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STRATEGIES FOR MINIMIZING SICKNESS ABSENTEEISM IN INDUSTRY 5.0 MANUFACTURING SETTINGS

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Abstract

This paper aims to investigate how aspects of health and job characteristics can predict sickness absenteeism in the manufacturing sector, a critical concern in the context of Industry 5.0 and advanced manufacturing. As Industry 5.0 emphasizes human-centric and sustainable approaches, understanding and managing employee well-being is paramount. The research was conducted among 175 participants of different socio-demographic characteristics. The variables were operationalized with a test battery that included - the Mental Health Inventory (MHI - 5; Berwick et al., 1991), The General Heath Questionnaire (GHQ-12, Goldberg & Hillier, 1979), Job Characteristic Inventory (JCI, Sims et al. 1976), and the rate of the sickness absenteeism was measured by the self-reported question: During the past 12 months, how many days in total were you absent from work due to illness? The results have shown that different aspects of health and specific job characteristics determined sickness absenteeism in correlation and prediction. The results underscore the importance of aligning health management strategies with the principles of Industry 5.0, ultimately contributing to enhanced operational efficiency and sustainability in the manufacturing sector. This research not only addresses current challenges but also provides a framework for future studies aimed at improving workforce well-being in advanced manufacturing settings providing preconditions for sustainable workplaces in the manufacturing sector.

Key words: *Industry 5.0, absenteeism, job characteristics, health.*

1. Introduction

The physical presence of employees in their workplaces is an issue that cuts across all organizations. Current reasons for absenteeism highlight the great need for solving this problem in the future. Absenteeism regarding employees is the omission or failure to show up at work at a predetermined time (Swaminathan,

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2010). Sickness absenteeism is further segmented into illness absenteeism which occurs when an employee misses work due to illness or health issues which is often common in many organizations.

Absenteeism is a common concern in every organization and influences the financial performance of the company (Nath et al., 2022). Many employees stay absent without giving any notice. It has been found in studies that less than half of the employees keep records of the absenteeism indexes or have a system put in place to try to eradicate it (Nath et al., 2022) Such complacency can further compound the concerns that are already bedeviling organizations since they do not tackle the reasons why absenteeism exists and instead focus on solving its effects.

Sickness absenteeism has been a problem for manufacturers for a long time. This problem remains an important area of concern especially now that the industry is in the age of Industry 5.0. Sickness absenteeism is inefficient amid production activities, but resorts organizations to additional costs, loss of output, hideous revenue, and excess burden on workers left in the organization (Mikalachki & Gandz, 2005). Thus, manufacturers must rethink their approaches to this problem by adopting strategic solutions based on the health of employees, and the organizational environment.

1.1 Research problem

Health, job characteristics, and sickness absenteeism among the employees of manufacturing companies have drawn interest in the context of Industry 5.0. With the achievement of Industry 5.0, there was less focus only on the efficiency of production systems but also on the interaction between people and machines and the application of new technologies to enhance productivity.

Within the workplace context, it has been stated that when job demands are successfully surpassed regardless of the work undertaken, mental health will deteriorate which will result in higher sickness absences. There is more around the issue of the dread of being made redundant because of automation because of the increase in absenteeism.

There is a link between general health which includes emotional, and psychological well-being with the levels of absenteeism in the manufacturing sector. Yet the progress of the progression of Industry 5.0 has eliminated some of the unpleasing job characteristics including shift work, long hours, and repetitive work, and poor work habits such as lack of work-life balance have detrimental effects on worker's overall health (Marecki, 2024). Studies indicate that people can address some of these health risks and reduce the absenteeism by changing work patterns, giving more freedom in planning schedules, and reducing physical demands (Grønstad et al., 2019).

The job characteristics have a lasting effect on both mental and physical health with an immediate impact on absenteeism in the Industry 5.0 environments. The Job Demands-Resources model recognizes that when high job demands are placed without attachment of sufficient resources, the worker is likely to experience such consequences as burnout, mental fatigue, and absenteeism (Bakker & Demerouti, 2017). Although the examination of Industry 5.0 has heightened

cognitive demands, additional resources have also been incorporated such as real-time AI systems support as well as good quality decision-making tools, which reduce the effect of job strain (García-Madurga et al., 2024). However, ambiguity in organizational roles and role overload given technological advancements, persist in exposing occupational stress and absenteeism to high levels (Ioannou, 2023). It is important to manage and mitigate the unreasonable workload by providing sufficient resources and a reasonable level of absenteeism in the workplace (Gagnon et al., 2017).

Based on the research problem identified, the research question can be stated as follows: 'In the perspective of Industry 5.0 employment, how do mental health, general health, and characteristics of the job in the organization affect sickness absenteeism in a manufacturing organizations?'

2. Method

2.1 Sample

The research was conducted on a sample of 175 respondents, employed in large companies from the manufacturing sector. In terms of socio-demographic features, the research included 74 (42.3%) female respondents and 101 (57.7%) male respondents. In terms of education, 118 (67.4%) respondents completed high school, 26 (14.9%) completed college, 16 (9.1%) completed a bachelor's degree, while 15 (8.6%) of them completed master's studies.

Table 1: Sample structure

Category	Frequency	Percent	Valid Percent	Cumulative Percent
Male	74	42,3	42,3	42,3
Female	101	57,7	57,7	100,0
Highschool	118	67,4	67,4	67,4
Higher School	26	14,9	14,9	82,3
Bachelor	16	9,1	9,1	91,4
Master	15	8,6	8,6	100,0

The age of the respondents ranged from 21 to 60 years (M = 36.36; SD=9.25). The respondents' work experience ranged from 1 to 39 years (M = 11.04; SD = 8.441).

Table 2: Descriptive statistics of the variables age and length of service

Variables	N	Min	Max	M	SD
Age	175	21,00	60,00	36,36	9,258
Length of service	175	1,00	39,00	11,04	8,441

2.2 Measures

The Mental Health Inventory - MHI-5 (Berwick et al., 1991) was used to operationalize the mental health variable. The questionnaire consist of 5 questions,

with the original six-level ordered category item format. It includes questions related to both positive and negative aspects of mental health.

The General Heath Questionnaire (GHQ-12; Goldberg & Hillier, 1979) was used to measure the employee's general health. The GHQ-12 is a version of the questionnaire, derived from the original 60-item General Heath Questionnaire (The General Heath Questionnaire – GHQ, Goldberg, 1978). The questionnaire consists of 12 items on a five-point Likert-type scale

Absence from work due to health issues at the workplace was operationalized by the question: "During the past 12 months, how many days in total were you absent from work due to illness?"

The Job Characteristics Inventory (Sims et al., 1976) was used as a measure of employees' perceptions of their job characteristics. The questionnaire consists of 30 items, five-level, arranged categories, Likert type, which measure six subscales, namely: job variety, autonomy, feedback, cooperation with others, task identity and friendship.

3. Results

The Table 3 below shows the descriptive statistics of the variables. The table includes means and standard deviation for the variables – Absenteeism, Sickness absenteeism, Mental health, General health and six dimensions of job characteristics - Skill variety Autonomy, Mental Health, General Health, Autonomy, Feedback, Dealing with others, Task Identity and Friendship.

Table 3: Descriptive statistics

Varibles	M	SD
Absenteeism	15,84	11,343
Sickness absenteeism	5,27	7,954
Mental health	14,70	2,818
General health	35,20	6,321
Skill variety	20,46	3,110
Autonomy	21,62	4,472
Feedback	19,76	4,051
Dealing with others	12,65	1,828
Task Identity	15,90	3,270
Friendship	30,17	4,516

Based on the set regression model, in which the set of predictors consists of mental health, general health and job characteristics, and the criterion sickness absenteeism, it was determined by the coefficient of determination that the set of predictors explains 9% of the variance of the criterion. The results of the multiple regression analysis are shown in the table below the text.

Table 4: Regression model

Model	R	R2	Adjusted R2	Std. Error of the Estimate
1	,301	,090	,042	10,774

By testing the significance of the model, it was determined that the set of predictors does not statistically significantly explain the set criterion. The results of testing the significance of the model are shown in the Table below the text.

Table 5: Significance of the regression model

Model	SS	Df	MS	F	p
Regression	1751,890	8	218,986	1,886	,066
Residual	17645,489	152	116,089		
Total	19397,379	160			

Based on the partial contributions of the predictors, it is determined that mental health and general health are not statistically significant predictors of sickness absenteeism, while two job characteristics stood out as significant positive predictors of sickness absenteeism - Task identity (β = .293; p = .007) and Friendship (β = .183; p = .049).

Table 6: Partial predictors

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error	Beta		
Mental health	,215	,368	,054	,584	,560
General Health	,052	,169	,029	,311	,756
Skill variety	-,435	,364	-,118	-1,194	,234
Autonomy	,476	,261	,195	1,826	,070
Feedback	-,058	,229	-,022	-,255	,799
Dealing with others	-,962	,617	-,154	-1,559	,121
Task Identity	,986	,360	,293	2,744	,007
Friendship	,440	,228	,183	1,930	,049

4. Discussion

This research aimed to understand how mental health, general health, and other job related factors impact sickness absenteeism in manufacturing companies in the context of Industry 5.0. On the basis of the regression model, it was established that the predictor set of mental health, general health, and job characteristics only accounted for 9% variation of sickness absenteeism. Additionally, the test for the statistical significance of the model revealed that the set of predictors does not significantly explain the variance in absenteeism, which raises important considerations about the complexity of factors influencing absenteeism beyond those captured in this study.

Interestingly, the partial contributions of individual predictors revealed more nuanced insights. Mental health and general health, which are commonly hypothesized to have strong links to absenteeism, were found to be statistically non-significant in this model. This finding contrasts with much of the existing literature that highlights the role of poor mental and physical health in predicting absenteeism (Karanika-Murray & Biron, 2020). One possible explanation for this result could be the advancements in workplace health programs and Industry 5.0's worker-centered approach, which may mitigate some of the negative impacts of health problems on attendance. Another explanation could be the relatively low variance explained by the model, suggesting that other unexamined variables, such as organizational policies or individual coping mechanisms, may play a more significant role.

However, two job characteristics—Task Identity and Friendship—emerged as significant positive predictors of sickness absenteeism. Task identity ($\beta = .293$, $p = .007$) reflects the degree to which an employee identifies with their work and perceives it as meaningful, and this strong association with absenteeism suggests that workers who feel more responsibility toward their tasks may be more susceptible to stress or pressure, leading to higher absenteeism. Similarly, friendship ($\beta = .183$, $p = .049$), representing the social connections formed at work, was also a positive predictor. While workplace friendships are typically linked to better job satisfaction and well-being, this finding indicates that strong social bonds may encourage informal absenteeism (e.g., taking leave to support colleagues or due to social pressures). This underscores the complexity of social dynamics at work in Industry 5.0 environments, where technological collaboration is increasingly accompanied by human-centric team structures (Tóth et al., 2023). These findings suggest that job characteristics may play a more direct role in absenteeism than previously thought, and interventions targeting work identity and social dynamics may be important in managing absenteeism in manufacturing companies.

5. Conclusion

This study explored the relationship between mental health, general health, and job characteristics in predicting sickness absenteeism within manufacturing companies adapting to Industry 5.0 technologies. The findings challenge traditional assumptions, as mental and general health were not found to significantly influence absenteeism. Despite widespread recognition of health as a key factor in absenteeism, this suggests that technological advancements and changes in workplace dynamics under Industry 5.0 may reduce the direct impact of health issues on attendance. Job characteristics, however, emerged as critical factors influencing absenteeism. Specifically, the sense of responsibility towards tasks and social relationships in the workplace were significant predictors. These findings demonstrate the necessity of understanding the specific factors that will shape absenteeism in a humanized, technologically oriented-work setting. Pertaining to Industry 5.0, the results indicate that organizations need to manage the job and organizational culture so as to reduce absentees and increase engagement. Given the current structural composition of the industry, the study highlights the importance of expanding the boundaries of absenteeism management to include factors outside health, to include critical job characteristics.

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