Human Resource Factors Influencing Employee Performance in Garment Manufacturing Firms (GMF) in Delhi/NCR

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Abstract: Indian textile industry is one of the oldest and the largest industries in India. It is growing at the rate of 20% each year and it is contributing 4% to the Gross Domestic Product (GDP). In terms of employment, it is the second largest employer, only second to agriculture, employing more than 35 million people across the nation. It has the largest pool of cheap and skilled labor. Readymade Garments account for approximately 41% of the country’s total textiles exports. There has been absence of emphasis given on HR practices in the apparel export industry. Studies of HR practices limited to the service and retail industry & insignificant studies on middle level management. Almost all theory and evidence about the relationship between HRM and performance based on the research in the United States, Europe and other developed countries and that too in parallel manufacturing industries. The objective of the study was to find the link between specific HR practices and employee performance in apparel export industry in Delhi, NCR region. To find the specific HR practices leading to better employee performance.

Key words: HRM practice; employee performance; garment manufacturing firms; Delhi/NCR

JEL codes: J5, M5, L6, L1

1. Introduction

The main aim of this study was to uncover the details of the human resource management (HRM) practices in the garment manufacturing environment for the middle level management that has not been widely researched, which is a vital source of livelihood and foreign exchange for many less developed countries.

Almost all of the theory and evidence about the relationship between HRM and employee performance is based on research in the United States, Europe and the East Asian countries (Henrietta Lake, 2006).

Because very little research has been done in the area of HRM and performance in a developing country context, this study is an attempt to represent practice in a different part of the world and to hope that the findings in India will be more applicable to the experience of other developing countries than the research conducted in developed market economies.

The methodologies adopted in many such studies are focused on HRM practices as apparent in organization rather than capturing the deep-rooted HR Strategy and its linkage with other dependent variables.
Human Resource Management (HRM) is an art of managing work force in an organization to achieve organizational goals. Investing in human capital has a direct effect on Organizational performance. Employers grapple with the question of how much to invest in the work force, and whether the benefits will cover the cost of investment. For Indian Apparel manufacturers, these questions are more mystifying as little research has been done that relates to their experience.

In a study on apparel manufacturing: a strategy for productivity improvement conducted by Bheda, Narag, Singla (2002) finds that productivity level achieved by Indian firms is substantially lower than the productivity in the western countries. They measured the improvement can be brought in either by people or machinery. The study conducted concluded factors associated with high productivity and which are controllable factors are training, incentives, pay system, reward system. The study suggested training programs for managers/supervisors, as management can adopt new practices only if managers are well equipped with better HR skills.

The primary purpose of this research was to provide a careful description of the various workplace HR practices that can be adopted by Indian garment manufacturers and to study the effect of these different practices on their performance. As well as uncovering particular HRM practice that lead to increased employee performance and ultimately organizational performance.

2. Selected Review of Literature

2.1 HRM Practices

Previous empirical research on the relationship between HRM practices and firm performance have focused on single HRM practices (Balkin, Gomez-Mejia, 1987; Bartel, 1994; Gerhart & Milkovich, 1990; Jackson, Schuler & Rivero, 1989; Russell, Terborg, & Powers, 1985; Terpstra & Rozell, 1993). In a study by Arthur (1994), using an empirical taxonomy of HRM practices, he found that steel minimills with commitment HRM systems had higher productivity, lower scrap rates and lower employee turnover than steel minimills with control HRM systems.

Khatri (2000) using a sample of 200 of the largest manufacturing companies in Singapore, found that HRM practices have a stronger direct effect on profitability than sales growth and non-financial measures. In fact, the significant relationship between HRM practices and profits is encouraging and is in agreement with findings from other studies (Gerhart & Milkovich, 1990; Huselid, 1995).

In another study by Villanova, Bernedin, Johnson and Dahmus (1994), they found that firms that were able to assess if individuals were compatible for the jobs they applied for, were more able at reducing employee turnover. In other studies related to compensation, Trevor, Gerhart and Boudreau (1997) found that salary growth had a pronounced effect on turnover, that is high salary growth significantly reduced turnover for high performing employees.

Employees who were compensated more for their high levels of performance were less likely to leave. Park, Ofori-Dankwa and Bishop (1994) also found that turnover is negatively associated with levels of pay, especially when pay was determined by individual incentives programs. As such, the higher the levels of pay, the lower the levels of employee turnover. Batt (2001) study show that turnover rates are lower and sales growth is higher in firms that emphasize high skills, employee participation in decision-making and in teams, and HR incentives such as high relative pay and employment security. Guthrie (2001) surveyed corporations in New Zealand and found that their HRM practices were related to employee turnover and profitability.
The literature highlighted that there were no consensus on which HRM practices should be used in a study. Dyer and Reeves (1995) include a table which compares the HRM practices included in some of the leading empirical studies in HRM.

Most studies of the HRM-performance relationship aggregate individual practices into multicomponent scales (e.g., Huselid, 1995; Way, 2002), or some would group organizations on the basis of their HRM profile (e.g., Ichniowsky et al., 1997; Wood & de Menezes, 1998), in order to test for the relationships. Researchers like Huselid (1995), Ichniowski et al. (1997), Ramsay, Scholarios and Harley (2000) and Khatri (2000) use comprehensive and detailed lists including up to 24 practices (Ramsay et al., 2000). However, it must be borne in mind that the specific components of HRM practices vary a great deal across studies and measures of HRM are generally of unknown reliability.

It should be noted however, that there has been very limited amount of work that has been done linking work practices to productivity for firms in the developing world. The lack of available data and difficulty of data collection is one of the reasons behind this.

As firms are entering into a more dynamic world of international business and as the globalization of world markets continue apace, comparative HRM issues appear to be gaining momentum. Both practitioners and academics in the field of HRM are increasingly aware of the need to examine and understand the HRM system suitable to different parts of the world. They are also interested in finding relevant HRM policies and practices for different types of organizations (for example, public/private sector, manufacturing/service sector) around the globe. HRM practices are central to improving the performance of employees as well as organization. In the words of Pfeffer (1994), having good HRM is likely to generate much loyalty, commitment or willingness to expand extra effort for the organization’s objectives.

Management scholars and practitioners alike have become increasingly interested in learning more about HRM practices to enhance employee and organization performance (e.g., Boselie et al., 2001; Den Hartog & Verburg, 2004; Ferris et al., 1999; Guest, 1997; Huselid, 1995; Paauwe, 1998, Paauwe & Boselie, 2003; Pfeffer, 1994). Huselid (1995) have found that the effectiveness of employees will depend on impact of HRM on behavior of the employees. It is now increasingly recognized, however, that the true effectiveness of firms’ human resource policies and practices should be evaluated from employees’ behavioral and psychological outcomes (Park, Mitsuhashi, Fey, & Bjorkman, 2003).

Empirical studies (Delery & Doty, 1996; Huselid, 1995) have showed that linking employee participation results in greater productivity, satisfaction and reduction in turnover. Employee turnover is often separated into categories of voluntary turnover, which is considered controllable, and involuntary (e.g., due to retirement or death), which is considered uncontrollable. Voluntary turnover and involuntary turnover of employees seemed to be influenced by different sets of factors.

In another study by Villanova, Bernedin, Johnson and Dahmus (1994), they found that firms that were able to assess if individuals were compatible for the jobs they applied for, were more able at reducing employee turnover. In other studies related to compensation, Trevor, Gerhart and Boudreau (1997) found that salary growth had a pronounced effect on turnover, that is high salary growth significantly reduced turnover for high performing employees. Similarly, William and Livingstone (1994) found that a negative performance-turnover relationship was stronger in organizations using performance-contingent reward systems.

Park, Ofori-Dankwa and Bishop (1994) also found that turnover is negatively associated with levels of pay, especially when pay was determined by individual incentives programs. As such, the higher the levels of pay, the...
lower the levels of employee turnover. Batt (2001) study show that turnover rates are lower and effectiveness in terms of sales growth is higher in firms that emphasize on high skills training, employee participation in decision-making and in teams, and HR incentives such as high relative pay and employment security.

Cooke (2000) has included efficiency and effectiveness as ingredients of performance apart from competitiveness and productivity. He further argued that training is the tool to develop knowledge and skills as means of increasing individual’s performance (efficiency and effectiveness). Singh (2004), whose observations are more relevant in our cultural context, argues that compensation is a behavior aligning mechanism of employees with business strategy of the firm. It clearly outlines duties, responsibilities, working conditions and expected skills of an individual performing that job (Qureshi M. Tahir, 2006).

3. Employee Performance Variables Undertaken for This Study

Effectiveness, on the other hand, is the evaluation of the results of the performance (Campbell, 1990). Effectiveness might also be thought of as doing the right things.

3.1 Efficiency

Efficiency is defined as the ratio of output over input. It has also been defined it as the “skillfulness in avoiding wasted time and effort” (Hyper Dictionary, 2003). Efficiency might also be thought of as “doing things right”. A relatively efficient process either requires fewer inputs or produces more outputs compared to a similar process, to achieve the objectives of the process.

3.2 Employee Turnover

Employee turnover is the rotation of workers around the labor market; between firms, jobs and occupations; and between the states of employment and unemployment (Abassi et al., 2000). The term “turnover” is defined by Price (1977) as: the ratio of the number of organizational members who have left during the period being considered divided by the average number of people in that organization during the period. Frequently, managers refer to turnover as the entire process associated with filling a vacancy: Each time a position is vacated, either voluntarily or involuntarily, a new employee must be hired and trained. This replacement cycle is known as turnover Woods (1995).

<table>
<thead>
<tr>
<th>Author, Year</th>
<th>HR practice applied</th>
<th>Effect on employee performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khurram Shahzad, 2008</td>
<td>Compensation, Promotion, Performance evaluation</td>
<td>Positive impact on employee performance</td>
</tr>
<tr>
<td>Simon Burgess, 2001</td>
<td>Monetary rewards, Pay for performance</td>
<td>Retention of capable employees</td>
</tr>
<tr>
<td>Zubair Aslam Marwat, Tahir Masood Qureshi, Mohd I. Ramay, Not known</td>
<td>Training, Recruitment, Compensation, Performance appraisal</td>
<td>Positive impact on employee efficiency and effectiveness</td>
</tr>
<tr>
<td>Riccardo Peccei, Not known</td>
<td>Systematic selection and socialization of employees, Training and development, Job design, Information-sharing, Employment security</td>
<td>Positive impact on employee attitude and behavior</td>
</tr>
<tr>
<td>Ermel L., Bohl D., 1997</td>
<td>Monetary and non-monetary incentives for recruitment compensation</td>
<td>Incentives help firms to attract and Retain Talented Workers</td>
</tr>
</tbody>
</table>
4. Garment Manufacturing Export Firms

India’s textiles and clothing industry is one of the mainstays of the national economy. It is also one of the largest contributing sectors of India’s exports worldwide. The report of the Working Group constituted by the Planning Commission on boosting India’s manufacturing exports during 12th Five Year Plan (2012-2017), envisages India’s exports of Textiles and Clothing at USD 64.41 billion by the end of March, 2017 (Government of India Ministry of Textiles (International Trade Section)).

The textiles industry accounts for 14% of industrial production, which is 4% of GDP; employs 45 million people and accounts for nearly 11% share of the country’s total exports basket. During the year 2012-2013 (Apr-Jan), Readymade Garments account for almost 39% of the total textiles exports. Apparel and cotton textiles products together contribute nearly 72% of the total textiles exports (Government of India Ministry of Textiles (International Trade Section)).

<table>
<thead>
<tr>
<th>Year</th>
<th>Textiles World Export</th>
<th>Textiles India’s Exports</th>
<th>Textiles India’s %age share in world exports</th>
<th>Clothing World Export</th>
<th>Clothing India’s Exports</th>
<th>Clothing India’s %age share in world exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>195.0</td>
<td>6.85</td>
<td>3.51</td>
<td>258</td>
<td>6.62</td>
<td>2.57</td>
</tr>
<tr>
<td>2005</td>
<td>203.0</td>
<td>7.85</td>
<td>3.90</td>
<td>276</td>
<td>8.29</td>
<td>3.00</td>
</tr>
<tr>
<td>2006</td>
<td>218.6</td>
<td>9.33</td>
<td>4.30</td>
<td>311.4</td>
<td>10.20</td>
<td>3.30</td>
</tr>
<tr>
<td>2007</td>
<td>241.3</td>
<td>9.81</td>
<td>4.06</td>
<td>347.06</td>
<td>9.93</td>
<td>2.86</td>
</tr>
<tr>
<td>2008</td>
<td>253.4</td>
<td>10.45</td>
<td>4.12</td>
<td>364.91</td>
<td>11.50</td>
<td>3.15</td>
</tr>
<tr>
<td>2009</td>
<td>211.1</td>
<td>9.12</td>
<td>4.32</td>
<td>315.62</td>
<td>11.45</td>
<td>3.62</td>
</tr>
<tr>
<td>2010</td>
<td>251.0</td>
<td>12.87</td>
<td>5.13</td>
<td>351</td>
<td>11</td>
<td>3.13</td>
</tr>
<tr>
<td>2011</td>
<td>293.5</td>
<td>15.01</td>
<td>5.13</td>
<td>412.45</td>
<td>14.36</td>
<td>3.48</td>
</tr>
</tbody>
</table>


4.1 Textiles Exports 2012-13

The targets for textiles exports for 2012-2013 initially set at USD 38 billion have been revised upwards to USD 40.50 billion, following the Foreign Trade Policy Annual Supplement in June, 2012 (Government of India Ministry of Textiles (International Trade Section)).

5. Methodology

Understanding the literature in parallel manufacturing industry, employee performance was considered as a variable to associate a link with HRM practices. Variables selected in employee performance were

1. Employee effectiveness
2. Employee efficiency
3. Employee turnover

5.1 HR Practices List Distributed among HRM Experts for Purpose of Ranking

To extract the variables of HR, seven HR managers from apparel export industry were asked for their respective feedbacks. The managers helped in ranking the HR practice variables from the exhaustive list of variables that we had prepared from previous studies to prove the relationship between HRM practices and employee performance in parallel manufacturing industries.

And we obtained the list of following variables:
HR Practice variables:
(1) Training
(2) Compensation
(3) Performance appraisal
(4) Recruitment & Selection

5.2 Extracting List of sub Variables of HRMP
After the feedbacks were collected for the final practices selected for this study, the sub variables were derived from a management book to develop the questionnaire.

5.3 Defining Sample Frame and Respondents
For this research, the list of top hundred apparel export houses was referred. The ranking of these export houses from all over India was on the basis of their financial turnover for the latest year for which the data is available. Further, the list of export houses were extracted which were in Delhi/NCR as this research is confined to Delhi/NCR only.
Respondents of this study are Human Resource executives of garment manufacturing firms in Delhi/NCR.

5.4 Development of Research Instrument
It was decided to use the 5-point LIKERT scale questionnaire method. The questionnaire was designed at gaining data on the current human resource management practices, and their perception on which practices according to them would help in improving organizational performance.

The questionnaire was developed by studying various previous researches on HRM practices and its impact on performance in apparel as well as parallel manufacturing sectors.
The sub variables selected, were used to form the basis for building the questionnaire.

6. Data Collection Procedure

6.1 Population and Sample Size
Thirty seven manufacturers belonging to Delhi-NCR region were identified from the selected sample frame of the top 100 exporters of India.
The selected samples were contacted inviting their participation in the study.

6.2 Overall Response Rate
The above generated responses of 16 export houses, out of a sample size of 37, thus generating an overall response rate of 49 percent. Similar studies undertaken in the U.S. by Schuster (1986), Delaney et al. (1989) and Huselid (1995) had response rates of 16%, 6.4% and 29% respectively.
Therefore the response rate compares favorably with the earlier studies undertaken in this respect.

6.3 Respondents
The questionnaire had to be filled by the person heading the HR function or the concerned executive in the company.

7. Objectives
The primary purpose of this research therefore is to provide a careful description of the various workplace practices used by Indian garment manufactures and to examine the positive effects of these different practices on employee performance. The sub-objective of this research is to extract variables of HR practices that strongly and positively affect the employee performance main objective of the research is “To find out the link between HR
practices and employee performance”.

8. Data Analysis and Results

The Employee Performance variables chosen for the study were Employee Effectiveness, Employee Efficiency and Employee Turnover.

The HR practices were selected after the ranking given to several HR practices by the industry experts.

The sub variables for HR practices were selected on the basis of review of literature which formed the basis for forming the questionnaire.

The questionnaire was distributed among 37 of the top export houses of Delhi and got back a response of 18 thus making it a response rate of 49%. The respondents were the HR Heads/Managers/Executives of the concerned organizations.

The responses were tabulated and a relationship between the HR practices and the Employee Performance was statistically achieved with the help of correlation analysis.

It was found that all the variables have strong positive correlation with Employee Effectiveness and Employee Efficiency.

8.1 Data Analysis

Three techniques were employed for data analysis; Gap analysis to assess the gaps which exist between various parameters for measuring HRM practice.

8.2 Correlation Analysis

It was used to analyze variables of success of HRM practices having impact on improving organizational performance of GMF.

8.3 Data Interpretation

The data collected was interpreted in terms of suggesting a hierarchy of factors which affect the performance of HRM at middle level of organization of GMF.

9. Correlation Analysis

This statistical instrument is used to determine the extent to which changes in value of one attribute are associated with changes in the other attributes.

The correlation coefficient is the measure of linear relationship between two attributes of columns of data. The correlation coefficient is also known as product-moment correlation coefficient.

Following Table 3 demonstrates the correlation among the selected variables:

<table>
<thead>
<tr>
<th></th>
<th>Effic.</th>
<th>Effi.</th>
<th>Turn</th>
<th>T</th>
<th>PA</th>
<th>C</th>
<th>S</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effic.</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effi.</td>
<td>0.988</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn</td>
<td>-0.14</td>
<td>-0.05</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>0.970</td>
<td>0.997</td>
<td>-0.245</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>0.981</td>
<td>0.957</td>
<td>-0.098</td>
<td>0.971</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>0.967</td>
<td>0.987</td>
<td>-0.256</td>
<td>0.944</td>
<td>0.983</td>
<td>0.957</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>0.987</td>
<td>0.957</td>
<td>-0.376</td>
<td>0.973</td>
<td>0.961</td>
<td>0.981</td>
<td>0.947</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 4  Key

<table>
<thead>
<tr>
<th></th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effec.</td>
<td>Effectiveness</td>
</tr>
<tr>
<td>Effi.</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Turn</td>
<td>Turnover</td>
</tr>
<tr>
<td>T</td>
<td>Training</td>
</tr>
<tr>
<td>PA</td>
<td>Performance Appraisal</td>
</tr>
<tr>
<td>C</td>
<td>Compensation</td>
</tr>
<tr>
<td>S</td>
<td>Selection</td>
</tr>
<tr>
<td>R</td>
<td>Recruitment</td>
</tr>
</tbody>
</table>

9.1 Findings

Findings from the correlation table:

All the variables have strong positive correlation with Employee Effectiveness and Employee Efficiency. However, all the variables have a strong negative co-relation with employee turnover suggesting that with better practices, employee turnover decreases and vice versa.

There is a positive correlation between performance appraisal (0.988) and employee effectiveness suggesting that with better performance appraisal techniques, employee effectiveness increases i.e. the employee can organize work process in such way so he/she will be able to perform more work during the same time.

There is a positive correlation between training (0.997) and employee efficiency suggesting that with better training and development techniques, employee efficiency increases, i.e., speed and accuracy of the employee at the job task increases.

There is a negative correlation between compensation (-0.098) and employee turnover suggesting that with better compensation techniques, employee turnover is lower indicating the presence of employees.

9.2 Best Practices

To find the best practice among the variables having the maximum impact on employee performance variables, following pie charts were constructed:

- Performance appraisal has the maximum positive impact on employee Effectiveness.

To find out the best practice, the following pie chart was constructed:

![Figure 1  Best Practice for Performance Appraisal](image_url)
It was found from the above figure that 17% of the respondents state and firmly believe that growth and development oriented performance appraisal leads to highly increased performance appraisal.

Figure 2: Training has the maximum positive impact on employee Efficiency
To find out the best practice, the following pie chart was constructed:

From the above figure, it was found that 21% of the respondents state and firmly believe that Training is necessary to improve productivity which is a combination of both employee efficiency and employee effectiveness, i.e., more the specific training is imparted and the more they are managed correctly to improve productivity, the efficiency of the employee will therefore be increased.

It suggests that once a training program is completed, employee productivity is expected to increase.

The benefits will be to the company, due to an increase in employee output and productivity and to the employee as the increase in output should translate into higher wages and opportunities for career advancement.

Figure 3: Compensation has the maximum impact over employee Turnover.
To find out the best practice, the following pie chart was constructed:
Table 5  Conclusive Results

<table>
<thead>
<tr>
<th>HR Practice</th>
<th>Employee performance variables</th>
<th>Effect</th>
<th>Best practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>T, PA, C, S, R</td>
<td>Effectiveness</td>
<td>+ve</td>
<td>Performance Appraisal</td>
</tr>
<tr>
<td>T, PA, C, S, R</td>
<td>Efficiency</td>
<td>+ve</td>
<td>Training</td>
</tr>
<tr>
<td>T, PA, C, S, R</td>
<td>Turnover</td>
<td>-ve</td>
<td>Compensation</td>
</tr>
</tbody>
</table>

T-training, PA-Performance Appraisal, C-Compensation, S-Selection, R-Recruitment

The above figure suggests that 23% of the respondents firmly state and believe that in their organization, salary and other benefits are comparable to the market hence leading to low employee turnover and higher retention.

In the above table all the variables have a strong negative co-relation with employee turnover suggesting that with better practices, employee turnover decreases and vice versa.

10. Study Limitations

There are two basic limitations of the study. The first refers to the fact that a single respondent provided information on HRM practices and perceived measures of employee performance, respondent bias may have set in. The level of overall response was not very high that may have resulted in estimation error due to response bias. The second refers to sample size which only large & medium export houses of Delhi, NCR region only, it is not representative of GMF in India.

11. Conclusion

The primary purpose of the present study was to demonstrate the linkage between HRM practices and employee performance in Delhi, NCR region. Till date, only a few other studies have made attempts to establish this link and that too in parallel manufacturing sectors in the western hemisphere. For example, studies undertaken by Arthur (1994) and Huselid (1995) in the western context have shown that HR practices have a significant relationship with employee performance. Like these studies, the present study also indicates that the selected HRM practices have a positive effect on employee performance.

The purpose of this study has been to investigate the relationship between the HRM practices and EP in the GMF context. Respondents varied in their perception on these practices as organizations change, their management’s philosophy and priorities differ. However a consensus was developed amongst them to make an effective practice system to enhance employee performance.

The results of this study strongly support the research problem as there is significant relation of employee performance with HRM practices including training, performance appraisal compensation, recruitment and selection.

It has also been found that training has maximum influence on Employee Efficiency as was also observed by Zubair Aslam Marwat, Tahir Masood Qureshi Mohd, Ramay, Kundu (2000), Bittner & Zeithmal (2001) and Sisakhti (2007).

It was also seen that Performance Appraisal has the highest impact on Employee Effectiveness as was also observed by Ermel LBohl D. (1997), Khurram Shahzad (2008), Simon Burgess (2001).

Thus, through the use of strategy-based HRM practices, these organizations can create a more competent and committed workforce, which in turn provides a source of sustainable competitive advantage. Clearly, the HRM
performance link that has been demonstrated in the Western hemisphere also exists in the Indian context.

References:


Karuppusami G. and R. Gandhinathan. “Sustainable development of total quality management through Deming’s PDSA cycle”, BSI.


