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Using Mathematical Methods for Measuring Impact of Work Related Factors on Knowledge Workers Clusters in Car Manufacturing Companies

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Abstract: Work-related stress is a pattern of reactions that occurs when workers are presented with work demands that are not matched to their knowledge, skills or abilities and which challenge their ability to cope. These demands may be related to time pressure or the amount of work (quantitative demands), or may refer to the difficulty of the work (cognitive demands) or the empathy required (emotional demands), or even to the inability to show one's emotions at work. Demands may also be physical, i.e. high demands in the area of dynamic and static loads. The aim of this study reviews the relationship between Work-Stress and Knowledge workers clusters at the Saipa Company.

Key words: Work stress · Knowledge workers clusters · Performance · Saipa

INTRODUCTION

Work stress can come from a variety of sources and affect people in different ways. Although the link between psycho-social aspects of the job and the health and well-being of workers has been well documented, limited work has been done on the effects of distinct stressors on job performance [1].

Work-Stress is one of the most important workplace health risks for employees in developed and developing countries [2, 3]. There are a number of workplace factors, called job stressors that make jobs stressful and difficult for number of employees in services as well as manufacturing industries. Additional stressors concern interpersonal relationships at work, such as conflicts with the behavior of supervisors, conflicts with colleagues, conflicts with subordinates and conflicts with management policies [4].

As well, various protective factors can prevent or reduce the effects of work stress and little research has been done toward understanding these mitigating individual and organizational factors. Job strain is only one stressor workers may face at the workplace. Physical exertion and job insecurity can also cause Work-Stress [5]. Even in an era of increasing high-tech information industries, the physical demands of work are still relevant and important to many [6]. Being seriously concerned about physical exertion of work can become a stressor. This is related to concerns about physical hazards and work injuries. Undoubtedly, uncertain job security and the fear of layoff is also an important source of psychological Work-Stress for some, especially during times of economic contraction [7, 8].

Work-Stress is an environmental situation in which a person is required to perform the tasks that threatens to exceed the person's ability and resources for meeting it, under conditions where he or she expects a large difference in the rewards from meeting the demand versus not meeting it [9]. In work life extreme Work-Stress is so aversive to employees that they will try to avoid it by withdrawing either psychologically (disinterest or lack of involvement in the job etc.), physically (frequent late coming, absenteeism, laziness etc.) or by leaving the job entirely [10].

Stress, particularly work-related stress, has aroused growing interest across Europe in recent years [11, 12]. The workplace has changed dramatically due to globalization of the economy, use of new information and communications technology, growing diversity in the workplace (e.g. more women, older and higher educated people, as well as increased migration, particularly between the EU Member States) and an increased mental workload [13, 14]. At the same time, workers are reporting an increasing level of mental health problems. In the 2000 European Working Conditions Survey (EWCS), work-related stress was found to be the second most common

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work-related health problem across the EU15 (at 28%; only back pain was more common) [15, 16]. Moreover, work-related stress has also been associated with a number of other ill-health outcomes, such as cardiovascular diseases, musculoskeletal disorders, particularly back problems and neck-shoulder-arm-wrist-hand problems, as well as absence from work. The potential outcomes of stress at work are thus rather diverse and do not only pertain to health but also to actual participation in the workforce. That is the reason why this topic report highlights work-related stress [17].

Studies on the association between Work-Stress and knowledge workers clusters have been conducted for many years [18]. However, the research findings are inconsistent in terms of their significance, magnitude and , in some cases, direction. Some studies found a significant positive relationship between Work-Stress and knowledge workers clusters distress [19]. Some studies showed the little association between them. Other studies even demonstrated a negative correlation between them [20]. These inconsistent findings could result from three causes. First, different studies investigated different types of stress. For example, some studies focused on specific work stress or caregiver's stress, while others focused on the measure of general life stress. Second, different studies were concerned with different knowledge workers clusters facets. For example, some studies focused on, such as clinical diseases or symptoms, others. It is focused on social role functions or adaptive behavior and still others focused on subjective life quality [21, 22]. Third, some moderators may exist between stress and health—such as social support, coping strategies, personality traits, demographic variables, study quality and so on—which alter the association between Work-Stress and knowledge workers clusters. In sum, "stress" and "knowledge workers clusters" are multidimensional concepts. Different Work-Stress types and knowledge workers clusters facets could result in different degrees of association, as shown in many studies [23, 24]. The exploration of moderators between Work-Stress and knowledge workers clusters is drawing more attention. A moderator is a qualitative or quantitative variable that affects the direction and/or strength of the relationship between an independent variable and a dependent variable [25].

For improving of knowledge workers clusters Performance, it needs to identify main resources of stress. There are three main resources for creating Work-Stress (Environmental, Organizational and individual factors). Environmental factors are focused on the political, economic and technological factors, which effects on the levels of Work-Stress in the staff. Organizational factors are: work needs (related factors on the jobs), role needs (related to pressures on the person), Intrapersonal needs (pressures are created by another staff), organizational structure (Differentiation at the level of organization and instructions), Organizational Leadership (management style of top managers). Individual factors are focused on Personal and family relationships, personal economic issues and inherent personality [26].

To study and analyze these problems, we should be able to answer some basic questions: What factors effects on knowledge worker (KW) Performance? It furthermore, provides conditions for output quality (And provides conditions for improvement KW Performance). It needs to select the suitable strategies for improving of KW Performance.

MATERIALS AND METHODS

Research methodology of this paper has been based on the analytical and descriptive Research. This analytical and descriptive type research has been carried out using the questionnaire as the research tool for gathering the required data. Data's gathering involved both reference material and a questionnaire survey. Sampling was simple random sampling and the data-gathering instrument was the questionnaire. The author had already undertaken research in this field, which had stimulated the decision-making techniques used to analyze this case study. There are four clusters and for any clusters are selected 30 persons (in sum, it is selected 120 persons. In November 2008 a request for interviews and questionnaires was sent to a number of cluster1 (30 persons, 30% Male and 70% Female, 70% over 10 years experience), cluster2 (30 persons, 30% Male and 70% Female, 70% over 10 years experience), cluster3 (30 persons, 30% Male and 70% Female, 70% over 10 years experience) and cluster4 (30 persons, 35% Male and 65% Female, 65% over 20 year's experience) in the Saipa Company. Prior to the interview and fill the questionnaire, the author explained the purpose of the research and made it clear that this information would be in the public domain, so any confidentiality concerns could be noted. The interview and questionnaire, from December 2008 to April 2010, lasted ten hours per week. The interview and questionnaire were semi-structured in nature, starting with general questions on the KW Performance management to put the respondent at ease. To ensure internal validity the interview and questionnaire were transcribed and sent

to the experts for check that no commercially sensitive information had been included. It is used three type questionnaires for data gathering (the first questionnaire is for reviewing of Work-Stress with 23 questions. The second questionnaire is for reviewing of KW Performance assessment with 10 questions and the third questionnaire is for reviewing of KW Performance with 57 questions).

Data analysis is done using Minitab 17, Spss 16 based on the descriptive and inferential statistics.

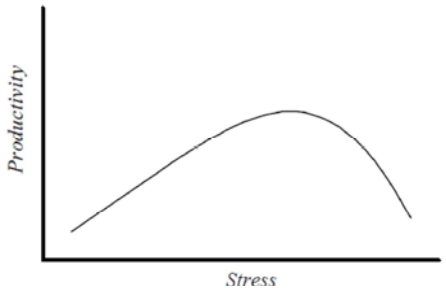

Fig. 1: Inverted 'U' relationship between Work-Stress and performance in Saipa Co.

RESULTS

In the questionnaire, it is used the combination of three indexes (job satisfaction, loyalty to the organization and work stress) for measuring of KW Performance. In addition, the weights of the KW Performance factors are calculated by the correlation coefficient.

KW Performance in computer programmers is more than other groups. In addition, job satisfaction and work stress in computer programmers is the desirable level rather than other groups. Therefore, there is the direct relationship between KW Performance with job satisfaction and work stress.

Work-Stress can have various effects on the individual as well as on the organization. Clearly not only the individual suffers but the organization may also be affected by absenteeism, work related accidents, turnover and impaired decision making. While Work-Stress is typically discussed in a negative context, it also has positive value. It offers potential gain, for example, the superior performance that ophthalmologists give during a complicated surgery. Such individuals often use Work-Stress positively to rise to the occasion and perform to their maximum. And hence the performance rises. The inverted U relationship between Work-Stress and performance is illustrated by Figure 1. From the organization's stand point, management may not be concerned when employee experience low to moderate level of stress. Such levels may lead to higher employee performance. But high levels of Work-Stress or even low levels sustained over a long period of time, can lead to management. From the individuals standpoint even low levels of Work-Stress are likely to be perceived as undesirable. What management may consider as 'a positive stimulus that keeps the adrenaline running' is a very likely to be seen as 'excessive pressure' by the employee. Stresses have an emotional impact on manufacturing organizations.

There are many physical sources of Work-Stress such as work overload, irregular work hours, loss of sleep, improper lighting. Psychological sources of Work-Stress may be due to a particular situation such as boring job, inability to socialize and lack of autonomy, responsibility of results, without sufficient authority, unrealistic objectives, role ambiguity, role conflict and dual career marriages. Since people differ widely in age, economic position and level of maturity people react differently to situations. What might be more stressful to one person may be less to another person. Table 2 presents relationship between KW Performance with job satisfaction and work stress.

According to Table 1:

- There is the direct relationship between KW Performance with loyalty and work Work-Stress in 95% confidence level and there is the direct relationship between KW Performance with job satisfaction and loyalty in 90% confidence level.
- Job's satisfaction has effects more than loyalty and work stress (Table 3).

Table 2 presents comparison between factors in 4 groups.

Table 1: Correlation between KW Performance with job satisfaction, loyalty and work stress

		Correlations			
		job satisfaction	loyalty	work stress	Performance
KW Performance	Correlation	.743**	.535**	.435*	1
	ANOVA	.000	.002	.016	
	N	30	30	30	30

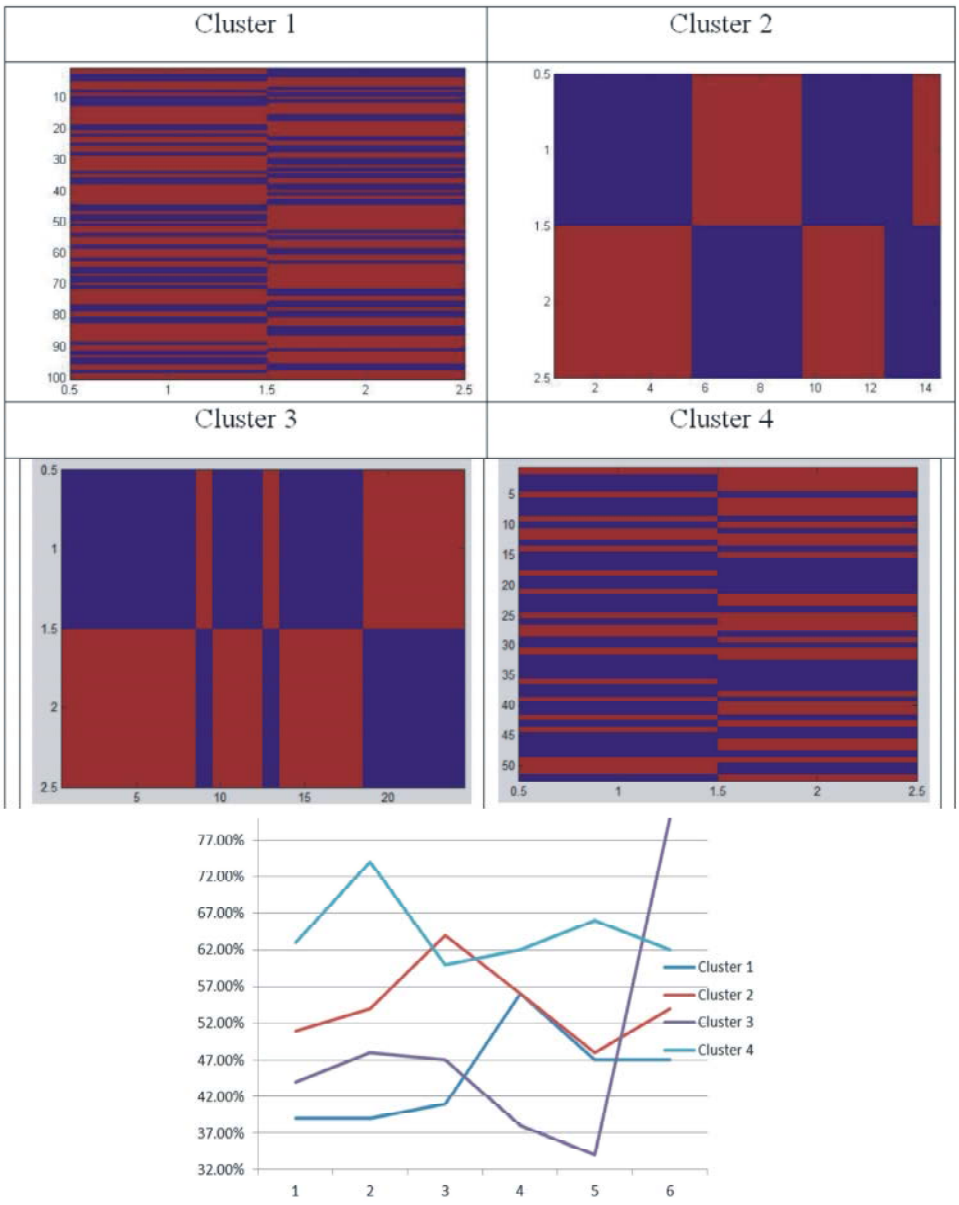

Fig. 2: Effects of the KW Performance on Factors in clusters

Table 2: Comparison between factors in 4 Groups

Group	Stress	KW Performance
cluster1	2.84	2.67
Cluster2	2.95	3.35
Cluster3	3.01	3.43
Cluster4	3.03	3.50

According to table 2, it concludes that there is the direct relationship between KW Performance and stress.

DISCUSSIONS

It may seem that there's nothing you can do about your Work-Stress level. The bills aren't going to stop coming, there will never be more hours in the day for all your errands and your career or family responsibilities will always be demanding. However, you have a lot more control than you might think. In fact, the simple realization that you're in control of your life is the foundation of Work-Stress management.

Managing Work-Stress is all about taking charge: taking charge of your thoughts, your emotions, your schedule, your environment and the way you deal with problems. The ultimate goal is a balanced life, with time for work, relationships, relaxation and fun-plus the resilience to hold up under pressure and meet challenges head on.

Work-Stress is lower than the medium-level and KW performance is the medium-level in the Saipa Company. There is the direct relationship between Work-Stress and KW performance. Therefore, It needs managing of stress. Work-Stress management starts with identifying the sources of Work-Stress in your life. This is not as easy as it sounds. True sources of Work-Stress are not always obvious and it is all too easy to overlook own stress-inducing thoughts, feelings and behaviors. Sure, it may know that theirs constantly worried about work deadlines. However, maybe it is their procrastination, rather than the actual job demands, that leads to deadline stress.

Measures that due to reduce Work-Stress factors in the Saipa Company, to remove or make ineffective the effects of Work-Stress and Work-Stress management, are:

- Exercise and physical activity,
- Deep breathing,
- Progressive muscle relaxation,
- Nutrition and healthy diet and rest,
- Fan inhibition of thought,
- To help people understand the situation,
- Development of goal-oriented culture,
- Promote cultural meditation on the staff,
- Administrator with biofeedback,
- Thinking, positive thinking prevalent among employees,
- Lifestyle management among employees

To reduce the Work-Stress level of the Saipa Company was the following actions:

Target in Order to Increase Staff Motivation: At first, it studied job description, secondly, Desirable performance standards documents; thirdly, Operational objectives write by employees with the guide the managers and finally, the staff and management targets to try to show good performance.

CONCLUSIONS

We have defined and classified the Work-Stress factors effects on the KW performance and analyzed them using the statistical approach. The KW performance is one of the most powerful elicitors of subjective emotion, yet it is not clear whether emotions elicited by the Work-Stress are similar to emotions elicited by visual stimuli. It presents the Work-Stress strategy influence on the KW performance. Consequent to this analysis, we have presented strategies for improving the KW performance, which were verified and validated in a case study. The results were re-rating of the experts who confirmed that 83.2 percent and it suggested for reliability. Validity of the model is used the Cronbach' alpha value was 88.2 percent, which indicates validity of the model.

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