Employees stress level assessment: a case of apparel industry

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Abstract The assessments of employees stress level in garment industry gains vital importance to improve the efficacy of employees. Fuzzy methods are more appropriate than the conventional methods for assessment of stress level. The study demonstrates an application of a multi-grade fuzzy approach to measure employees stress level. This is the first time that the employees stress level assessment framework has been developed in the garment industry sector. Through literature review and expert opinions, sub-factors, factors and enablers of employees stress in workplace were identified and a conceptual model was developed. This study suggests that stress level assessment is essential to identify the current stress level of employees in workplace. This would help the garment industries to reduce its stress level further. In this study the stress level was found to be 4.74; which indicated the case company employees stress level is fair. Finally, the high stress sub-factors were identified to point the way for further improvements.

Keywords: Stress level; Work system; Work culture; Employees stress; Garment Industry; Multi-Grade Fuzzy

1. Introduction

Garment Industries play a very important role in Indian exports sector and contribute a substantial sum towards the Indian Gross Domestic Product. These industries are involved in producing wide range garments for both domestic market as well as foreign market. The processes for producing a garment start from sourcing of raw materials like cotton, wool and polyester, spinning into yarn, development of fabric, dyeing, cutting, stitching, printing, checking and packaging.

Garment industries provide employment opportunities to the sort of who are exposed to continuous and repetitive work which explains us the working environment. Garment industries mostly demand for precision and consistency in their work, it becomes important to discuss both physical and psychological behavior of those employees. Demographically garment industry employees are from low income background who were migrated from their native region. These employees earn their compensation based on the piece rate system or hourly wage. Therefore, they earn their wages based on their individual productivity. For the garment industries, productivity and on-time delivery of the products plays an important role in deciding the organizational profits. In addition to that, the work needs to be error-free to efficiently increase the productivity. Understanding the stress level of the employees becomes an important aspect in order to prevent employee attrition, injuries and also improve the efficiency of the work.

[1] has proposed a theory on role of textile industries in our Indian economy and states that garment industry is the second largest sector of industries after agriculture in terms of employability and economic contribution. This industry has undergone continuous development all around the world
and it is important for us to study the stress level of the employees working in these industries. Stress is a part of the working environment in any sector of industries, only the degree of stress varies according to the work done by the employees and analyzing this stress level of those employees is essential in these industries because psychological behavior of them plays a vital role. These industries depend upon the productivity, accuracy and quality in the work done by the employees which is explains the need to analyze the stress level of the employees.

2. Literature Review

2.1 Stress

[2] briefed about the effect of stress on employees working in emergency / rescue agencies. Stress responses are the responses generated by the human body to any demand placed on the body and they are generated by stressors. Stressors can be classified psychological or biogenic. Psychological Stressors are environmental events where interpretation of individual plays a predominant role in stimulating the particular response of the individual. Biogenic stressors are artificial stimulants such as caffeine, theophylline and nicotine which would have a direct impact on their stress response. Traumatic stress is the stress that has to be considered in case of emergency like Mining and fire department. Critical Incident Stress Debriefing (CISD) process in determining the effect of stress on the emergency workers in three different situations were Pre-incident, during incident and Post incident. Based on the analysis made by the various officials of CISD research process, traumatic stress has affected the decision-making process of the employees and in turn sufficient training must be done in order to make the employees stress free. Various methods in which the employees experience traumatic stress such as unavailability of resources, work life balance, optimal working time and this paper concludes by highlighting the various solutions that can be incorporated in order to minimize the stress experienced by the employees on all three occasions.

[3] highlighted about the types of attention styles and stress factors affecting the sales and marketing managers in hotels. Analyses of different attention styles and how those attention styles have an impact on the key elements of the job like performance etc. Sample of 70 members from Hotel Sales and Marketing Association at Seattle chapter is used. Initially discusses about the varied attention styles, their impact on making mistakes and classifies the members into three categories of mistakes such as mistakes because of overloaded by external stimuli, mistakes happened as they were overloaded by internal stimuli and mistakes due to reduced attention. The second half deals with the effect of stress factors on the performance of the sales and marketing personnel of the hotel industry. Stress questionnaire was developed involving 14 stress factors and ranking them accordingly in terms of least stressful to most stressful. Responses were collected and those responses were analyzed. On those responses, it is found that the marketing personnel experience a lot of stress over the other department.

[4] conducted a research on determining the factors in the workplace that affects mental wellbeing, engagement in work and stress for working parents. Started from determining the factors responsible for suitable workplace environment in order to increase or provide optimal health conditions to the working parents. The aim of this research is to identify the connections between the objective and subjective workplace factors responsible for work fatigue, engagement in work, stress, work-family conflict among the working parents and their small children. A sample of 1562 working parents were
taken from the south Sweden region who had kids between the ages of 2 and 7 and questionnaire were distributed on the basis of differentiating the questions into three major dimensions like flexibility, attitude and benefits, then the outcomes were measured. Based on the cross-sectional analysis, flexibility in the work place and attitude towards the work had a positive impact on stress and wellbeing of the parents while the benefits in the workplace had lesser impact compared with other two. Result states that positive attitude in work as well as parenthood and workplace flexibility is responsible for good wellbeing, lesser stress and good workplace engagement among working parents.

[5] conducted a research on identifying the stress and workplace satisfaction for the employees who were servicing the people with intellectual disability. The research was done on 450 employees and questionnaire was framed based on general distress, satisfaction in work, job strain and a wide range of factors, then their outcomes were analyzed. A questionnaire consisting of more than 20 information needed such as basic characteristics, job control, role ambiguity, job feedback and a lot more were given and the results were analyzed. Path analysis results that there were three factors responsible for general distress, six factors accounted for job strain and six factors responsible for job satisfaction. This paper identified that stress on work-home conflict and also stress due to lack of staff support have direct impact on general distress and work satisfaction.

[6] described supervisor’s stress based on Analytic hierarchy process (AHP) and formed an evaluation index system to analyze the stress. 16 factors were identified based on AHP which were categorized into three broad categories such as personal, organizational and environmental factors. Stress source and their related stress index were identified and analyzed based on the empirical study made on the supervisors. The result indicates that evaluation method in order to find out the hidden stressors and can be efficient used in implementing stress management in supervisors.

[7] pointed the factors affecting the stress and satisfaction of Australian nurses. This paper initially starts with the background of the study based on low employee retention in Australian hospitals. Identified 2 factors responsible for job satisfaction and stress; they were social support and empowerment. A sample of 157 registered nurses were taken, questionnaire was distributed and analysis were made, Based on analysis, Social support which was derived from colleagues, supervisors lowered stress in the work place and increased satisfaction. At the same time, the empowerment such as individual belief, value of work goal, control over work and impact increased job satisfaction and reduced the job stress.

[8] have stated the stress factors which aid in predicting the injuries of hospital personnel. Stress at work place is a major problem leading to various health problems both physically and mentally. A sample of 5111 hospital employees from 10 Finland hospitals were studied for the work stressors and injuries that happened because of stress at work place. Questionnaire was formed in order to measure the psychological distress, job control and overload of work, and then the results were analyzed. Based on the analysis it was found that psychological distress had significantly no relation with the injuries but low decision latitude, highly repetitive work which is monotonous, interpersonal problems and conflicts at workplace were the important stress related factors that had an impact towards injuries.

2.2. Health condition
2.2.1. Mental and Physical health

[9] have highlighted that the mental and physical health conditions that have been affecting the employees in American business organization in order to reduce the cost burden that happens to these health problems.

2.3. Career Development

2.3.1. Related Educational Career.

Organizational Career planning should go in line with the individual career planning because it helps the organization in employer retention. [10] have done a research on the important factor which contributes to career development in secretariat office in a city.

2.3.2. Demographic Characteristics

Some of the characteristics have an effect in the career development of the employees in the organization. [11] identified the factors that are affecting the career development of the employees by a comparative analysis done between two organizations. Two different factors of characteristics i.e. demographic and organizational characteristics affecting the career development of the employee as well as the organization.

2.4. Work Experience

2.4.1. Knowledge of working of an organization

Knowledge of working in an organization is essential when it comes to handling the stress. [12] proposed a research on the role of work experience that affects the future employability of the students.

2.4.2. Multi-Skilled

Multi skilled can be defined as a workplace strategy which improves productivity and reduce the indirect costs [13]. Multi-skilled worker is a person who possesses various skills which would allow them in contributing to more than one work processes.

2.5. Type A Behavior

2.5.1. Role Stress

[14] briefed about the impact of Type A behavior employee’s role stress on work related outcomes. Role stress is defined as the high work tension and low job satisfaction. Role stress is measured on the basis of role ambiguity, conflict and job overload.

2.5.2. Psychological Strain

[14] had proposed a conceptual model which suggests that Psychological strain has an impact on the role stress of the employees.

2.6. Absence of Feedback
2.6.1. Perceived Feedback

[15] have proposed the impacts of individual feedback on the behavior of particular individual in an organization. Perceived Feedback is defined as the perception level of an individual who is receiving the feedback. Perception level of the employees was impacted by the nature of the source, age of the recipient, clarity of the message, consistency of the message and reliability of the source. Perception level is high when the source of the message is well known to the receiver.

2.6.2. Acceptance of feedback

[15] have proposed a research on studying the effects of individual feedback on the behavior of particular individual in an organization. The acceptance of feedback is defined as whether the individual is ready to accept the feedback given by the source.

2.7. Role Ambiguity

2.7.1. Adaptability to change and Pay

[16] have described the variables responsible for the behavior of the organization. They found that both role conflict and ambiguity are critical variables in the organizational behavior model.

2.8. Role Conflict

2.8.1. Absence of information and recognition

[17] has conducted a research on the effect of role conflict in complex organizations. This defines that role conflict exists in four forms conflict in resources and time, conflict due to expectations and demands, conflicts due to assigning different role to same person and conflict in between person.

2.9. Superior Support

2.9.1. Social Environment and Job Induced

[16] have proposed a paper on study the variables responsible for the behavior of the organization. Social environment has been explained as the opportunity to increase the friendship in the work environment. Job induced anxiety has been explained as feeling nervousness in the job.

2.10. Time Pressure

2.10.1. Incentive

[18] proposed a theory on impacts of time pressure and accountability. They developed a conceptual model to understand the impact of the time pressure and accountability. Based on that model, Incentive is referred as the less amount of pay given by the negotiators for working more hours.

2.10.2. Individual working capacity

[19] has proposed a research on degree of strain that is developed during building work which is related to individual aerobic work capacity.

2.11. Work Environment
2.11.1. Environmental Ergonomics

[20] have proposed a research on understanding the impacts of ergonomics training on the stress level of the employees. They found that environmental ergonomics has a positive impact on the stress level of the employees.

2.12. Company Environment

2.12.1. Management Involvement

[21] have proposed a research in studying the impacts of justice perceptions of the employees to organizational commitment to leave the organization. Perception of organizational support has a positive impact on the employee retention in the company. Management involvement has been termed as the involvement of the management in every activities of the employees.

2.12.2. Organizational Legal Norms

[22] proposed a research on how ethical behavior of the organization plays a role on the organizational bases. Organizational legal norms are considered as one of the factors that is used in order to analyze the working climate of the organization. They found that organizational legal norms have a positive impact on the working climate and working behavior of the employees.

3. Research Question

The paper expects to separate into three distinct areas so that the research can be effectively and obviously comprehended in all viewpoints. In this manner the accompanying research questions were surrounded with the goal that each piece of the exploration is taken consideration independently. The study proceeds to the pathway as indicated by the stream of the exploration addresses which by finding the arrangements give the entire thought of the idea. This framework helps the managers of the Garment industry by answering the following research questions (RQ):

RQ 1: How to measure employees stress level in Garment industry?
RQ 2: What are the factors that influence employees stress level in Garment Industries?
RQ3: How to address those weak attributes to minimize the stress level?

The first question is addressed with the help of various references, literature review, research articles etc. and is verified with the help of experts. The Second question is answered with the help of literature review and Multi-Grade Fuzzy approach for stress level score. The third question is answered by using the results obtained, conclusion and the discussion.

4. About the Case Company

The Case garment manufacturing unit is located at Tirupur district in the state of Tamilnadu, India. There are approximately 230 employees working and they are a leading garment exporter. The Case Company has been in the garment sector for more than five years and they have various departments like cutting, stitching, checking, packing and inventory. Study has been carried out with the help of experts in that Case Company and various Garment units located in Tirupur, India.
5. Research Methodology

The research methodology used in this research is multi-grade fuzzy approach, primarily to analyze the stress level of employees in garment industries. This Research is limited to the Indian Garment Industries. The following driver variables (Enablers, Factors and comparing Sub factors) which influence the stress level of organization are distinguished and delineated in Table 1. With these recognized drivers, a survey with a 10-point Likert scale as per the multi-grade fuzzy methodology was developed, which was then utilized for gathering of information. The rating and weightage are collected from the experts in garment manufacturing firms. This method was used by many researchers for solving the problems in the literature ([23]; [24]; [25]; [26]; [27]; [28]; [29]; [30]; [31]).

| Table 1. Enablers, Factors and Sub-factors affecting Stress level |
|---------------------------------------------------------------|
| Goal Enablers Factors Sub Factors                             |
| Work stress evaluation (I) Personal Factors (I1)              |
| Health condition (I11) Mental (I111)                          |
| Career development(I12) Related education career(I121)        |
| work experience (I13) Knowledge of working of an organization (I131) |
| Organizational Factors (I2) Absence of feedback (I21)         |
| Role ambiguity (I22) Adaptability to change (I221)            |
| Role conflict (I23) Absence of information (I231)             |
| Superior support (I24) Social Environment (I241)              |
| Time pressure (I25) Inappropriate Incentive (I251)           |
| Environmental Factors (I3) Work environment (I31)             |
| Environmental Ergonomics (I311)                               |
| Company environment (I32) Management involvement (I321)       |
| Ambience (I322)                                               |
| Enviromental legal norms (I323)                              |

The employees stress level index of the case company is represented by I. It is the product of the ratings based on each drivers (R) and the weights assigned to each drivers (W) given by experts. The equation for stress index is

\[ I = W \times R \]

The assessment scale has been graded into five levels since every factor involves fuzzy determination. I = (10, 8, 6, 4, 2). 8–10 represents ‘High Stress level’, 6–8 represents ‘Normal Stress level’, 4–6 represents ‘Fair Stress level’, 2–4 represents ‘Low Stress level’ and less than 2 represents ‘extremely low Stress level. The mean normalized weightage of the experts’ opinions and the attributes ratings are shown in Table 2.

| Table 2. Rating and Weightage by experts |
|------------------------------------------|
| Ji | Ijj | Ijk | R1 | R2 | R3 | R4 | R5 | Wijk | Wij | Wi |
| II | II1 | II11| 1  | 4  | 4  | 2  | 2  | 0.62069 | 0.3125 | 0.308824 |
The calculation comprises of three levels namely, primary assessment calculation, secondary assessment calculation and tertiary assessment calculation finally to obtain $I$ the final Stress level of the organization.

The overall Stress level assessment value of the organization is $I = 4.748887$ which falls in the range 4–6 which represents ‘Fair Stress levels’.

6. Results and Discussions

From the calculations we are able to determine that the stress level in garment industries falls in the range of 4-6 on a 10-point assessment scale in which 0 being low stress level and 10 being the high stress level. The result $I = 4.748887$ obtained implies that there exists a Fair stress level in the garment Industries.

Based on the experts rating, the identified sub-factors which possess a high stress level are adaptability to change, job induced, individual working capacity, environmental ergonomics and ambience.

7. Conclusion

The proposed framework identified 20 sub-factors for ten major factors contributing towards the stress level of the employees in the garment industries. They were based on the findings in literature review and experts opinion. Multi-grade fuzzy approach was used in order to analyze the weightage of those sub-factors and their implications towards the stress level in the organization. Questionnaire was developed to collect the responses from the employees in the industries. Based on the responses gathered from the employees, the overall stress level for the employees in the garment industries were found to lie within the range of 4-6 which implies that the stress level in the garment industries is “Fair stress level”. The sub-factors which contribute more towards the stress level were identified from the mean value of the responses and the sub-factors which have high impact to the stress level are
adaptability to change, job induced, individual working capacity, environmental ergonomics and ambience. These five sub-factors can be improved by communicating the changes to the employees before implementing, necessary periodical training for the employees, providing work based on employee’s individual capability, providing incentive for working beyond the assignment, proper environmental surrounding with safety measures, proper work environment with sufficient space for production and inventory. Management should focus on these sub-factors and the improvement measures to minimise the stress level in the industries. By reducing the stress level of the employees, the overall productivity may tend to increase thus achieving organization goals.

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