

An investigation of productivity efficiency of apparel export manufacturing units of Jaipur

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■ **ABSTRACT :** Apparel industry plays a significant role in the industrial growth. The apparel manufacturing activities have been shifted from developed to developing countries. The developing countries, like India and many other Asian countries earn valuable foreign exchange by exporting apparel. In order to sustain in global market, it, is essential to eliminate exploitation of labour, remove the existing labour inequalities and have a fashion forward approach towards the manufacturing process. There is a need to improve the performance on quality, productivity and technology. The apparel industries in Rajasthan are mainly concentrated in Jaipur. There are approximately 350 apparel manufacturing units in Jaipur. The present study aims to explore the current production system of apparel manufacturing units and examine the productivity efficiency of apparel manufacturing units. The data were collected from managers/supervisors/ industry owners of 150 apparel export industries through interview schedule. In order to find the productivity, the output was converted into standard equivalent product for physical measurement (labour productivity). The performance was evaluated in terms of product and time. The units were evaluated on the basis of productivity and results revealed that some of the units were unaware of many issues on the productivity especially in production process. At the time when the apparel manufacturing in India is making efforts to become globally competitive, this study would prove a useful reference for productivity enhancements and attaining higher efficiencies.

■ **KEY WORDS :** Apparel manufacturing units, Productivity, Efficiency, Labour productivity

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Textiles and apparel industry plays a pivotal role in the Indian economy. It constitutes 14 per cent of total industrial production of the country and is the second largest employer after agriculture in India (Olsen and Thomas, 2008). The first two quarters of financial year 2009-10 were unfavourable for garment exporters (Nair, 2010). Today, apparel exports from India have made inroads into the international market for their durability, quality and beauty. One of the reasons for the economical pricing of India's readymade garments and apparel is the availability of highly skilled, cheap labour in the country. Its productivity is pre-dominantly driven by workers sewing skills. At present clothing manufactures require low inventory and quick response system that can turn out a wide variety of products to meet the customer demand.

The production rate of manufacturing organization is linked with many factors; critical among them is higher productivity with minimum defects in their process and products, which is not possible without higher rate of quality. The ability to improve productivity and quality has little to do with resources, programmes, and techniques, but depends more on attitudes, corporate philosophy, and operating systems.

Productivity is the quantitative relationship between what we produce and the resources used. In simple words productivity is concerned with the efficient utilization of resources (input) in producing goods (output). Productivity is expressed in terms of efficiency (Bheda, 2004).

Productivity is measured by achieving towards established goals based on relationship between input and

output. The output in garment factories can be pieces of finished or produced garments. The output of sections or departments within the garment factories could be meters of the fabric inspected, cut components in cutting room, number of garments ironed in the ironing section and so on. The inputs are in terms of man- hours, machine hours, meter of fabric consumed or electricity consumed.

Productivity can be calculated as:

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$

Another productivity measure is labour efficiency, which is the time spent working productively to the total time spent on work. It analyzes and compares the productivity of a particular production line or factory that turns out specific apparel products. However, comparing productivity levels across products or operating lines can be difficult because benchmark differ from one garment to another. To compare productivity, factories economists define labour productivity as the production value added that each worker generates. In this case labour productivity equals the value of production divide by labour input. Increasing labour productivity is not only key to improve a firm's competitiveness, it is widely acknowledged as the key to improving national economic well-being. Increasing in labour productivity allows payments to workers wages to rise. With increasing productivity and wages come rising living standards. Productivity enhancements in one industry also have spillover effects in other industries, as new domestic and foreign investors are encouraged to invest in the local economy. The industrial sector diversifies, creating new sources of growth.

In the present era of tough competition and rapid development both in terms of technology and production process, every apparel industry irrespective of its size and functions has to follow some organized and systematic approach even for its mere existence. The main considerations of apparel sourcing and manufacturing decisions are lower costs, high productivity and better quality. Faced with increasing labour costs, advanced technologies for garment manufacturing processes increase productivity and produce, better quality goods, in high volume, short time cycles and at lower costs. Thus, advanced technologies and conduciveness are facing new challenges driven by the intense competition is critical for Indian garment manufacturers to remain competitive and grow.

Today manufacturers are facing intensive global competition. They are becoming increasingly aware of the importance of the modern management philosophy in providing them with a competitive advantage in a free market system (Yeung and Chan, 1999). As stated by Mannan and Ferdousi (2007), the key to competitive in the international market place is to simultaneously improve both quality and productivity on continual basis. Firms are now more concerned about customer satisfaction. The customers are now

demanding a wide variety of products at a lower cost and fast delivery. They also expect more innovative products at a competitive prize as customers have more opportunities to choose from a variety of options.

There are wide variations in the level of competency in the apparel units. The major contributors of this variation are lack of work study and lack of system to establish performance levels (Olsen and Thomas, 2008). In view the above aspect, there was a need to access the productivity to achieve cost and quality edge over the competitors. Therefore, the objectives of the study are to explore and examine the productivity efficiency of apparel manufacturing units.

■ RESEARCH METHODS

Locale of the study:

The study was confined to the apparel export houses, Jaipur city. The data were collected from 150 Apparel manufacturing Industries.

Sample selection:

A list of apparel manufacturing units of Jaipur was obtained from Apparel Export Promotion Council which revealed that there were in all 350 export units in Jaipur. The inclusion or exclusion criteria were applied on these units. The units which did not fall within this category were ignored. A new list of apparel units was prepared which fell under this category. From the list prepared, 150 units were selected randomly.

The data were collected from the managers/supervisors and Industry owners of apparel manufacturing units of Jaipur.

Inclusion criteria:

The survey was limited to those apparel manufacturing industries that were:

- Only export oriented units of apparel were considered.
- Data were taken from only sewing section.
- The units were comparable in the sense that only those firms which deal with ladies were considered.
- In order to calculate the productivity, one piece dress was considered.
- Data were taken from only those units which had more than 20 machines.
- Units where the work was carried in piece rate considered *i.e.* one worker/machine.
- The working hours, in between 10-12 hours/day were considered.

Exclusion criteria:

- Only export units were considered.
- Fabricator units were ignored.
- Machine productivity was ignored.
- Only sewing productivity was considered.

Selection method:

The data were collected with the help of interview schedule. In order to estimate the production efficiency, manufactures/supervisors/managers of the apparel units of Jaipur were approached to gather data on productivity. The schedule had questions related to number of machine, operators, helpers, checkers, duration of work shift, product sewn, average daily output etc.

Measuring productivity:

In order to get uniformity of the unit, the output was converted into standard equivalent product for physical measurement (labour productivity). The performance was evaluated in terms of product and time.

Data analysis:

After gathering the data, the data were analyzed for operator productivity and total labour productivity.

$$\text{Operator productivity} = \frac{\text{Volume of output}}{\text{Direct labour input (volume)}} = \text{dresses/shift}$$

$$\text{Total labour productivity (sewing)} = \frac{\text{Volume of output}}{\text{Direct labour input}} \quad (\text{Bheda, 2004})$$

Categorization of low, medium and high productivity units:

After calculating the total labour productivity (sewing), and sewing operator productivity of 150 units, the data were categorized relatively into low, medium and high productivity units.

■ RESEARCH FINDINGS AND DISCUSSION

The level of productivity was calculated using operator productivity. Productivity was categorized into low, medium and high productivity units. There were 46 units with low productivity with productivity level of 2-6 dresses/shift, 66 units with medium productivity with productivity level of 7-11 dresses/shift and 38 units with high productivity with productivity level of 12-16 dresses/shift (Table 1).

Characteristics of low productivity units:*General features:*

Low productivity was found in 46 units. The total labour productivity in these units was 4.65 dresses/shift and operator productivity was 5.07dresses/shift. This indicates that operator productivity was higher than total labour productivity.

The units were comparatively new, they were established 13 years back. Average annual turnover of the units was Rs. 16,10,870/- and average number of employees in the unit were 84. Major export destinations of these units are USA (37%), Japan (26%), EU (30%) and other countries (7%) like Canada, South Africa, Spain, and Sweden. The products category manufactured in these units were one piece dress in all the units. Besides shirts (16%), skirts (47%) and other garments (37%) such as children wear; trousers etc. were also manufactured. All units of this group dealt in cotton fabric such as cotton voile, cambric and cotton linen, cotton hosiery and in some units (40%) synthetic fabrics such as viscose rayon, polyester etc are also used (Table 2).

Labour practices:

The average operators working in the sewing section were 39 and average numbers of machines installed in the sewing section were 45. There were few specialized machines used in the sewing section; bar tacking machine (15%) and belt loop making machine (10%). 66 per cent units payed wages on daily basis and 34 per cent unit payed wages on monthly basis. Only 75 per cent units gave incentives to their workers.

Production:

The average production of the unit was 162 pieces/ day and average order quantity per style of this group was 10,176 pieces. The lead time of the order was 60 days (Table 2).

Characteristics of medium productivity units:*General features:*

Medium productivity was found in 66 units. Total labour productivity was 8.3dresses/shift and operator productivity was 9.01dresses /shift. The average age of establishment of the medium productivity units was 21 years which was high compared to low productivity units. Average annual turnover of the units was Rs.5,79,09090/- and average number of employees working in the units was 347. Major export destination of the units were USA (35%), Japan (28%), EU (26%)and other countries (11%) such as Canada, South Africa etc. Majority of the units have one piece dress as the major product category followed by shirt (37%), skirt (31%) and others (32%) such as children wear and trousers. Material used in the units was cotton fabrics such as cotton voile, cambric and cotton linen (100%), followed by cotton hosiery (55%), and synthetic (45%) such as viscose rayon polyester etc. (Table 2).

Table 1 : Distribution of units on the basis of total labor productivity (sewing) and operator productivity

Level of productivity	Number of units	Percentage	Operator productivity (Dresses/shift)
Low productivity	46	31%	5.07
Medium productivity	66	44%	9.01
High productivity	38	25%	13.61

Labour practices:

The average operator working in the sewing section was 136 and average number of machines installed in the sewing section was 140. Specialized machines in the sewing section were bar tacking machine (45%), belt loop making machine (33%), loop attachment machine (20%) and fusing machine (2%). 75 per cent units pay wages on daily basis and 25 per cent unit pay wages on monthly basis. 87 per cent unit give regular salary plus incentives to their workers.

Production:

The average production of the unit was 830 pieces per day and average order quantity per style of these units

was 15,140 pieces. The lead time of the order was 75 days (Table 2).

Characteristics of high productivity units:

General features:

High productivity was found in 38 units. Total labour productivity was 10.82 dresses/shift and operator productivity was 13.61 dresses/shift. The average age of establishment of the high productivity units was 24 years which is high compared to low and medium productivity units. Average annual turnover of the units was Rs.15,85,08901/- and average number of employees working in the units was 926. Major export destinations of the units were USA (40%), Japan (24%),

Table 2 : Characteristics of low, medium and high productivity units			
Characteristics	Low productivity units (n=46)	Medium productivity units (n=66)	High productivity units (n=38)
Total labour productivity	4.65	8.03	10.82
Operator productivity	5.07	9.01	13.61
Establishment of the units	13 years	21 years	24 years
Annual turnover of the units	Rs. 16,10,870/-	Rs. 5,79,09090/-	Rs.15,85,08901/-
Average number of employees in the units	84	347	926
Major export market	USA. 37% Japan 26% EU 30% Others 7%	USA 35% Japan 28% EU 26% Others 11%	USA 40% Japan 24% EU 21% Others 15%
Major product	One piece 100% Shirt 16% Skirt 47% Other 37%	One piece 100% Shirt 37% Skirt 31% Others 32%	One piece 100% Shirt 19% Skirt 58% Others 23%
Material used	Cotton 100% Hosiery 60% Synthetic 40%	Cotton 100% Hosiery 55% Synthetic 45%	Cotton 100% Hosiery 65% Silk 20% Synthetic 15%
Average operator in the sewing section	39	136	368
Average machines in the sewing section	45	140	380
Specialized machines in the sewing section	Bar tacking machine 15% Belt loop making machine 10%	Bar tacking machine 45% Belt loop making machine 33% Loop attachment 20% Fusing machine 2%	Bar tacking machine 65% Belt loop making machine 50% Loop attachment 30% Fusing machine 8% Computerized embroidery machine 25% Computerized sewing machine 10%
Salary scheme Daily/ Monthly	Daily 66% Monthly 34%	Daily 75% Monthly 25%	Daily 60% Monthly 40%
Salary incentives	75%	87%	82%
Average production per day	162 pieces/day	830 pieces/day	2967 pieces/day
Average order quantity (pieces)	10,176 pieces	15140 pieces	24,340 pieces
Average lead time	60 days	75 days	90 days

EU (21%) and others (15%) such as South Africa, Spain and Sweden. Garments manufactured in these units were one piece dress as the major product category followed by skirt (58%), shirt (19%) and other garments (23%). Material used in the units was cotton fabric (100%) such as cotton, voile, cambric, cotton linen and cotton hosiery (65%), synthetic (15%) like rayon viscose and polyester, silk (20%) such as chiffon and georgette (Table 2).

Labour practices:

The average operator working in the sewing section was 368 and average number of sewing machines installed in the sewing section was 380. Specialized machines in the sewing section bar tacking machine (65%), Belt loop making machine (50%), Loop attachment (30%), fusing machine (8%), Computerized embroidery machine (25%), Computerized sewing machine (10%). 60 per cent units pay wages on daily basis and 40 per cent units pay wages on monthly basis. 82 per cent units give incentives to their workers (Table 2).

Production:

The average production of the unit was 2967 pieces per day and average quantity of pieces per style of these units was 24,340. The lead time of the order was 90 days (Table 2).

It is observed in Table 2 that operator productivity was higher than total labour productivity. The table indicates that the sewing operators were very efficient but the helpers and checkers were not able to work so efficiently.

High productivity units have been operating for the longest time as compared to low and medium productivity units. High productivity units have the maximum annual turnover of Rs.15,85,08901/-. The reason of this high turnover was because of greater production capacity and large order quantities for production.

In high productivity units there were more number of employees and better infrastructure so as to meet the demand of buyers. Whereas the low and medium productivity units have poor infrastructure and less number of employees. The major export destinations of the units were USA, Japan and EU (France, Germany, Australia and Italy) and other markets are also catered by these units like South Africa, Canada, Spain and Sweden. Japan, USA and EU were the most popular export destinations, because the people of these countries prefer saganeri or bagru printed cotton fabric which is the unique feature of the garments manufactured in Jaipur.

The major product category of the units was one piece dress which is manufactured in all types of units as its demand is more in foreign countries. Low, medium and high productivity units used cotton and varieties of cotton fabric like voile, cambric and linen etc. because of its demand in foreign countries where people prefer to wear cotton fabric. High productivity units used silk, synthetic and other fabrics

like viscose, rayon, polyester etc. because of the varieties of style they manufacture.

High productivity units have greater number of operators and more advanced sewing machines in their sewing section. They make use of specialized machines like computerized sewing machine, computerized embroidery machine, fusing machine, bar tacking machine, loop attachment machine etc. as compared to low and medium productivity units because of the variety of style they manufacture. Most of the units prefer to give salary on daily basis because retention of workers in a unit is a problem and workers get the return for the amount of work done. Most of the units also give incentives to workers because it motivates their workers. The average production capacity of high productivity unit was the highest followed by low and medium productivity units.

Average lead time according to order quantities was more in low productivity units and less in high productivity units. Low productivity units produced fewer garments in more time whereas high productivity units produced more garments in fewer days.

Productivity performance could change between a poorly managed and a well managed apparel manufacturing unit. This change is mainly caused by factors like labour, machines, specialized machine, and maintenance of machines, performance and order quantity etc. It may also be due to operators inefficiency, machine speed loss (machine not functioning at predefined/ theoretical speed) small interruptions like thread breakage, needle break and changes, wrong method used while stitching, unnecessary extra movements, wrong work place layout etc. In this situation the actual output was not as the calculated/planned or theoretical output.

The factors that could cause productivity loss are as follows:

Raw material availability:

Raw material availability is a vital area for any industry, whereas uncertainty prevails in India with respect to the major raw material, namely, cotton etc., the undue and frequent price fluctuations, the mismatch between supply and demand, lack of proper forecasting of political decisions and other commitments.

Absenteeism:

Absenteeism is one of the major problems that affects the productivity in majority of the units. Shortage of skilled labour adversely affects productivity. Getting work from unskilled or semiskilled labour is difficult when the supply of the labour is less than the demand resulting in low productivity.

Poor working condition:

One of the most important factors affecting the productivity of labour is poor working conditions. In many of

the factories, cramped workspace for the worker is not conducive for improving output. Some factories also lack basic facilities such as canteens, toilets, etc. and in many cases, regular breaks for using these facilities are not provided. Other factors, which contribute to such situation, are poor interpersonal relationship at the work place.

Poor incentive structures:

Another serious constraint for enhancing productivity is the poor incentive and pay systems. In most factories, allowances are not linked to productivity, and in the cases where productivity payment is made; they are based on only flat-rate allowances rather than incentive system.

Low investment in technology:

The apparel manufacturing industry has become a hi-tech industry world. There is lack of viable investment both in basic technology among domestic producers as well in specialized high technical machinery among exporters. It is necessary for manufacturers to invest in advanced technology. Without such investment, apparel manufacturing is not able to sustain in global market.

Inadequate training:

Inadequate training of managers and workers alike is an important factor constraining productivity and competitiveness. Little emphasis was placed on the importance of training and its role in improving productivity by factory owners and managers. Often, managers do not view training as an investment and are unwilling to incur expenditure on it.

Poor production system:

Poor methods of production are followed which affects the productivity and the workers give a below average performance. None of the units used conveyer system to carry goods from one place to another; only 10 per cent units use trolleys for this work. The reasons could be poor planning, poor machine set up and poor quality. Machinery was generally good but maintenance was poor. Only 10 per cent units went for proper preventive maintenance programme for machines and the time spent on repairs was not recorded.

Lack of industrial engineering cell:

None of the unit used industrial engineering cell, they did not take it seriously and the work was off standard. Proper standard time did not exist for various production operations. There was a complete absence of attention to the issue of time lost by workers. Problems of inadequate space and poor layout existed thus reduced the time on handling materials.

Low apparel industry standardization:

Under the current international competitive pressures,

the standardization of apparel industries has become essential to conform to the required standards of the major international buyers. There are a number of shortcomings in most of the units. For example, basic facilities such as toilets, ventilation and working space etc.

Lack of professionalism in the industry:

At the initial development stage of the apparel industry, more than 70 per cent of the Jaipur entrepreneurs managed their enterprise as family business. In most of the factory activities, purchasing and for the management industry, no professionals are employed. There was an evident lack of professionalism in the factory as most entrepreneurs were unwilling to invest in human resources to manage the various functions of their business professionally.

Suggestions for productivity improvement:

- For productivity improvement, it is must for every apparel producer to start measuring productivity.
- Labour productivity can be improved by imparting knowledge and skills to the work force by arranging training programmes with experts. A well-trained staff member will instantly be more productive.
- The apparel manufacturer should follow modern management practices, adopt flexible manufacturing, quick response techniques and productivity improvement techniques.
- Productivity improvement techniques involve purchasing extra machinery or new plans to increase the output. This is definitely a long-term approach as it will take a long time to set up and may take staff a good while to become familiar with the new machinery.
- Finally, one of the standard productivity improvement ideas is to look at how rewards motivate staff and consequently become more productive. It is not necessarily the case that providing people with more money will make them produce more.

Conclusion:

Productivity strives to minimize human hazards and human efforts with a view to utilize them to those areas where they can contribute maximum to the output.

The study analyzed the manufacturing performance of the apparel manufacturing units and identifies the low, medium and high productivity units. The study reveals that higher productivity units have better performance than medium and low productivity units. Units are unaware of many issues on the production process and productivity. If Indian apparel manufactures are to grow in the years to come, a lot more need to be done, production of garments in huge quantity with strict specification and standards adopting modern production practices and supplying in time.

The garment industry should adopt performance

management system in their organizations in order to measure and evaluate their performance and take corrective measures accordingly. An efficient approach to performance management enables employees and team to understand the goal of the organization and to see how individual and team outputs contribute to the achievement of organizational objectives and values.

This study would prove a useful reference paper for productivity enhancement, and attaining higher efficiencies.

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