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IMPACT OF ERGONOMIC RISK FACTORS ON EMPLOYEE PERFORMANCE IN THE IT INDUSTRY

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ABSTRACT

For enterprises to maintain a competitive advantage in a market that is in a state of constant flux, they will need to devise novel approaches to the planning and management of innovations. One of the primary objectives of this strategy is to improve the effectiveness of the manufacturing processes. This is accomplished via the use of a variety of techniques and the allocation of varying degrees of importance to various aspects of the manufacturing process. One of the most important aspects of Industry 5.0 is emphasising the importance of putting people first, being concerned about the environment, and being flexible enough to adjust to changing circumstances. In the context of this discussion, the term "human-centred approach" refers to the process of developing socio-technical systems that prioritise the health, safety, and well-being of individuals while simultaneously promoting behaviours that are advantageous to society. It is the study of how research and industry practices interact with one another that is known as ergonomics. In this particular region, the objective is to increase productivity without putting the safety of the workers in jeopardy. To create things, activities, machines, systems, jobs, and settings that are as secure, efficient, and usable as they possibly can be, it is necessary to have a solid understanding of how people behave, as well as what they are capable of doing and what they are not capable of doing. The workers are the foundation of the industrial economy, and they are the system's most important resource. According to the study, a significant amount of effort has been put forth in order to reduce the negative impact that manufacturing has on the environment. This has been accomplished by reducing the number of ergonomic issues that arise during the design phase of the production process. Through the use of bibliometric research, the foundational works that serve as the foundation for ergonomics have been discovered. In order to effectively use the advantages of ergonomics while simultaneously applying sustainable practices, it is necessary to make specific modifications to the techniques that are currently being used and to make improvements in technology. The findings of this research shed light on the connection between ergonomic and psychological risk factors and the level of productivity achieved by workers.

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KEYWORDS: Ergonomics, Employee performance, SEM, Ergonomic risk factor

1. INTRODUCTION

Ergonomics is a field that is studied and practised by individuals who work in both the manufacturing and service industries. The phrase "research and practice" is often used by those who work in this profession to define themselves. However, a significant number of individuals who work in this field simply refer to themselves as researchers or practitioners. Ergonomists, on the other hand, are another profession that requires them to do tasks using their hands. The findings of the study and the actual actions that individuals do in this area do not seem to be consistent with one another, as is abundantly obvious. In spite of the fact that ergonomics is not the only profession that faces competition, it is an excellent subject to investigate how academics and practitioners collaborate in order to enhance the level of collaboration that exists between the two groups. The association between psychological and ergonomic risk factors and workplace productivity is a relatively new topic of research. This is due to the fact that it has a substantial influence on the well-being of employees as well as the profitability of businesses. In spite of this, a number of research study these characteristics in isolation, which has led to a dearth of bibliometric analyses that provide a coherent framework that connects the two categories of risk to output. The purpose of our study is to investigate the subject matter in order to fill in the knowledge gap [1].

It is possible for a number of factors to contribute to feelings of burnout, unhappiness with one's job, and absenteeism. These factors include working excessive hours, not having sufficient resources, and not communicating well. Problems of this kind also have a negative impact on psychological safety, which is essential for effective collaboration and achievement in the field of information technology [2]. When there is insufficient psychological safety, it will have a negative impact not only on the ability of the company to learn but also on the performance of its employees. Employees are less likely to raise their problems when they do not feel that they are in a psychologically secure environment. Given that information technology departments are responsible for 75 percent of all workplace violence, this is a significant concern. Workers may experience feelings of anxiety if they are bullied, harassed, or swarmed while they are on the job. By fostering an environment in which people are able to freely express themselves without the fear of making mistakes, psychological safety instantaneously increases the amount of love that individuals have for their employment [3].

Ergonomics is a wide field that encompasses a number of subfields that are concerned with concerns that are related to workplaces, where they are crucial. Because of the way it examines the connections between individuals and the job that they do, it has an effect on the whole organisation [4]. One of the fields of study known as ergonomics is concerned with addressing the psychological, biomechanical, and physical requirements of workers. The structure of workstations, the instruments that are

employed in such spaces, the legislation that controls employment, and the environment are all included in this scope of responsibility. The influence of ergonomic and psychological aspects on job satisfaction, physical and mental health, and absenteeism among healthcare workers has been the subject of a great number of studies; nevertheless, there is a dearth of research that evaluates these multidimensional interactions within a coherent framework. Due to the interconnections between these factors, the likelihood of occurrences such as accidents occurring at work would certainly increase [5]. It is of the utmost importance to have a complete understanding of these components in order to safeguard staff and increase productivity in environments that are both complex and fast-paced, such as hospitals. There is a possibility that individuals may have a greater interest in working in the healthcare industry if these issues are resolved, which would be fantastic for the expansion of the workforce in that sector. It is feasible to improve the system's performance and increase the amount of work that can be accomplished without placing the workers' health, safety, or happiness in jeopardy if the elements that have been stated above are taken into consideration [6]. When it comes to a variety of aspects, including safety, comfort, and productivity at work, the quality of the environment in which individuals do their jobs has a significant impact. It is possible that poorly built facilities might have a significant impact on the health, comfort, and productivity of workers when they are forced to work in environments that are less than idealistic. When seen from this angle, it is simple to conceive of a profession in which employees are always seeking for ways to improve themselves.

2. LITERATURE REVIEW

As a result of technological advancements, individuals are taking on activities that are progressively more difficult and collaborating with colleagues from various different industries. This is due to the fact that jobs that need less degree of expertise are being replaced by those that require more such skills. The reason for this is that technology is taking over tasks that need less expertise than they used to. In order for businesses to achieve their goals of increased productivity and decreased rates of accidents and illnesses, they must place a greater emphasis on ergonomics in the workplace. It is necessary for operators to possess both psychological and physical resources in order to achieve success in their employment. In spite of the fact that the sociotechnical revolution is causing a shift in the way production is carried out, people will continue to play a significant role in the success of the business. There are a number of arguments that can be found in the literature [6] on the benefits of human-centered design ideas and the significance of ergonomic principles for the development of jobs and workplaces. to include ergonomic principles into the design of assembly methods in order to make the construction more robust and pleasant by using these approaches. The use of collaborative equipment results in a reduction in both mental and physical stress experienced by workers. In addition to making the workplace safer, this also makes it simpler to keep track of duties, and it increases productivity by accelerating production, reducing the number of errors that are made, and producing better goods. Therefore, the corporation is in a far better position to compete in the market as a result

of this [7].

There has been a significant amount of study conducted over the course of the last several years that indicates that workplaces that are not set up correctly, both physically and socially, may be connected to potential health issues as well as decreased levels of productivity. Both the World Health Organization and the International Labor Organization have reported that around two million individuals lose their lives annually as a result of diseases, accidents, or injuries that are associated with their place of employment [8]. It is of the utmost importance to keep in mind that not all incidents that might occur at work result in death. The fact that job satisfaction was shown to be a mediator of the connection between supportive work environments and better mental health and performance outcomes is evidence that this link is very important [9]. The recognition that mental and physical health are key variables that impact absenteeism and overall performance was the catalyst that led to the elucidation of the relationship between psychological resilience, physical competence, and workplace engagement. On the other hand, it is well knowledge that mental health issues, such as anxiety and depression, are responsible for individuals missing 12 billion workdays annually. This results in a loss of productivity that costs the economy one trillion dollars [10].

It is necessary for businesses and industries to include a high number of different criteria in order for them to be sustainable. It is important to take into consideration not only the social and environmental performance of the organization, but also these characteristics, which should include the ability to generate revenue and continue operational. The amount of money that a company is capable of making is one of the most important factors that determines whether or not it will be successful. The process of rationalization is one approach that may be used to increase productivity. A number of strategies are included in this approach, such as making judgments that are reasonable, encouraging others to take the initiative, and continuously striving to improve. Making the most of the growth and usage of all of the components of the system that is being examined need to be the primary objective of any activity that is considered to be of any kind. In order to ensure that the development process runs without a hitch, it is necessary to have a complete understanding of the objectives of rationalization and change, as well as to establish and keep up an atmosphere that is conducive to the accomplishment of these objectives. If you want to achieve your sustainability objectives, including ergonomics into your company plan might be of assistance. This might be shown in a variety of ways, including the implementation of programs that concentrate on occupational health and safety, the design of work with people in mind, the provision of learning opportunities for both individuals and groups, the engagement of workers, the promotion of wellness in the workplace, and the maintenance of a healthy balance between work and life [11].

When one considers the impacts that technology has on people, the situation gets far more difficult.

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Because educators have not spent a significant amount of time researching or discussing ergonomics, the general populace does not have a great deal of knowledge on this topic [12]. In addition, there is a dearth of research that is geared at addressing occupational health and safety concerns within the hospitality and tourist sectors of India. When it comes to ergonomics, the posture of the person while they are executing their job is a very significant factor to consider. This encompasses every aspect of the body, from the head to the shoulders to the trunk to the legs, as well as the length of time that you are in labor. On the other hand, the neck may be bent, rotated, or extended in accordance with the requirements of different situations. It is possible that the arms, hands, and shoulders will be used in a variety of various postures while doing the exercise. On the other hand, the amount of labor that the worker will have to accomplish will increase in proportion to the degree to which their body travels away from the neutral position. If they remain in that posture for an extended period of time, they may experience a great deal of pain. However, despite the fact that there have been some achievements in combining ergonomic and psychological strategies, there are still a few concerns that need to be solved. The findings of the research indicate that there is an immediate need for treatments that include both the enhancement of the physical architecture of the workplace and the beginning of activities to improve mental health [13].

3. METHODOLOGY

Production schedules are becoming more popular in the manufacturing industry, and they are being improved and simplified. One of the goals of this is to improve the functioning of the system. The passage of time is a worry; however, we must also take into consideration the individuals involved, as they have the potential to make the solution less effective. The evaluation of the manufacturing processes may be done in a variety of different ways, and every one of these approaches has the potential to provide better outcomes in terms of efficiency, reduced waste, improved quality, or making it simpler for the organization to carry out its duties. One of the most important aspects of ergonomic philosophy is the process of determining how individuals make use of various components of a system and developing concepts, theories, and strategies that might assist workers in accomplishing their goals. Because of this, companies are able to maximize the potential of their employees as well as the system as a whole. One of the primary objectives of ergonomics is to assist people in accomplishing more while they are at work.

4. ANALYSIS

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Table 1: Correlation Analysis

Correlations	Physical Ergonomic Risk Factors	Cognitive Ergonomic Factors	Work-Related Stress and Burnout Levels	Employee Performance in the IT Industry
Physical Ergonomic Risk Factors	1	.755**	.784**	.791**
Cognitive Ergonomic Factors	.755**	1	.967**	.908**
Work-Related Stress and Burnout Levels	.784**	.967**	1	.939**
Employee Performance in the IT Industry	.791**	.908**	.939**	1

The results of the correlation study show that there is a robust and statistically significant association between all of the investigated factors. All of the following are positively correlated: employee performance, levels of work-related stress and burnout, cognitive ergonomic variables, and physical ergonomic risk factors ($r = 0.755$, $p < 0.01$). Employee performance in the information technology workplace may be significantly affected by poor physical ergonomics due to the strong correlation between these factors and elevated stress and cognitive strain levels. The cognitive ergonomic aspects are significantly associated with workplace stress and burnout ($r = 0.967$, $p < 0.01$). Therefore, when confronted with increased cognitive demands, complicated activities, or an overwhelming quantity of information, IT workers are more likely to feel emotional and mental tiredness. A substantial correlation exists between cognitive ergonomic measurements and occupational performance ($r = 0.908$, $p < 0.01$). This proves that cognitive strain has a major effect on work output and efficiency. How well workers do their jobs is strongly correlated with workplace stress and burnout ($r = 0.939$, $p < 0.01$). The results of this research show that emotional and mental weariness are major contributors to the lack of productivity among IT workers. Mental and physical ergonomic risk factors are interrelated, and the results demonstrate that they have a substantial effect on workers' productivity on the job. Stress management and the elimination of ergonomic hazards may, based on the strength of these links, considerably enhance IT performance.

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Table 2: Regression Analysis

Model	Sum of Squares	df	Mean Square	F	p value
Regression	281.844	3	93.948	391.714	.000b
Residual	35.016	146	0.24		
Total	316.86	149			
Coefficientsa	B	Std. Error	Beta	t	p value
(Constant)	0.043	0.105		0.411	0.68
Physical Ergonomic Risk Factors	0.136	0.043	0.142	3.192	0.00
Cognitive Ergonomic Factors	-0.004	0.111	-0.004	-0.037	0.97
Work-Related Stress and Burnout Levels	0.85	0.117	0.832	7.259	0.00
a Dependent Variable: Employee Performance in the IT Industry					

The regression analysis confirms the significance of each component of the model. Workers in the information technology industry are considerably affected by cognitive ergonomic variables, work-related stress and burnout, and physical ergonomic risk factors, according to the p-value of 0.000 ($p < 0.001$). Since the sum of squares from the regression model (281.844) exceeds that from the residual sum of squares (35.016), it may be concluded that a significant amount of the variance in employee performance is explained by the regression model. The selected ergonomic parameters seem to account for the effects on the performance of IT personnel. Physical ergonomic risk indicators have a favorable and statistically significant effect on employee performance as independent predictors ($B = 0.136$, $\beta = 0.142$, $t = 3.192$, $p < 0.01$). This proves that changes to the physical and ergonomic work environment considerably affect workers' productivity. The effect is still significant once other variables are controlled for, regardless of how big the standardized beta value is. Cognitive ergonomic features do not have a substantial influence on employee performance, according to the data ($B = -0.004$, } $= -0.004$, $t = -0.037$, $p = 0.97$). Cognitive ergonomic factors still cannot predict performance independently, even after accounting for physical ergonomic hazards and stress levels, as seen by the high p-value in this model. The mountain of research linking them to higher rates of stress and burnout on the job may be to blame. Workplace stress and burnout are the main elements that impact an employee's performance on the job ($B = 0.85$, $\beta = 0.832$, $t = 7.259$, $p > 0.001$). Stress and burnout are the two primary variables impacting performance, as shown by the high standardized beta value. According to the results of this research, mental health is a major factor in the SEM of the IT industry when it comes to productivity and efficiency.

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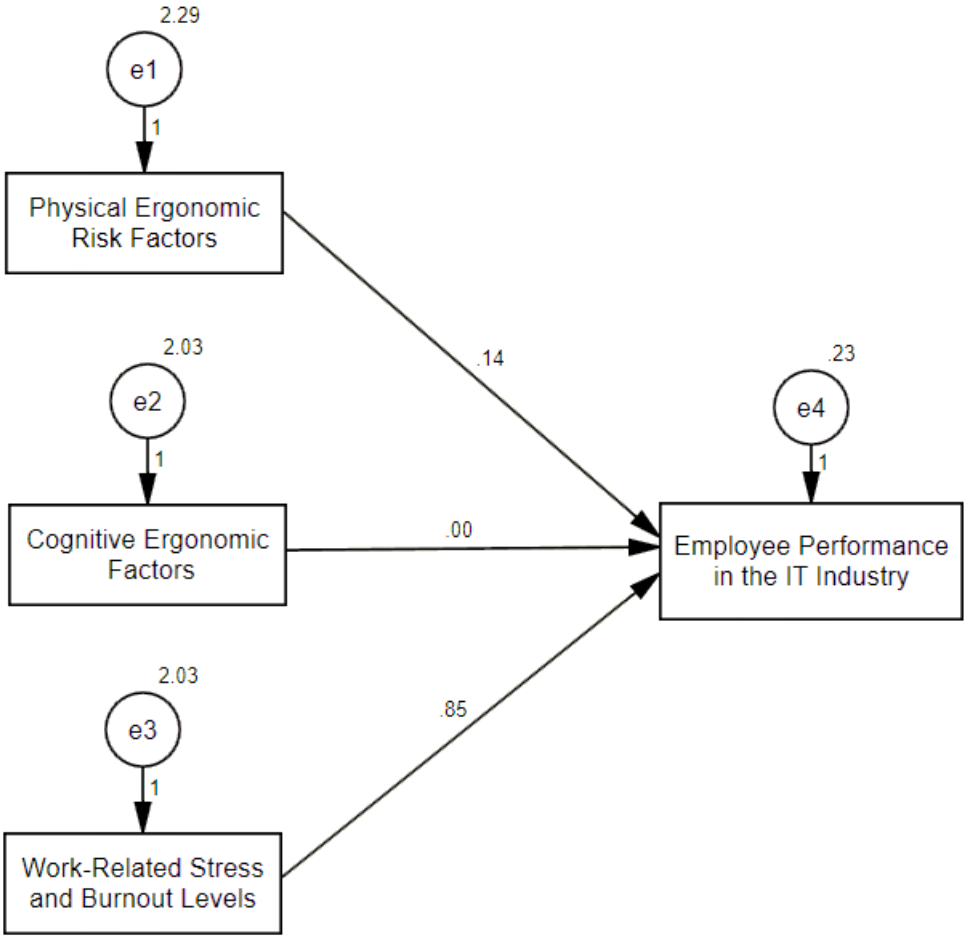
STRUCTURAL EQUATION MODEL



Physical ergonomic risk factors have a substantial influence on the job performance of IT professionals, according to the structural model results (Estimate = 0.136, C.R. = 5.197, $p < 0.001$). The critical ratio (C.R.) is significant at the 5% level since it is higher than ±1.96. This proves that workers' efficiency is greatly affected by their physical ergonomic circumstances. The outcome of the performance assessment is heavily dependent on even a little estimate. Workers' performance on the job is unaffected by cognitive ergonomic features, according to the p-value of 0.88, the estimate of -0.004, and the C.R. of -0.147. In this structural model, cognitive ergonomic traits do not independently predict employee performance, as seen by the tiny critical ratio and elevated p-value. The bulk of the data may be explained by the considerable association between cognitive factors and professional stress and burnout. Office stress and burnout levels had a substantial and positive effect on employees' job performance (Estimate = 0.85, C.R. = 30.548, $p < 0.001$). This variable is the most important one

in the model due to its very high critical ratio. The results show that stress and burnout have a major effect on how well IT workers do their jobs

5. DISCUSSION

Organizational ergonomics includes participatory ergonomics as one of its subfields. Giving individuals the information and authority to make choices about the most essential aspects of their work, and then trusting them to carry out those decisions in a manner that delivers the desired outcomes, is what it means to empower people. During times of crisis, people who work in the field of information technology are more likely to experience feelings of stress and burnout. Pandemics, natural disasters, and economic downturns are all examples of the varieties of crises that fall under this category.

There is a possibility that individuals working for private firms may experience a significant amount of emotional exhaustion as a result of the increasing focus placed on customer-centric operations and the elevated expectations placed on performance. In the event that employees get regular exams, modifications to the ergonomic characteristics of their workplace, and social support programs, it is possible that they will be able to continue working in their current positions and even perform better in any environment [14].

Even while being absent from work is a clear indication of stress, presenteeism and quiet departure may have less obvious effects on workers' performance on the job. When it comes to absence statistics, these elements are not often noted. According to the conclusions of the research, institutions need to address not just the more visible issue of formal attendance, but also the psychological and motivational elements that drive individuals to disengage from their work. It is possible for businesses to retain their employees for longer periods of time by enhancing the ergonomic conditions of their workplaces and making them more spacious and pleasant. There is a possibility that this will also reduce the likelihood of workers leaving without prior notice [15].

Being able to produce high-quality things in a timely manner while maintaining a high level of efficiency is the most critical factor in today's highly competitive business environment. Rationalization is a method for boosting the efficiency of production that entails taking logical action, fostering worker initiative, and using rationalization methods that have been carefully prepared [16]. This method is a means to increase production efficiency. It is essential to make use of and develop each component of the system in a variety of different ways in order to achieve reasonable behaviour. For logical conduct to take place, this is an essential component. In order for it to be successful, all of the individuals involved need to reach a consensus on the objectives and modifications that are required, and the appropriate conditions and criteria need to be established in order for these

modifications to be implemented. It is necessary for individuals to be acquainted with and use contemporary technology, concepts, and methodologies in order to achieve the objective of rationalization projects, which is to increase performance and efficiency.

6. CONCLUSION

There is an unbreakable connection between the function that people play in the production framework of Industry 5.0 and the rise of the firm's value. This connection cannot be severed. There is the possibility for the new digital technology to realize its full potential if the appropriate individuals are in control of its development. Through the use of organizational, cognitive, and physical ergonomics, the all-encompassing method has the potential to make individuals more productive, safe, and comfortable, while also reducing stress and mistake rates. In addition, it is essential to keep in mind that, while considering Industry 5.0, workspaces in human-centric systems may become more adaptable with the assistance of developing technologies like as cyberergonomics, motion capture systems, and wearable gadgets. It is possible that the use of participatory ergonomics and models like as HCV will assist us in better comprehending the dynamic relationship that exists between people and technology. At the end of the day, this will result in the accomplishment of objectives that are not only strong but also long-lasting and in harmony with one another.

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