

MULTI CRITERIA DECISION ANALYSIS OF WORKPLACE STRESS IN SMALL AND MEDIUM ENTERPRISES

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(Received: 16 August 2023, Accepted: 29 August 2023)

(1st International Conference on Recent and Innovative Results in Engineering and Technology ICRIRET 2023, August 16-18, 2023)

ATIF/REFERENCE: Masood, M. & Ahmad, W. (2023). Multi Criteria Decision Analysis Of Workplace Stress In Small and Medium Enterprises. *International Journal of Advanced Natural Sciences and Engineering Researches*, 7(7), 207-213.

Abstract – Workplace stress is a major issue that has major implications for the health of employees and the prosperity of micro, small, and medium-sized businesses. Despite the abundance of research on workplace stress, small and medium-sized businesses (SMEs) still lack a comprehensive framework that considers several criteria to analyze and rank stress variables. This thesis aims to close that gap by utilizing multi-criteria decision-making (MCDM) to evaluate and rank sources of stress in the workplace for small and medium-sized enterprises (SMEs). The goals of the research were met by using the Analytical Hierarchy Process (AHP) and the TOPSIS technique. To begin, we conduct a literature review to identify and classify the many causes of occupational stress that have been identified in prior research. Workload, job instability, role ambiguity, role conflicts, and not having a proper balance between work and personal life are all examples of personal and organizational pressures. The selected policy alternatives are based on five main parameters (Demand, relationship, Control, Risk and Role), 16 sub-parameters, and three alternatives. A hierarchical decision model has been developed by using these parameters and their criteria selected for the study. A questionnaire-based survey has been conducted for data collection at different SMEs covering the Taxila, Hattar and Islamabad region. After analyzing the data, it is concluded that in the main criteria Demand factor has the most significant effect in the workplace. It also finds that the role factor has the least significant criteria. Talking about the ranking of the alternatives, Stress management workshops have the highest priority which helps us to minimize workplace stress.

Keywords – Workplace Stress, MCDM, AHP, TOPSIS, Small and Medium Enterprises

I. INTRODUCTION

Stress among workers has become a major issue in the organizational workplace. Stress in organizations has a huge impact on workers that's lead to mental illness, depression, psychological stress. To minimize stress in the workplace we should know the factors that effect in workplace. Workplace stress factors can negatively impact employees by causing a decline in job satisfaction,

Reduced productivity, increased absenteeism, and the development of physical and mental health problems [1]. Organizations can take steps to address workplace stress by implementing various measures aimed at preventing and managing stress. These measures may involve promoting work-life balance, establishing support systems, cultivating a positive work culture, offering stress management training programs, and encouraging open communication and employee involvement [2].

Employees experience stress in the workplace due to various reasons, and these stressors are interconnected rather than separate aspects. The stress level among employees is increasingly changing for several reasons, including work overload, overcrowding, loud noises generated by machines, and conflicts arising from poor decision-making. Stress can also arise from personal life transitions, such as domestic problems, financial issues, and divorce, which are individual causes of stress. Additionally, organizational factors contribute to workplace stress. These factors include role uncertainty, where employees are unsure about their responsibilities and others' expectations, as well as having excessive workloads and limited time to complete tasks. Poor working conditions, characterized by distractions, noise, uncomfortable temperatures, and a chaotic work environment, also contribute to stress [3].

II. PROBLEM AND OBJECTIVES

Stress plays a vital role in any organization's production. The problem is that there are many factors that impact on job performance, production of organization, job satisfaction. The work overload also makes an employee frustrated that causes a decline in performance. The workplace stress can motivate employee's capability and job performance will increase [10]. The objective of this research is to find workplace stress factors among professionals and develop an AHP and TOPSIS method that is used for ranking purposes and selecting the best alternative. It will help organizations to provide a stress less working environment and make their employees happy that's lead to more productivity.

The main objectives of research study are:

- Perform comprehensive literature related to workplace stress models and their related factors.
- Perform industrial field study to identify the workplace stress factors in small and medium enterprises.
- To perform the multi criteria techniques for the prioritization of workplace stress factors.

- To develop the policy guidelines for the workplace stress reduction.

III. LITERATURE REVIEW

A. Stress

Organizational stress is a common problem that can seriously affect both people and the general functioning of the organization. Stress may be caused by a variety of circumstances and affect personnel at all levels of the organization. Based on the information available on the internet, below is an overview of stress in organizations: Stress is a constantly changing condition that arises when individuals confront situations involving possibilities, restrictions, or responsibilities directly related to their goals. The perceived consequences of these situations are both uncertain and significant [9]. It is essential to recognize that tension is not always negative and can offer potential benefits. Stress can be viewed as a thrilling challenge and can be used to improve performance in situations such as "clutch" moments for athletes and performers. However, stress becomes harmful when it is associated with restrictions and demands that prevent people from doing what they want or represent the loss of something desired. Uncertainty regarding the outcome and the perceived significance of the outcome are necessary conditions for stress to manifest itself. Even those who believe that winning or losing is inevitable may experience tension if the outcome is significant [4].

B. Small and Medium Enterprises

The definition of Small and Medium Enterprises (SMEs) can vary across organizations and countries. Different authorities provide their own criteria for categorizing SMEs. For instance, 23 SMEDA (Small and Medium Enterprises Development Authority) defines an SME based on the employment size, stating that it can have up to 250 employees. SMEDA also sets a maximum paid capital of twenty-five million PKR and an annual sales threshold of two hundred fifty million PKR. SME Bank, on the other hand, defines a small enterprise as having total assets of up to twenty million PKR, while a medium enterprise can have total capital of up to one hundred million PKR[7].

Najmoddin Nekzada and Selamawit Fisseha Tekeste conducted a study to examine the causes of workplace stress and explore potential strategies to mitigate it. Their research focused on stress-inducing factors such as job overload, hostile work environments, and conflicts between employees and their superiors within a multinational firm. Using a qualitative, case-study-based approach, the researchers gathered insights from six Volvo trucks AB employees through semi-structured interviews. The study emphasizes the significance of effective stress management for the success of any business. It identified time management, emotional disclosure, and downtime as crucial aspects of a successful stress management process [5]. Workplace stress is a critical issue that can have adverse effects on employee well-being and overall organizational productivity. Researchers have recognized the importance of identifying and managing workplace stress factors using multiple criteria decision-making (MCDM) techniques. This literature review focuses on examining relevant studies published from 2000 to 2023 to explore the applications of MCDM techniques in addressing workplace stress factors. Zavadskas, Turskis, and Kildien (2015) looked at 393 articles published between 2000 and 2014 to find out how Multiple Criteria Decision Making (MCDM) methods were used and how they were used. The review looked at articles from many different areas and found that MCDM methods were used a lot in research about energy, the environment, and sustainability. Out of all the tools, the Analytic Hierarchy Process (AHP) method turned out to be the most popular. Hybrid MCDM methods came in second [6].

C. Stress Assessment

A multitude of research studies have utilized Multi-Criteria Decision Analysis (MCDA) methodologies to assess the levels of workplace stress within SMEs. Various methodologies and tools, including the Analytic Hierarchy Process (AHP), Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), and Weighted Sum Model (WSM), have been employed in these studies. In the subsequent section, we will examine particular instances of these studies, the methodologies employed, and their contributions to

advancing our comprehension of workplace stress in small and medium-sized enterprises (SMEs) [8].

IV. METHODOLOGY

Our research has been segmented into four phases for the identification of stress factors and development of policy guidelines in workplace SME's.

- A. *Phase 1:* In this phase, a gap in literature has been identified and analysed so that further research can be conducted. Then, literature has been examined for factors that influence the workplace in SME's and Organizations.
- B. *Phase 2:* In the second phase, a questionnaire has been developed and tested for assessing and quantifying the burden of various factors under investigation. It is preferable to use a pair-wise comparison questionnaire with a Saaty scale to collect responses from respondents in order to minimize the workplace stress factors using MCDM technique.
- C. *Phase 3:* In the third phase we have done the ranking of each stress factor by using MCDM techniques. This stage is the implementation of AHP and TOPSIS techniques. To do so, we used the data that is collected from designated SMEs.
- D. *Phase 4:* In the fourth and final phase we found out the best alternative solution and develop the policy guidelines to minimize the workplace stress factors which affected the most in SME.

V. DATA COLLECTION AND ANALYSIS

A survey has been designed to gather data for a research project employing the AHP and TOPSIS methodologies. The AHP format was used in making the questionnaire for the pair-by-pair comparison of each criteria option and the TOPSIS is used to give us the best ideal and ideal worst solution of workplace stress factors. Employees from different enterprises are personally questioned for their thoughts using the pairwise comparison survey approach during direct interviews. During this phase, we need to select and approve the criteria, factors, and sub factors. This direct interview procedure relates to organization employees and managers at various levels of the small and medium enterprises. After gathering the

data from employees, the individual factors of this analysis weight function were used to aggregate the factors that affect the workplace in small and medium enterprises. Due to the better outcomes, the data were gathered by employees with more than one year of expertise. The main factors needed for the analysis of the research study are found by a review of the literature and then we need to get finalized criteria through a survey carried out using questionnaires. Through surveys-based questionnaires, the alternatives or best viable solution for the research project have also been determined.

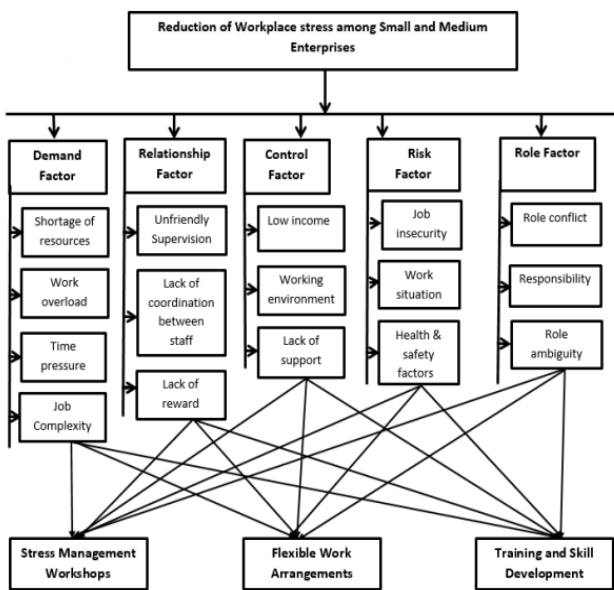


Fig.1 Research Methodology

VI. RESULTS:

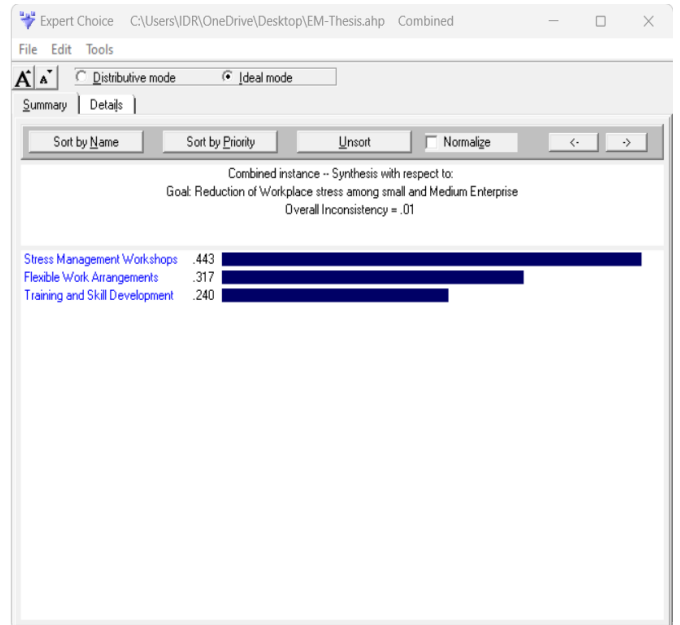


Figure. 2 Ranking Alternatives w.r.t Goal

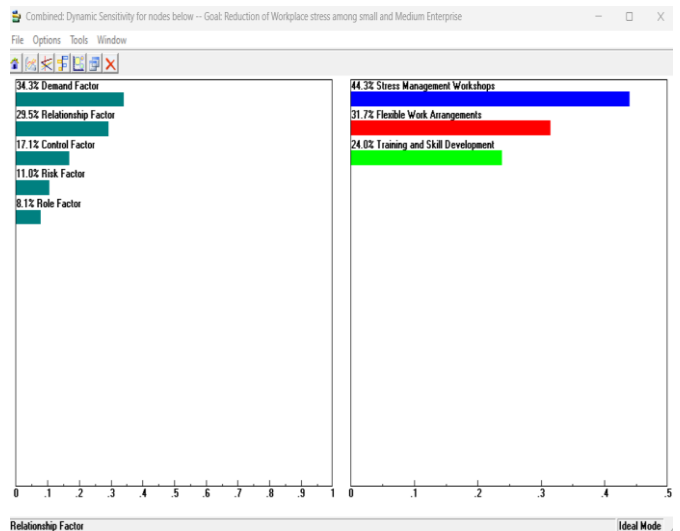


Figure. 3 Ranking Alternatives w.r.t Main Criteria

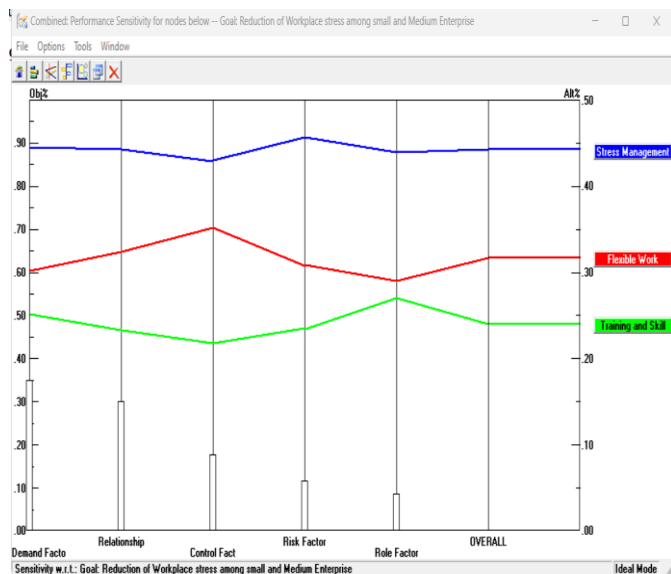


Figure. 4 Combined performance Sensitivity graph of main Criteria and Alternatives

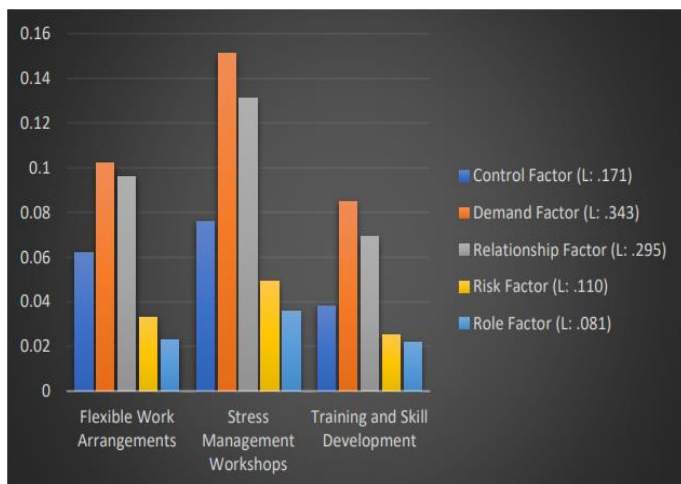


Figure 5 Alternatives behavior Graph w.r.t Main Criteria



Figure. 6 Ideal Best Solution Using Topsis Technique

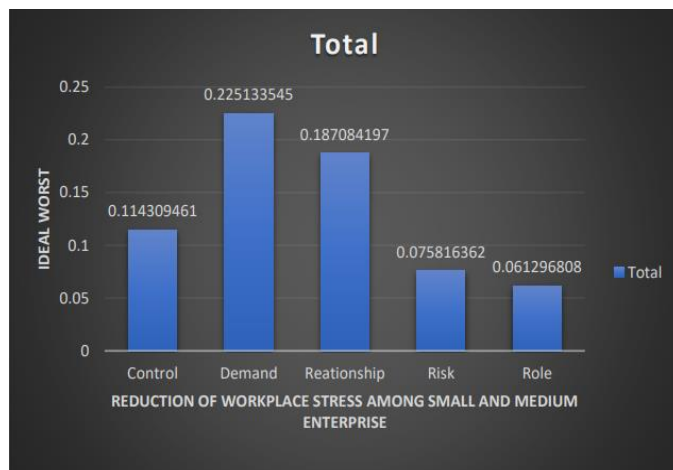


Figure. 7 Ideal Worst Solution Using Topsis Technique

VII. DISCUSSION

The results presented in above Figures indicate that, among the five main criteria, Demand ranked the highest and was considered the most important criterion with 34.3%, as per the research objective. The relationship criterion ranked second with 29.5%, while the Control criterion ranked third with 17.1%. The Risk criterion ranked fourth of 11%. Lastly, the Role criterion ranked fifth with 8.1% and on the other hand of the graph the results shown that among the three alternatives, Stress management workshops ranked the highest and was considered the most important alternative, with 44.3%, as per the research objective. Flexible work arrangements were ranked second with 31.7%, and Training and skill development was ranked third with 24%. Additionally, the inconsistency judgment was 0.01, which is less than the acceptable limit of 0.10. Figure .4 displays the overall priorities for three alternatives on the right y-axis. The Stress management workshops has the highest overall priority with a value of 44%, followed by Flexible work arrangements with 32% and Training and skill development with 24%. The left y-axis shows the priority for each criterion, with "Demand" having the highest priority at 35%, followed by "Relationship" at 30%, "Control" at 15%, "Risk" at 12% and "Role" at 07%. The alternative priorities with respect to each criterion are shown on the right y-axis. In the Fig.5 graph shows the behaviour of each alternative with respect to main criteria. These alternatives help us to identify which is the most optimal solution in order to minimize the workplace

stress. Stress management workshops is the most favourable alternative in this scenario.

A. Ideal Best

In the Fig.6 graph shows the ideal best solution with respect to the main criteria. These values tell us how our main factors are closer to our goal i.e., Reduction of workplace stress.

B. Ideal Worst

In the Fig.7 graph shows the ideal worst solution with respect to the main criteria. These values tell us how much our main factors are away from our goal i.e., Reduction of workplace stress.

VIII. ORIGINALITY AND CONTRIBUTION

This study has made important contributions to the existing body of literature in a number of key ways. First, it has found different ways to reduce stress in the workplace that work well. Second, the study created a hierarchical decision-making model based on Multiple Criteria Decision Making (MCDM) to deal with and reduce the most important stress factors. Lastly, the research included an informative industrial field study that was able to find and study stress factors in the workplace, especially in SMEs. Together, these efforts add new and useful information to the field 80 of workplace stress management and suggest ways to improve the health and happiness of employees.

IX. CONCLUSION

The study's findings indicate that effective approaches to managing workplace stress primarily hinge on specific criteria and their sub-criteria. The research, utilizing literature review and questionnaire data analysis, identified five key factors: Demand, Relationship, Control, Risk, and Role, alongside 16 sub-criteria falling under three alternatives. To pinpoint the optimal stress-alleviation strategy, a comparison of various policy options was conducted using established Multiple Criteria Decision Making (MCDM) methods - AHP and TOPSIS. In employing TOPSIS, the study evaluated both the best and worst solutions based on core components and objectives. The Expert Choice software aided in developing an AHP hierarchy model to analyse outcomes. These outcomes were

derived from input gathered from workers in Taxila and Islamabad regions, encompassing diverse organizations. Among the factors, Demand exerted the greatest impact on the workplace stress model. To address this, the study identified the most effective solution for minimizing workplace stress: Stress management workshops. This proactive approach fosters well-being and cultivates a supportive organizational culture, yielding a resilient and engaged workforce. Ultimately, this leads to enduring success for both individuals and the organization. By effectively managing and mitigating these factors, organizations can provide employee training that enhances efficiency, satisfaction, and long-term prosperity.

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