54	0.00	0.48	0.44	443
	2015-16	59731	108.86	95609	119051	0.04	-0.64	1.49	-0.11	407
	2016-17	89723	302.43	44059	171625	0.50	1.78	-0.54	0.44	489
	2017-18	93739	298	48187	167479	0.04	-0.01	0.09	-0.02	528
	2018-19	122202	300.45	52970	240175	0.30	0.01	0.10	0.43	703
	2019-20	120171	298.03	52910	220877	-0.02	-0.01	0.00	-0.08	624
	2020-21	127227	279.06	58205	263832	0.06	-0.06	0.10	0.19	642
	2021-22	177244	302.34	75856	359863	0.39	0.08	0.30	0.36	697

Source: Annual Survey of Industry (ASI) from 2008-09 to 2021-22 by MOSPI

NIC-139 (manufacture of other textiles) indicate the real wage is significantly high growth of 0.58 per cent in 2011-12 and 0.39 per cent in 2021-22. Man-days per employee's highest increase of 1.78 percent in 2016-17. Total employed had a high growth of 1.49 per cent in 2015-16 and smaller variation in other years. Net Value Added has significant growth of 0.81 per cent in 2012-13 and 0.36 per cent in 2021-22.

Overall, the textile industry in Haryana has experienced significant growth, with fluctuations in wages, employment, and productivity metrics. NIC-139 has shown more consistent growth compared to NIC-131. The number of factories has increased substantially in both sectors, indicating sectoral expansion.

Association Matrix of Net Value added, real wages and man-days per employee, engagement in Textile manufacturing of Haryana

An association matrix is calculated for the relative progress of all variables like real wages, man-days, NVA and entire engagement in both groups of textile industries.

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Table 3. Association of first group industry of four variables in Haryana
First group of Industry Code: 131

	Real wages	Man-days	Employment	NVA
Real wage	1			
Man-days	-0.041	1		
Employment	0.702	-0.618	1	
NVA	0.924	0.072	0.580	1

Source: Author's calculation

Table 3. Show a strong positive correlation between real wages and employment. It indicates that real wages increase and employment tends to increase as well. This shows significant at the 5% level. Real wages and NVA between robust positive correlations are likely to be significant at the 5% level. All the other pairs have no significant correlation. The study found that moderate to strong positive correlation between employment and NVA. It is indicated that real wages and employment are similar to real wages and NVAs in the textile sector in Haryana.

Table 4. Association of second group industry variable in Haryana
Second group of industry Code: 139

	Real wages	Man-days	Employment	NVA
Real wage	1			
Man-days	0.014	1		
Employment	0.690	-0.705	1	
NVA	0.976	0.037	0.657	1

Source: Author's calculation

Table 4 represents a strong positive correlation between real wages and employment. There is high real wages are related to high employment levels. It is likely to be significant at 5 per cent. Real wages and NVA between robust positive correlations. This correlation is highly significant at the 5 per cent level. Man-days and employment represent a strong negative correlation. The other remaining pairs have no significant correlations. The null hypothesis is rejected in only two pairs one is real wage and employment and the second is real wage and NVA. Thus, all found employment increase with growth in real wage rate in the together groups of manufacturing.

Influence the wage rate through Labour productivity in the textile industry in Haryana

Labour productivity defines the growth of the textile industry. This study examined the influence of labour productivity on the wage rate defined in textile manufacturing in Haryana. To find the effect of labour productivity, this is the equation study has been applied:

$$y = \alpha + \beta . X + \varepsilon$$

y = is the Wage rate of textile employees
α = is the intercept
β = is the Regression coefficient
X = is the Labour productivity of textile employees

Table 5. Simple Linear Regression among Labour Productivity and Wage Rate in Haryana

Industry	Constant	β	t- value	R-Square	F-Value	P-Value
code-131	26119.49	0.497	4.72	0.67	22.29	0.001
code-139	40727.87	0.382	3.63	0.55	13.21	0.004

Source: Author's Calculation

Table 5 shows the first group of industry a one-unit increase in the labour productivity found in a 0.497 per cent increase in wage rate. For other industry code-139, the increase is 0.382 per cent. This indicates higher labour productivity are associated with higher wage rate in both industries. The t-value of both industries is statistically significant at a five per cent level. In the first group of industry, 67 per cent of the variability in productivity is described to wage rate, the second group of industry, 55 per cent is explained. The F-value tests the overall significance of the model in both industries. The P-value indicates there is strong evidence that labour productivity has a significant effect on wage rates in both industries. Overall analysis shows labour productivity is a vital factor in influencing wage rate in both industries.

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6. CONCLUSION

The study concluded that the first group of industry code-131, overall labourers and other than labourers increased over time. Women workers generally increase but fluctuate, on other textile industry code-139 women workers progressively increase compared to industry code-131. The second group of industry like manufacturing of other textiles is more consistent progress in real wage, employment, man-days per employee, and net value added compared to spinning, weaving and finishing of textiles. Both groups of industries shows that strong association among the employment and wage rates and similar real wages and NVA. The simple regression analysis indicates labour efficiency has a strong significant effect on wage rate in both groups of textile industries in Haryana.

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