

FACTORS AFFECTING PRODUCTIVITY IN TIRUPUR GARMENT INDUSTRY

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ABSTRACT: The Tirupur heartland of the India's knitwear is a major source of foreign exchange for the country. Productivity improvement is crucial for the industry to meet the competitiveness and earn more profit. The aim of the present study is to analyze and identify the critical success factors which affect the productivity of Tirupur Garment industry. The present study used the convenient sampling method to select the samples. Expert opinion method and questionnaire method has been used for collecting the data. The study has made an analytical research design. Factor analysis was carried out based on the data collected from 20 firms with 23 factors. The study aims to identify the factors in all the departments such as human resources, production, and quality control which all are affecting the productivity of the organization. The study identifies that the process and human resource factors have the greatest impact on productivity out of the total 23 factors. Technology plays a vital role in increasing productivity. But due to high investment required, entrepreneurs do not switch over to technological upgradation. The study suggests to make awareness about the benefits of adopting newer technologies such as increased rate of production, reduced overhead costs, reduced material handling time and lead time among the entrepreneur. Another major factor which affects the productivity is machine maintenance. In many cases machine problems are due to mishandling of the machine by the workers and improper maintenance. The study suggested that workers should involve in maintenance of the machines and should provide proper training in basic machine handlings.

Key words: Productivity, Factors affecting Productivity, Garment Productivity, Tirupur Garment Industry.

1. INTRODUCTION

The manufacturing sector plays a vital role in any economy by generating direct and indirect employments and by contributing to the growth of overall gross domestic product (GDP) that provides a foundation for growth in other sectors of the economy. Manufacturing companies try to redefine, redesign and improve their production systems to meet the competitiveness of cost among the low wage economies and the established players prefer to move up the manufacturing value chain to compete on technology and innovation of present market. One of the most important manufacturing towns of India is Tirupur, it is an important trade center of India and one of the largest contributing sectors of India's export. It has gained universal recognition as the leading source of Hosiery, Knitted Garments, Casual Wear and Sportswear. The present study analyzes the factors affecting productivity in Tirupur garment Industry.

2. SIGNIFICANCE OF THE STUDY

The Garment Industry of Tirupur, one of the industries competing in the global market earning foreign exchange. Improving the productivity is the only option to keep hold the market share of these industries. The industries had made a tremendous effort to improve the productivity through technology advancement. In order to improve the manpower skill, the Ministry of Textiles, Government of India has an ambitious scheme entitled integrated skill Development scheme to trained manpower at various levels viz., managerial, technical and operator level. The study aims to identify the factors in all the departments such as human resources, production, and quality control which are affecting the productivity of the organization.

3. OBJECTIVES OF THE STUDY

- To analyze the factors influencing the productivity in Tirupur Garment industry.
- To aim at diagnosing factors that contribute to productivity of Tirupur Garment Industry.
- To generate suggestions for increasing the productivity of the industry with growing demands.

4. DATA AND METHODOLOGY

The present study has selected 20 companies based on the turn over of the company and collected the opinions of 5 experts from each company. A sample of 100 respondents has been taken for the study. Convenient sampling method is used to select the samples. Expert opinion method and questionnaire method has been used for collecting the data. The primary data is collected using a structured questionnaire was built based on five-point Likert scale (1- strongly disagree, 2-disagree, 3-neither agree nor disagree, 4- agree, and 5- strongly agree). This questionnaire consisted of 23 factors affecting productivity and the respondents were collected from about 20 companies in Tirupur. The study has made an analytical research design. Factor analysis was carried out based on the data collected from 20 firms and 23 factors.

5. REVIEW OF LITERATURE

A select review of literature related to this study are;

Dolage et al. (2010) [1], investigates the influence of the adoption of Flexible Manufacturing Technology (FMT) on the Total factor Productivity Growth (TFPG) of Malaysia Manufacturing Industry using the two situations, one, including the industry fixed effects dummy variables and the other without these, are contrasted which account for the greater variation in FMT show positive and moderately significant relationship with TFPG.

Rajesh Bheda et al. (2007) [2], have studied 22 variables and grouped them in 5 factors for improving productivity of apparel industry. The correlation and ANOVA methods were used. The factors were quality, age of workers, number of machines, technology and lead time. They concluded that technology and quality were more important factors.

Liu & Li (2012) [3], have studied the growth factors in China's manufacturing industries, industrial productivity, technological progress and efficiency and concluded that China's industrial strength is based mainly in input growth, and the improvement in technical progress.

Bhaskaran (2013) [4], has studied the variables affecting productivity in apparel manufacturing industry and critical success factors were determined using descriptive statistics. The factors were number of machines installed, WIP, quality. Further they have recommended strategies for productivity improvement.

Sharma & Mishra (2010) [5], have examined the interrelation between exporting and productivity performance by using a representative sample of Indian manufacturing firms over the period 1994–2006 and concluded that entering in the export market does not improve productivity performance but exit from the export market does have an adverse effect on the productivity.

Bhandari and Maiti (2010) [6], Joint Secretary, Ministry of Textiles, Government of India identifies key reasons leading to fall in productivity level are India's eroding cost competitiveness across products, extremely fragmented nature of the industry, technological obsolescence. He also asserts that since textiles, especially garments is a labour intensive activity there is a crying need to reform labour laws for achieving high productivity and to improve tight delivery schedules.

Nikolaos Bilalis et al. (2007) [7], attempted to analyze the "Production Structure of the Indian Textile Industry" by estimating a Translog production functions, in which capital, labour, energy materials and liberalization index are the input determinants. The study covered the period of 1979-2002 and a separate analysis carried out for the pre- (1979-1991) as well as post-liberalization (1991-2001) period. The results revealed that the post-liberalization growth in productivity was less than that of the pre-liberalization. The factors that influenced productivity are also identified and found the entrepreneurial skill ratios as negative and low throughout the period of study.

Kulkarni P.R et.al (2014) [8], they made an attempt to find the factors responsible for productivity of 'Solapur based Textile SMEs'. A survey work of 164 textile manufacturing SMEs was carried out. Factor analysis which shows that there are eight factors affecting productivity of this sector viz., synchronization of management processes, TPM for weaving and dyeing, input process quality, HR policies for textile SMEs, process technology, labor behavior, use of scientific tools and techniques and systems deployment.

Summaiya and Satish (2013) [9], their aim of the study is to determine the critical success factors affecting productivity of power loom industry. The result of the study shows that human factors and technological factors are the two most important factors affecting productivity.

6. FACTORS AFFECTING PRODUCTIVITY IN TIRUPUR GARMENT INDUSTRY.

Productivity may be defined as a measure of the ratio between quantifying the output against the amount of input of resources of production. Output means the quantity produced and inputs are the various resources employed, e.g., land, building, machinery, materials and labor. Productivity refers to the efficiency of the production system. It is an indicator of how well the factors of production (land, capital, labor and energy) are utilized. There is a range of research studies take place across the world to identify the factors influencing productivity in manufacturing sector. Based on the literature review the present study comprised it both the internal as well as external factors those are applicable to garment manufacturing industries. There were 23 factors under consideration which are classified into five groups namely (A) process factor (B) human resource factor (C) product factor (D) control factor and (E)) external factor.

Sl.No.	Factors	Attributes
I.	Process Factor	<ol style="list-style-type: none"> 1. Maintenance 2. Lead Time 3. Production Standards 4. Level of Technology 5. Management Goals 6. Yarn Quality
II.	Human Resource Factor	<ol style="list-style-type: none"> 1. Training 2. Motivation 3. Labour Turnover 4. Labour Relations 5. Absenteeism and Lateness 6. Bonus 7. Wages

I.III.	Product Factor	1. Flexibility 2. Quality 3. Optimum Volume 4. Cost
IV	Control Factor	1. Inventory/Availability of Raw materials 2. Rejection Level 3. Repair Level
V	External Factor	1. Plant Location 2. Market Demand 3. Export Destination 4. Workers Education

7. RESULTS AND DISCUSSION

Using all the 23 variables extracted from the five Factors viz., Maintenance of the Machines(X1), Lead Time(X2), Production Standards(X3), Level of Technology(X4), Yarn Quality(X5), Management Goals(X6), Availability of Raw material(X7), Market Demand(X8), Export (X9), Worker Education(X10), Training(X11), Motivation(X12) Labour Turnover(X13), Labour Relationship(X14), Absenteeism and Lateness(X15), Increment of Wages(X16), Bonus(X17) Inventory(X18), Rejection Level(X19), Repair Level(X20), Quality(21), Optimum Volume(X22), Cost(X23), and Factor analysis is performed in order to group these variables on priority basis based on the strength of inter-correlation between them, called ‘Factors’ and cluster these variables in to the factors extracted and the results are presented in the following tables.

**Table: 7.1
Variables**

Variables	Factors											Community
	1	2	3	4	5	6	7	8	9	10	11	
Machine Maintenance (X1)	-0.8	-0.1	0.1	0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	0.2	0.7
Lead Time (X2)	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.9	0.0	0.0	0.1	0.8
Production Standards (X3)	-0.1	0.1	0.1	-0.1	0.0	0.8	0.1	0.0	0.0	-0.1	0.0	0.7
Level of Technology(X4)	0.7	-0.1	0.2	0.0	-0.2	-0.1	0.1	0.0	0.2	0.1	0.1	0.6
Yarn Quality (X5)	-0.1	0.0	0.1	0.1	0.1	0.0	-0.1	0.1	0.0	0.1	0.8	0.8
Management Goals (X6)	0.0	0.2	0.1	-0.3	0.1	-0.5	0.1	-0.2	0.2	-0.5	-0.1	0.8
Availability of Raw Materials (X7)	0.2	0.0	0.0	-0.2	0.4	0.2	0.5	-0.1	0.1	0.0	0.3	0.7
Market Demand (X8)	0.0	0.1	-0.1	-0.1	0.0	-0.1	0.0	-0.1	0.1	0.8	0.1	0.8
Export Barriers (X9)	-0.4	0.1	0.7	-0.2	-0.1	0.1	0.2	-0.1	0.0	-0.1	0.0	0.8
Workers Education(X10)	0.0	0.1	0.2	0.3	0.6	0.4	0.0	-0.2	0.1	-0.1	-0.3	0.7
Training(X11)	0.1	0.1	0.0	0.1	-0.6	0.1	0.0	-0.1	-0.1	0.0	-0.1	0.5

Motivation (X12)	0.3	-0.1	0.3	0.1	0.3	0.0	0.0	-0.4	-0.2	0.1	0.1	0.6
Labour Turnover(X13)	-0.1	0.7	0.1	0.2	0.1	-0.1	0.1	0.0	0.0	0.3	0.0	0.6
Labour Relationship (X14)	-0.3	0.0	0.0	-0.1	0.1	0.0	-0.3	0.1	0.6	0.0	-0.3	0.6
Absenteeism and Lateness(X15)	0.0	0.0	-0.2	0.7	0.0	0.1	-0.1	-0.2	0.1	-0.1	0.2	0.7
Increment of wages and salaries(X16)	0.0	0.0	-0.1	-0.1	0.0	0.0	0.8	0.1	-0.1	0.0	-0.2	0.7
Bonus (X17)	0.1	-0.1	-0.1	0.2	-0.3	0.3	-0.1	0.0	0.6	-0.1	0.2	0.7
Inventory management (X18)	0.2	0.0	0.7	0.1	0.1	0.1	-0.1	0.0	0.0	-0.1	0.1	0.6
Level Rejection(X19)	-0.2	0.0	0.2	0.7	0.0	-0.3	0.0	0.3	0.1	0.0	-0.1	0.7
Repairing Level(X20)	0.2	0.1	0.5	-0.2	-0.1	0.0	-0.2	0.4	-0.1	0.3	-0.3	0.7
Quality (X21)	0.0	0.7	-0.2	-0.2	0.2	0.1	-0.3	0.2	0.0	-0.1	0.0	0.7
Optimum Output(X22)	0.2	0.1	0.0	0.0	0.3	-0.2	0.1	0.0	0.7	0.1	0.0	0.6
Cost(X23)	0.1	0.8	0.1	0.0	-0.3	0.0	0.1	0.0	0.1	-0.1	0.0	0.7
Eigen value	1.7	1.7	1.6	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	15.9
% var exp	7.6	7.2	6.9	6.5	6.0	6.0	5.9	5.9	5.8	5.7	5.5	69.1
Cum % V exp	7.6	14.8	21.7	28.2	34.2	40.2	46.1	52.0	57.8	63.6	69.1	

THE KMO AND BARTLETT'S TEST OF SPHERICITY

The use of KMO and Bartlett's test of sphericity is primarily essential to measure sample adequacy for using Factor Analysis. The small value of KMO statistics indicate that the correlations from pair of variables cannot be explained by other variables and the Factor analysis may not be appropriate.

Table 7.2
KMO and Bartlett's test

Kaiser-Meyer-Olkin	Measure of sample adequacy	0.587766
Bartlett's test of Sphericity	Approx. Chi-square	306.5253
	DF	253
	Sig	0.011944

Table 7.3
Reliability Statistics

Cronbach's Alpha	N of items	N of variables
0.687	100	23

The internal consistency is estimated by Cronbach's alpha reliability coefficient normally it ranges from 0 and 1. The Cronbach's alpha value for 23 variables is 0.687, which is higher than 0.6, therefore it suggests a satisfactory reliability.

Table 7.1. gives the rotated factor loadings, communalities, eigen values and the percentage of variance explained by the factors. Out of the 23 variables, 11 factors have been extracted and these 11 factors put together explain the total variance of these variables to the extent of 69.1 %. In order to reduce the number of factors and enhance the interpretability, the factors are rotated. The rotation increases the quality of interpretation of the factors. There are several methods of the initial factor matrix to attain simple structure of the data. The varimax rotation is one such method to obtain better result for interpretation is employed and the results are given in Table 7.4.

Table 7.4
Clustering of Variables

Factor	Variables	Rotated Factor Loadings
I(7.6%)	Machine Maintenance (X1)	-0.8
	Level of Technology(X4)	0.7
II(7.2%)	Labour Turnover(X13)	0.7
	Quality(X21)	0.7
	Cost(X23)	0.8
III(6.9%)	Export Barriers(X9)	0.7
	Inventory management (X18)	0.7
	Repairing level (X20)	0.5
IV(6.5%)	Absenteeism and Lateness(X15)	0.7
	Rejection Level(X19)	0.7
V(6.3%)	Workers Education(X10)	0.6
	Training(X11)	-0.6
VI(6.0%)	Production Standards (X3)	0.8
	Management Goals(X6)	-0.5
VII(5.9%)	Availability of Raw Materials(X7)	0.5
	Increment of wages and salaries(X16)	0.8
VIII(5.9%)	Lead time(X2)	0.9
	Motivation (X12)	-0.4
IX(5.8%)	Labour Relationship(X14)	0.6
	Optimum Output(X22)	0.7
X(5.7%)	Management Goals(X6)	-0.5
	Market Demand(X8)	0.8
XI(5.5%)	Yarn Quality(X5)	0.8

Eleven factors were identified as being maximum percentage variance accounted. The two variables namely Machine Maintenance (X1) and Level of Technology(X4) were grouped together as Factor I and accounts 7.6% of the total variance. The three variables namely Labour Turnover(X13), Quality(X21) and Cost(X23) constituted the Factor II and accounts 7.2% of the total variance. The three variables namely Export Barriers(X9), Inventory management (X18) and repairing level (X20) constituted the Factor III and accounts 6.9 % of the total variance. The two variables namely Absenteeism and Lateness(X15) and Rejection Level(X19) constituted the Factor IV and accounts 6.5 % of the total variance. The two variables namely Workers Education(X10) and Training(X11) constituted the Factor V and accounts 6.0 % of the total variance. The two variables namely Production Standards (X3) and Management Goals(X6) constituted the factor VI and accounts 6.0 % of the total variance. The two variables namely Availability of Raw Materials(X7) and Increment of wages and salaries(X16) constituted the Factor VII and accounts 5.9 % of the total variance. The two variables namely Lead Time(X2) and Motivation (X12) constituted the Factor VIII and accounts 5.9 % of the total variance. The two variables namely Labour Relationship(X14) and Optimum Output(X22) constituted the Factor IX and accounts 5.8 % of the total variance. The two variables namely Management Goals(X6) and Market Demand(X8) constituted the Factor X and accounts 5.7 % of the total variance. One variable namely five constituted the Factor XI and accounts 5.5 % of the total variance Thus the factor analysis condensed and simplified the 23 variables and grouped into 11 factors explaining 69.1% of the variability of all the 23 variables.

The above factor analysis results identified as the 11 factors out of 23 variables which are more influence on the productivity of the companies. Among the 11 factors Machine Maintenance and the level of Technology are the prime factor classified as Factor I for affecting the productivity of organization. The negative sign of machine maintenance variable implies that the most of the companies are fail to maintain the machines properly. For achieving the high productivity, the companies are updated their production technology and should give proper care to maintenance of the machines and tools. The human resource factors Labour turnover, motivation and training, absenteeism and lateness were influenced more than 6% to productivity. Among these factors the labour turnover is the unending problem in Tirupur garment industry. For attaining high productivity level, the companies should overcome this HR related problems through retain their labours and provide adequate training to their labourers.

8. CONCLUSION

Based the above analysis of the study it is clear that out of the total 23 factors influencing productivity, process and human resource factors has the greatest impact. The technology plays a vital role in increasing productivity. But due to high investment required, entrepreneurs do not switch to technological up gradation. This can be solved by make awareness about the benefits of adopting newer technologies such as increased rate of production, reduced overhead costs, reduced material handling time and lead time.

To increase the higher productivity in garment industry must adapt the proper training to their employees inside the plant. Implementation of labour training and motivational programs increase the rate of higher productivity and reduce the mishandling of the machines. In many cases machine problems are due to the worker not having received correct training in basic machine handlings.

Another major factor which affects the productivity is machine maintenance. A poorly maintained machine can be inefficient. It will also have frequent breakdown and quality problems. In many companies machines are maintained only when they break down. Proper maintenance of machines to prolong their economic life, reduce breakdowns. Machine maintenance should therefore be planned and coordinated with supervisors and workers. Workers should be involved in machine maintenance.

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