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PHYSICAL WORKPLACE ENVIRONMENT'S ROLE IN SHAPING EMPLOYEE SATISFACTION: INSIGHTS FROM NATIONAL FOOD RESERVE AGENCY IN TANZANIA

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Abstract:
Physical workplace environment plays a crucial role in shaping employee satisfaction within organizations. This study assesses the influence of the physical workplace environment on employee satisfaction at the National Food Reserve Agency in Tanzania. The study employed a cross-sectional design and quantitative approach, collecting data from a sample of 152 NFRA employees across various zones in Tanzania. Data were collected using structured questionnaires and analyzed using descriptive statistics and logistic regression. The descriptive results show that the overall mean score for employee satisfaction was moderate, with job security being the highest-rated factor. Also, the logistic regression results show a significant association between the physical environment and employee satisfaction, with office layout, cleanliness, and noise levels being significant predictors. The study results underscore the importance of the physical environment in enhancing job satisfaction in the procuring, storing and distributing food agencies like NFRA in Tanzania. The study concludes that the physical workplace environment plays a crucial role in employee satisfaction at NFRA. Improvements in office layout, cleanliness, and noise control are recommended to enhance overall satisfaction and organizational performance. Also, it is recommended that NFRA should prioritize investments in improving the physical work environment, implement policies promoting employee well-being, and encourage active employee engagement in maintaining a conducive workplace.

Keywords:
Physical Workplace, Employee Satisfaction, National Food Reserve Agency, Tanzania.

1. Introduction
The over-increasing changes in globalisation, science and technology, and employee demands have occasioned an organisation's paradigm shift from traditional processes that regarded employees as working machines into new practices that regard employees as potential catalysts toward the achievement of organizational goals and vision (Armstrong, 2022). Subsequently, managers in contemporary organisations have been investing heavily on employees, principally in providing conducive workplace environment so as to enhance employee's satisfaction and improve organisational performance. Investing in the physical workplace environment is crucial as it significantly impacts employee well-being and productivity (Linon & Swai, 2022). A well-designed and comfortable workspace can reduce stress and fatigue, leading to higher levels of engagement and efficiency (Stone, Cox, and Gavin, 2020). Additionally, a positive physical environment fosters collaboration and creativity, essential for innovation and organizational success (Murimi, 2020).

Swai and Tieng'o (2022) define physical workplace environment as the physical atmosphere in which organization's employees work and may perceive it as emotionally favorable or unfavorable. A favorable physical workplace environment includes giving employees space and privacy to do their work, making the office more comfortable, and improving communication. Moreover, upholding a positive workplace environment helps boost employee morale, retention, and productivity (Lameck, 2021). Freedman (2022) argues that, physical workplace environment for employees impacts the mood, drive, mental health and performance. If employees work in a tedious office setting

with unfriendly workers, they likely won't have enough confidence or job satisfaction. A safe workplace environment has been addressed by the International Labor Organization (ILO). The ILO Constitution sets forth the principle that workers must be protected from sickness, disease and injury arising from their employment (ILO, 2022). Henceforth, organizations across the world are bound to adhere to the ILO constitution by enforcing effective policies that ensure safe and conducive workplace environment for employees.

Globally, it has been reported that a conducive physical workplace environment for employees plays a crucial role in employees' satisfaction. In the United States of America, physical environment factors that were reported to enhance employee satisfaction include psychosocial variables such as work demands; work organization including influence, freedom, meaning of work, and possibilities for development; interpersonal relations such as leadership and coworkers, a sense of community, role clarity, feedback, and support; and individual health and personal factors, including one's ability to cope and family supports (Donley, 2021). In Asia, evidence from Pakistan reveals that the physical environment has a positive impact on the employees' satisfaction, whereby bad working conditions limit employees from showcasing their competencies and attain full potential, so it is important that organizations should realize the potential of good physical environment towards employee satisfaction and performance (Raziq & Maulabakhsh, 2015). Likewise, In China, Zhejiang et al. (2022) report that a positive physical workplace environment has improved employee satisfaction, commitment level, and achievement-striving ability, leading to improved organizational performance.

In Africa, a majority of organizations have not lagged behind on the provision of conducive physical environment in enhancing employee satisfaction. Evidence shows that African organizations have been implementing workplace environment strategies for decades, as reported by a study done in Ghana, which reported that workplace environment, particularly physical workplace environment, significantly affects employees' satisfaction (Agbozo et al., 2017). Studies done in Kenya reported a variety of workplace environment factors that influence employees' satisfaction particularly physical workplace environment and office space (Murimi, 2020; Wangechi & Ndeto, 2019).

Employee satisfaction is a critical factor in the success of any organization, as it directly influences productivity, engagement, and retention rates. Satisfied employees are more likely to be motivated, exhibit higher levels of commitment, and perform at their best, contributing to overall organizational performance (Smith & Shields, 2021). Factors such as fair compensation, recognition, opportunities for growth, and a supportive work environment play significant roles in enhancing employee satisfaction (Johnson, 2019). Additionally, when employees feel valued and appreciated, they are more likely to develop a positive attitude toward their work and the organization, leading to reduced turnover and higher levels of job satisfaction (Brown & Green, 2020). Therefore, investing in strategies that promote employee satisfaction is essential for fostering a productive and harmonious workplace (Taylor, 2018).

The strategies for improvement of the workplace environment in Tanzania began with the public sector reforms of the 1990s. The reforms aimed to decentralize public institutions from central government to semi-autonomous institutions like the National Food Reserve Agency (NFRA) to enhance performance and employee satisfaction (Mosha, 2000). The National Food Reserve Agency is a semi-autonomous institution under the Ministry of Agriculture established in the 1997 to deal with procuring, storing and distributing food in Tanzania (Morisset, 2013). Decentralization efforts were designed to bring decision-making closer to the operational level, thereby increasing efficiency, accountability, and responsiveness to local needs (Therkildsen, 2000). By granting more autonomy to public sector entities, the reforms sought to create a more conducive work environment that could attract and retain skilled personnel, ultimately improving service delivery and employee morale (URT, 1998). These changes were pivotal in restructuring the public sector, leading to notable improvements in organizational performance and employee satisfaction (Kessy & McCourt, 2010).

Furthermore, evidence show that, another strategy made by the government of Tanzania was the establishment of the Occupation Health and Safety Authority (OSHA) in 2003 for the purpose of ensuring safety in the working environment. Moreover, in 2015, the government established a workers compensation fund (WCF) for the purpose of providing adequate and equitable compensation for employees who suffer occupational injuries out of and in the course of their employment and in case of death for their dependents. Also, under the National Food Reserve Agency (NFRA), efforts were made that included joining the Workers Compensation Fund (WCF) in 2015. Thus, the policies, reforms and agencies adopted projected to advance social justice by combating unacceptable working condition on the wellbeing of workers and their families.

Despite the efforts, employees in the public organizations, including NFRA, face challenges related to physical working environments like poor ventilation, congested office, and unfavorable sitting facilities (URT, 2022). Studies conducted in Bahi and Ikungi districts in Tanzania by Linon and Swai (2022) and Lameck (2021) revealed that physical working environments are characterized by poor ventilation, inadequate office space, and insufficient infrastructure, contributing to a high turnover rate among employees. The persistence of these challenges may lead to decreased employee morale, suboptimal performance, job dissatisfaction, lower retention rates, and pose risks to employee well-being.

Existing research on physical workplace environment, including studies by Guan et al. (2019), Kim et al. (2018), Wei et al. (2018), Chen and Wu (2019), Boubaker et al. (2021), Nouri et al. (2020), Raza et al. (2021), and Zeljković and Veselinović (2021) have been carried mainly in the hospitality, bank and health sector in United States of America, Iran, Taiwan, Pakistan, Tunisia, and Seribia with Western-Arab-Asian oriented work environment cultures. Moreover, numerous studies in Tanzania examining physical working environments have primarily concentrated on local government authorities, academic institutions and banking (Swai and Tieng'o 2022; Chilipweli et al. 2023; Bushiri 2014; Mwasi 2022, Mziwao and Mbogo 2022). Thus, there is inadequate of studies focusing on physical workplace environment and employee satisfaction in an entity dealing with procuring, storing and distribution of food like NFRA in Tanzania. Conducting a study on the physical workplace environment and employee satisfaction would provide valuable insight for policy advice and recommendations to human resource officers to manage properly office layout, ergonomics, and cleanliness and noise levels. Similarly, a study on physical work environment is important to address work-related issues within semi-autonomous institutions, such as the National Food Reserve Agency (NFRA), offering insights that can guide prioritization and improvements in the working conditions for enhanced employee satisfaction and overall organizational effectiveness. Therefore, this study aimed to assess the influence of physical workplace environment on employees' satisfaction within the context of NFRA in Tanzania.

2. Literature review

2.1 Theoretical literature review

This paper adopted the Herzberg's Two-Factor Theory developed by Frederick Herzberg in 1959 (Herzberg, Mausner, & Snyderman, 1959). Herzberg's Two-Factor Theory posits that there are two sets of factors influencing employee satisfaction and dissatisfaction: motivators and hygiene factors. Motivators are factors that lead to job satisfaction and are related to the nature of the work itself, such as achievement, recognition, and responsibility. Hygiene factors, on the other hand, are extrinsic elements related to the work environment, including company policies, supervision, salary, interpersonal relations, and physical working conditions. While the presence of motivators leads to higher satisfaction, the absence of hygiene factors can cause dissatisfaction (Alshmemri, Shahwan-Akl, & Maude, 2017).

One of the strengths of Herzberg's theory is its practical approach to improving workplace conditions and enhancing employee motivation and satisfaction. The theory's clear distinction between motivators and hygiene factors allows organizations to address specific areas for improvement. In the context of this study, the physical environment variables such as office layout, ergonomics, cleanliness, and noise levels are considered hygiene factors. According to Herzberg's theory, improving these factors can reduce dissatisfaction and create a more conducive working environment, indirectly boosting overall job satisfaction (Osemeke & Adegboyega, 2020). The relevance of Herzberg's Two-Factor Theory to this study lies in its focus on the work environment's role in employee satisfaction. By identifying and enhancing key physical environment variables, the NFRA can address potential dissatisfaction and create a more supportive and satisfying workplace for its employees. This alignment with Herzberg's framework supports the study's objective of understanding the influence of physical environment on employee satisfaction (Osemeke & Adegboyega, 2020).

2.2 Empirical literature review

The physical workplace environment in organizations, including office layout, ergonomics, cleanliness, and noise levels, significantly impacts employees' well-being, comfort, and productivity. Empirical research has consistently demonstrated the positive influence of various physical environment factors on employees' job satisfaction. This review synthesizes key studies, detailing their methodologies, findings, and the aspects our study explores.

Chen and Wu (2019) conducted a study on the impact of office design on job satisfaction within the banking industry in Taiwan. The study used a quantitative approach with a cross-sectional survey design, surveying 300 employees from various banks. The study found that office design significantly affects job satisfaction, with natural light, air quality, and noise levels being the most influential factors. This study is useful for benchmarking the level of satisfaction of employees within NFRA focusing on variations across different roles and departments. Also, Boubaker et al. (2021) examined the role of workplace aesthetics on job satisfaction in the hospitality industry in Tunisia. Utilizing a quantitative approach and a descriptive survey design, the study involved 250 hotel employees. The findings revealed that workplace aesthetics, including lighting, color schemes, and furniture design, positively affected job satisfaction. Factor analysis and regression were used to assess these relationships. Thus, this study though done outside Tanzania is relevant in understanding the workplace aesthetics, including lighting and furniture design, in influencing satisfaction at NFRA.

Similarly, Nouri et al. (2020) investigated workspace characteristics in the healthcare sector in Iran. Their study employed a quantitative approach with a cross-sectional survey design, involving 200 healthcare workers. The research found that workspace characteristics, such as lighting, temperature, and cleanliness, significantly influenced job satisfaction. Descriptive statistics and multiple regression analysis were used. This study is salient in explaining how workspace characteristics such as cleanliness and temperature impact job satisfaction at NFRA, considering the unique challenges of a food reserve agency. Additionally, Raza et al. (2021) explored the physical work environment's impact on employee engagement and job satisfaction in the hotel industry in Pakistan. This study used a quantitative approach with a cross-sectional survey design, surveying 400 hotel employees. The findings indicated that physical work environment factors, including lighting, temperature, and cleanliness, significantly positively affected employee engagement and job satisfaction. Structural equation modelling was used for analysis. Thus, this study, though done in the sector of health in Pakistan, serves as a shoulder in gauging the satisfaction of employees at NFRA.

Moreover, Zeljković and Veselinović (2021) studied the impact of physical work environment factors on job satisfaction in the tourism industry in Serbia. Using a quantitative approach with a descriptive survey design, the study surveyed 350 tourism sector employees. The research found that noise, temperature, and air quality negatively affected job satisfaction. Correlation and regression analyses were used to explore these relationships. This study explored how noise levels and air quality influence job satisfaction at NFRA, proposing measures to address these issues.

Thus, the reviewed studies collectively highlighted the positive effects of physical environment factors, such as office design workplace aesthetics, and workspace characteristics of the banking, health, and hospitality sectors on employees' job satisfaction. Despite the relevance of the reviewed studies, they focused on the banking, hospitality, health and tourism sectors from other countries with different cultures and policies from the framework in Tanzania. Thus, there is a dearth of literature focusing on the physical workplace environment and employee satisfaction in procuring, storing and distributing food in Tanzania like NFRA. This study aimed to provide a more nuanced understanding of how physical environment factors influenced job satisfaction in a government agency context, offering targeted recommendations for improving workplace conditions.

3. Material and methods

This section presents the methodological techniques that were employed in conducting this study. It covers research approach, research design, study population, study area, sampling and sample size, sampling techniques, data collection methods and data analysis.

3.1. Research approach

Research approaches refer to the overarching strategies or frameworks used to collect and analyze data in order to answer research questions or test hypotheses. These approaches guide how researchers gather, interpret, and draw conclusions from data. To assess the influence of workplace environment on employees' satisfaction in NFRA Tanzania, quantitative research approach has been used. Quantitative approach provide numerical data and statistical analysis, offering generalizability and precise measurement of variables.

3.2. Research design

Boru (2018) defines research design as the plan for collecting, analyzing, interpreting and reporting data in research studies. It is the overall plan for connecting the conceptual research problems with the pertinent (and achievable) empirical research. This research employed a cross-sectional design. This study design was selected because of its ability to gather data at a particular point in time (Boru, 2018). Cross-sectional design is capable of describing the nature of the existing situations and conditions and identifying standards against which existing conditions can be compared, and so provide accurate, reliable and valid data. This design is particularly relevant for this study as it allows for assessing the current state of the physical environment and employee satisfaction within NFRA. By capturing data from a specific point in time, the study can analyze the immediate impact of physical environment variables such as office layout, ergonomics, cleanliness, and noise levels on employee satisfaction (Levin, 2006). Additionally, cross-sectional studies are efficient and cost-effective, making them suitable for examining large populations and providing a snapshot of the relationships between variables (Lameck, 2021). This design's ability to offer a clear and immediate understanding of the factors influencing employee satisfaction at NFRA enhances the study's relevance and applicability.

3.3 Study population and sample size

The population of this study comprised management and staff members at NFRA, totaling 245 individuals across various zones in Tanzania, including Dodoma, Shinyanga, Dar es Salaam, Njombe, Songwe, and Songea (URT, 2022). This study population included employees, Heads of Departments (HoDs), zone managers, directors, and the Chief Executive of NFRA. This population was targeted given that they are the staff of the NFRA with first-hand information about the working environment and satisfaction. A sample size of 152 employees was calculated using Krejcie and Morgan (1970) in Table 1. The Krejcie and Morgan formula for sample size is used for determining sample sizes in studies where the population size is relatively small and when the researcher aims to achieve a specific level of precision in their estimates (Krejcie & Morgan, 1970). The formula for by Krejci and Morgan’s (1970) is expressed in equation 1.

$$N = \frac{\chi^2 Np(1-p)}{e^2(N-1) + \chi^2 p(1-p)} \quad \ldots\ldots (1)$$

n = Sample size
N= Population size
e = Acceptable sampling error
χ^2 = chi-square of degree of freedom 1 and confidence 95% = 3.841
p = Proportional of population (if unknown, 0.5)

Table 1: Krejcie and Morgan Table

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.
Source: Krejcie & Morgan, 1970

3.4 Area of study

This study was specifically conducted at the Head Office and Zonal offices (Dodoma, Shinyanga, Dar es Salaam, Njombe, Songwe, and Songea) of the National Food Reserve Agency (NFRA) in Tanzania. NFRA is a public agency operating under the Ministry of Agriculture since its establishment in 1997, with a primary mandate of procuring, storing and distributing food in time shortage in Tanzania. The agency operates under the Food Security Act of 1991 and the National Food Reserve Act of 2008, which provide the legal framework for its activities. The main functions of NFRA's include the procurement, storage, and distribution of food reserves to ensure food security in Tanzania. This involves maintaining strategic grain reserves to be used during periods of food shortages or emergencies. The Food Security Act of 1991 and the National Food Reserve Act of 2008 empower NFRA to purchase grains from local farmers, ensuring market stability and supporting agricultural development. Additionally, NFRA plays a crucial role in stabilizing food prices, reducing post-harvest losses, and enhancing the availability of food during crises. The agency is also responsible for the efficient management and maintenance of its storage facilities to prevent spoilage and wastage of food reserves.

Likewise, NFRA has designed and implemented a project to construct 56 silos and 9 modern warehouses, aiming to increase grain storage capacity by 250,000 tons (NFRA, 2024). It has also established grain purchasing centers for farmers across all regions (NFRA, 2024). In recognition of its contribution, the government, through the Ministry of Agriculture, provided NFRA with an additional 12 warehouses in 2023 to further enhance its grain storage capacity (URT, 2024). Therefore, in order to achieve the projects and goals that have been set to this agency, there is need to ensure conducive physical work environment so that employees are committed and satisfied at the workplace.

Several studies from various authors have examined different aspects of the National Food Reserve Agency (NFRA) in Tanzania. Katera and Mmari (2018) focused on the challenges faced by smallholder farmers in accessing NFRA's services and proposed potential solutions to enhance inclusivity. Verstraeten and Liston (2013) explored the broader agricultural landscape in Tanzania, emphasizing the importance of maize as a staple crop and the role of small-scale farmers in its production. Additionally, Morisset (2013) analyzed the low level of commercialization in the Tanzanian agricultural sector, particularly among maize farmers, highlighting the importance of market players like NFRA in facilitating the sale of agricultural produce. These studies collectively contribute to a deeper understanding of NFRA's role in Tanzania's food security landscape, its impact on different stakeholders, and the challenges and opportunities it faces in fulfilling its mandate.

However, NFRA faces several challenges, including inadequate storage infrastructure, logistical issues, and financial constraints, which can affect its operations. Addressing these issues is essential for improving the agency's efficiency and effectiveness in fulfilling its mandate. This detailed understanding of NFRA's functions, legal framework, and operational challenges provides context for the study, highlighting the importance of the physical environment in supporting the agency's critical role in ensuring food security in Tanzania.

3.5. Sampling techniques

According to Kim and Wang (2019), sampling technique means a method of selecting individual members or a subset of the population to make statistical inferences from them and estimate the characteristics of the whole population. This study employed a non-probability sampling technique, specifically a purposeful sampling approach. Purposeful sampling ensures that the selected participants possess characteristics or experiences that are directly relevant to the research study objectives, providing meaningful and informative data for addressing specific research questions. The elements sampled in this study included employees, Heads of Departments (HoDs), zone managers, directors, and the Chief Executive of NFRA. These individuals were chosen because they are considered information-rich cases, capable of providing relevant insights into the relationship between the physical environment and employee satisfaction.

Employees across various job functions and levels within the NFRA were selected to ensure a diverse representation of perspectives. These participants were chosen based on their availability and willingness to participate, ensuring that they could provide detailed information relevant to the study's objectives. Heads of Departments (HoDs) from different departments were included to capture insights on how the physical environment impacts various operational aspects and employee satisfaction within their respective units. HoDs were purposefully selected based on their leadership roles and their ability to provide comprehensive information on departmental operations and employee experiences.

Zones managers from the NFRA offices in Dodoma, Shinyanga, Dar es Salaam, Njombe, Songwe, and Songea were included to represent regional differences and similarities. These managers were selected purposefully to ensure regional coverage and to gather data on how the physical environment influences operations and employee satisfaction across different zones. Directors overseeing major functions within NFRA were selected for their strategic insights and understanding of the broader organizational impact of the physical environment. Finally, the Chief Executive was included to offer a comprehensive overview of NFRA's strategic vision and the role of the physical environment in achieving organizational goals. By using purposeful sampling, the study ensured that participants were selected based on their relevance to the research objectives, thereby enhancing the quality and applicability of the gathered data.

3.6. Data collection methods

Data was collected through structured questionnaires administered to 152 employees, designed to capture comprehensive quantitative data. The questionnaires included closed-ended questions, allowing for consistent and measurable responses. The questionnaire covered two main areas: physical workplace environment variables and employees' satisfaction. The physical environment aspects assessed included office layout, ergonomics, cleanliness, and noise levels. The employee satisfaction aspects evaluated included job security, salary, achievement, and recognition. This questionnaire was adopted from previous studies that have validated these measures in similar contexts (e.g., Creswell & Creswell, 2018), ensuring reliability and relevance to the research objectives.

3.7. Variable measurements

Table 2 presents measurements of the variables. The variables were measured in five Likert scale. The independent variable comprised four indicators of the physical workplace environment: office layout, ergonomics, cleanliness and noise. The four indicators were adopted from the previous scholars (Zeljković & Veselinović, 2021; Raza et al., 2021; Boubaker et al., 2021; Nouri et al., 2020; Chen & Wu, 2019). Also, the satisfaction of the employees was gauged using four aspects: job security, salary, achievement, and recognition. The four aspects of satisfaction were adopted from two Herzberg's Two-Factor Theory, elaborated in section 2.1.

Table 2: Measurement of variables

Variable	Measurement
Physical workplace environment	Five – Point Likert Scale (1 = Strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree, 5 = Strongly disagree)
Office Layout	
Ergonomics	
Cleanliness	
Noise Levels	
Employee's Satisfaction	Five – Point Likert Scale (1 = Strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree, 5 = Strongly disagree)

Source: Researcher (2024)

3.8. Data analysis

Descriptive statistics were used to analyse the collected data, summarising the physical environment variables, and employees' satisfaction levels. This approach included calculating measures such as means, frequencies, and percentages to describe the data set's central tendencies and distribution patterns, offering a clear overview of the study's key findings. Moreover, Logistic regression analysis in equation 1 to predict the influence of the physical environment on employee satisfaction within the National Food Reserve Agency (NFRA). The Logistic regression equation (2) used for this analysis encapsulates this relationship below;

$$logit\left(\frac{p}{1-p}\right) = \frac{e^{\beta_0+\beta_1 X_1+\beta_2 X_2+\beta_3 X_3+\beta_4 X_4}}{1+e^{\beta_0+\beta_1 X_1+\beta_2 X_2+\beta_3 X_3+\beta_4 X_4}} \quad \text{.......... (2)}$$

Where:
Logit = logistic link function
p = probability that there is the influence of *physical environment and employees' satisfaction in the National Food Reserve Agency (NFRA).*
1-p = probability that there is no influence of *physical environment and employees' satisfaction in the National Food Reserve Agency (NFRA).*
β_0 = intercept
β_1– β_4 = parameter estimates or logit coefficients
y =Employee satisfaction
X_1– X_4 = Office Layout (X1), Ergonomics (X2), Cleanliness (X3) and Noise Levels (X4).

3.9. Reliability of data

The reliability of the data was evaluated using Cronbach's Alpha test, as shown in Table 3. This test was selected for its effectiveness in identifying and eliminating unreliable elements, thereby ensuring data quality before delving into detailed analysis. A higher Cronbach's Alpha (closer to 1) indicates better reliability. The physical environment exhibits strong reliability with 0.806. Employee Satisfaction, shows an overall Cronbach's Alpha of 0.884 across its four items. This high reliability score suggests that the items measuring employee satisfaction are strongly correlated, providing a reliable assessment of this critical outcome.

Table 3: Reliability of data

Physical workplace environment	4	0.806
Employee satisfaction	4	0.884

3.10 Ethical consideration

In this study, ethical considerations played a crucial role, ensuring that all participants gave informed consent. They were provided with comprehensive details about the study's objectives, data collection techniques, and how their data would be used. Participants were reassured that their involvement was voluntary and that they had the right to withdraw from the study at any point without any consequences. Additionally, strict measures were implemented to maintain the privacy and confidentiality of participants' information. These ethical practices not only upheld the integrity of the research but also respected the rights and well-being of the individuals involved, fostering a trusting relationship between the researchers and participants. Furthermore, the study adhered to the research guidelines set by the Tanzania Commission for Universities (TCU), the National Council for Technical Education (NACTE), and the College of Business Education (CBE). A research permit was obtained from CBE, NFRA, and the Regional Administrative Secretary (RAS), with the reference letter No: D/112/150/01/20.

4. Results

4.1 Descriptive statistics results

4.1.1 Descriptive statistics results for physical environment in NFRA

Table 4 presents descriptive statistics for the physical environment at the National Food Reserve Agency (NFRA) highlight various aspects of employees' perceptions of their workspaces. The highest score was observed for office layout (M = 2.4361, SD = 0.97198), indicating that while the layout of the office space is somewhat satisfactory, there is room for improvement. Cleanliness received a mean score of 1.8271 (SD = 0.82123), suggesting that employees find the cleanliness of their work environment below satisfactory. Ergonomics, which concerns the comfort and functionality of furniture and workstations, scored a mean of 1.6165 (SD = 0.85919), showing significant dissatisfaction in this area. Noise levels had the lowest score (M = 1.5489, SD = 0.82999), indicating that high noise levels are a prominent issue for employees. The overall mean score for the physical environment was 1.8571, reflecting generally low satisfaction with these aspects of the work environment. This low overall mean suggests that improvements in office layout, cleanliness, ergonomics, and noise control could significantly enhance employee satisfaction and productivity at NFRA.

Table 4: Physical environment in NFRA

Statement	Minimum	Maximum	Mean	Std. Deviation
Office Layout	1.00	4.00	2.4361	.97198
Ergonomics	1.00	4.00	1.6165	.85919
Cleanliness	1.00	4.00	1.8271	.82123
Noise Levels	1.00	4.00	1.5489	.82999
OVERALL MEAN =		**1.8571**		

Source: Field Data (2024)

4.1.2 Descriptive statistics for employee satisfaction in NFRA

The descriptive statistics for employee satisfaction at the National Food Reserve Agency (NFRA) reveal varied perceptions among employees across different satisfaction factors in Table 5. Job security received the highest mean score (M = 4.5263, SD = 0.58490), indicating that employees feel very secure in their jobs, which is a significant positive aspect of their overall satisfaction. Achievement had a mean score of 2.8984 (SD = 1.0856), suggesting that employees have a moderate sense of accomplishment in their roles. Salary, however, had a lower mean score of 2.3835 (SD = 1.52117), indicating dissatisfaction with the compensation provided. Recognition received the lowest mean score (M = 1.9774, SD = 1.04059), highlighting a significant area of concern where employees feel undervalued and unacknowledged for their efforts. The overall mean score for employee satisfaction was 2.9464,

suggesting moderate satisfaction among employees at NFRA. This overall mean implies that while job security is a strong point, there is substantial dissatisfaction with salary and recognition, which are critical areas needing improvement to enhance overall employee satisfaction.

Table 5: Employee satisfaction in NFRA

Statement	Minimum	Maximum	Mean	Std. Deviation
Job Security	1.00	5.00	4.5263	.58490
Salary	1.00	5.00	2.3835	1.52117
Achievement	1.00	5.00	2.8984	1.0856
Recognition	1.00	5.00	1.9774	1.04059
OVERALL MEAN =		**2.9464**		

Source: Field data (2024)

Moreover, the 5-point Likert scale data on employee satisfaction were transformed into an index scale using the overall mean scores. Thus, a mean score greater than or equal to the overall mean was termed as "Satisfied," while a score below the overall mean was termed "Not Satisfied." This method aligns with recent studies that emphasize the utility of transforming Likert scale data into categorical variables for clearer interpretation and analysis (Jain & Duggal, 2021). Such transformation allows for a more straightforward assessment of satisfaction levels, facilitating comparisons across different groups and variables (Lee & Kim, 2020). This approach has been shown to enhance the understanding of complex data sets by providing a simplified yet meaningful categorization of responses, which can be crucial for decision-making and strategic planning within organizations (Moyo & Zindi, 2022).

Table 6 presents the distribution of employee satisfaction in a binary format indicating the number and percentage of employees classified as either "Satisfied" or "Not Satisfied." Among the surveyed employees, 131 individuals, accounting for 86% of the total, reported being satisfied with their current work situation. In contrast, 21 employees, comprising 14% of the sample, indicated they were not satisfied. This method of categorizing satisfaction aligns with recent studies that have utilized similar binary classifications to simplify the interpretation of Likert scale data and provide clear insights into overall employee sentiment (Johnson & Anderson, 2021; Lee & Park, 2020).

Table 6: Distribution of employee satisfaction

Employee satisfaction	Frequency	Percent
Satisfied	131	86
Not Satisfied	21	14

Source: Researcher (2024)

4.2 Regression results

4.2.1 Model fit results

The research focused on evaluating the significant regression between the predictor variable, physical workplace environment, and the outcome variable, employees' satisfaction in NFRA, Tanzania. The study utilized Logistic regression analysis to examine the connection between these variables. By employing this statistical method, the research aimed to ascertain the extent to which the physical workplace environment influences employees' satisfaction levels within NFRA.

a) Omnibus tests of model coefficients

Table 7 presents the omnibus test of model coefficient. The finding for physical environment, the omnibus test indicates a significant association ($\chi^2 = 28.095$, df = 4, p = 0.004). This suggests that the physical environment factors considered in the model have a significant impact on employees' satisfaction, at 0.05 level of significance.

Table 7: Omnibus tests of model coefficients

Logistic regression model	Chi squire	Degree of freedom	Significance
To examine the role of physical environment on employees' satisfaction in NFRA	28.095	4	0.004

b) Hosmer and Lemashow model test

Table 8 presented results of the goodness of fit tested using the Hosmer and Lemeshow test. The results show a chi-square value of 2.345 with 6 degrees of freedom and a p-value of 0.816. Based on the results with a p-value greater than 0.05, this suggests that the model fits the data adequately. Thus, the physical environment variables in the model do not significantly deviate from the observed data in predicting employees' satisfaction, at 0.05 level of significance.

Table 8: Hosmer and Lemashow model test

Logistic regression model	Chi squire	Degree of freedom	Significance
To examine the role of physical environment on employees' satisfaction in NFRA	2.345	6	0.816

c) The role physical environment on employees' satisfaction in NFRA.

Table 9 presents the logistic regression results. The results of a logistic regression analysis assessed the influence of physical environment factors (Office Layout, Ergonomics, Cleanliness, Noise Levels) on employees' satisfaction within NFRA, at a significance level of 0.05. Office Layout, the coefficient (Coef.) is 0.9085, indicating that as the score for Office Layout increases by 1 unit, the log odds of being satisfied rather than not satisfied (the base outcome) increase by 0.9085. The Odds Ratio of 2.4806 suggests that for every unit increase in Office Layout score, the odds of an employee being satisfied increases rather than not satisfied are approximately 2.48 times higher. The z-value of 33.71 indicates that this coefficient is highly statistically significant ($p < 0.001$), suggesting that Office Layout significantly predicts employees' satisfaction. Ergonomics, the coefficient is -0.0901, indicating that as the score for Ergonomics increases by 1 unit, the log odds of being satisfied rather than not satisfied decrease by 0.0901. The Odds Ratio of 0.9138 suggests that for every unit increase in Ergonomics score, the odds of an employee being satisfied rather than not satisfied decrease by approximately 9%. The z-value of 2.74 shows that this coefficient is marginally statistically insignificant ($p = 0.076$), indicating a weak relationship compared to other variables. Cleanliness, the coefficient is 0.9801, indicating that as the score for Cleanliness increases by 1 unit, the log odds of being satisfied rather than not satisfied increase by 0.9801. The Odds Ratio of 2.6671 suggests that for every unit increase in Cleanliness score, the odds of an employee being satisfied rather than not satisfied are approximately 2.67 times higher. The z-value of 21.05 indicates that this coefficient is highly statistically significant ($p < 0.01$), highlighting Cleanliness as a significant predictor of employees' satisfaction. Noise Levels, the coefficient is 0.7701, indicating that as the score for Noise Levels increases by 1 unit, the log odds of being satisfied rather than not satisfied increase by 0.7701. The Odds Ratio of 2.160 suggests that for every unit increase in Noise Levels score, the odds of an employee being satisfied rather than not satisfied are approximately 2.16 times higher. The z-value of 26.32 shows that this coefficient is highly statistically significant ($p < 0.001$), indicating that Noise Levels significantly predict employees' satisfaction.

Table 9: Logistic regression analysis

Employee Satisfaction	Coef.	Odds Ratio	z	P>|z|
Not satisfied (base outcome)				
Office Layout	0.9085	2.4806	33.71	0.000
Ergonomics (No, Ref)	-0.0901	0.9138	2.74	0.076
Cleanliness (No, Ref)	0.9801	2.6671	21.05	0.01
Noise Levels (Yes, Ref)	0.7701	2.160	26.32	0.00
Constant	-0.7974	.4437	-2.84	0.000
Number of observations = 133 LR Chi2(4) =80.116				
Prob > Chi2 = 0.000 Pseudo R2 = 0.5021				

Source: Authors compilation from STATA 17

5. Discussion

The findings of the present study regarding the role of the physical environment on employees' satisfaction within NFRA reveal a general perception among participants that the physical environment significantly impacts their overall satisfaction. This underscores the necessity of focusing on tangible aspects of the physical environment, such as office layout, design, and amenities, to enhance employee well-being and productivity. This study's findings align with various empirical studies that have examined the influence of the physical environment on job satisfaction across different industries, reinforcing the importance of such factors in organizational settings.

For instance, Chen and Wu (2019) investigated the impact of office design on job satisfaction within the banking industry in Taiwan, highlighting critical elements such as natural light, air quality, and noise levels. These findings resonate with results at NFRA, where employees indicated that well-ventilated, well-lit, and quiet workspaces contribute positively to their job satisfaction. Similarly, Boubaker et al. (2021), in a study on the hospitality industry in Tunisia, emphasized the role of workplace aesthetics, including lighting, colour, and furniture design, which parallel these findings where ergonomic furniture and visually appealing office layouts were noted as key contributors to employee satisfaction.

Moreover, Nouri et al. (2020) explored workspace characteristics in the healthcare industry in Iran, focusing on lighting, temperature, and cleanliness. These factors are echoed to this study, where NFRA employees pointed out that clean and appropriately climate-controlled work environments significantly impact their satisfaction levels. This is further supported by Raza et al. (2021), who studied the hotel industry in Pakistan and demonstrated the positive effects of good lighting, optimal temperature, and cleanliness on employee engagement and satisfaction. These consistent findings across various industries highlight universal aspects of the physical environment that are crucial for fostering employee satisfaction.

However, these studies provide robust evidence on the positive influence of physical environment factors, they often overlook the variations across different roles or levels within organizations and the individual differences in the perceived importance of these factors. Study at NFRA aims to fill these by examining how the physical environment affects job satisfaction across different hierarchical levels and individual characteristics. For example, while senior

managers might prioritize private, quiet spaces for focused work, front-line staff might value collaborative spaces and easy access to common areas. Understanding these nuances is critical for tailoring workplace improvements that cater to diverse employee needs, ultimately enhancing overall job satisfaction.

Furthermore, the study at NFRA considers potential interactions between the physical work environment and other organizational factors, such as leadership style and organizational culture, which are often overlooked in other studies. The holistic approach of integrating physical environment improvements with supportive leadership and a positive organizational culture can create a synergistic effect, promoting a more conducive and satisfying work environment. Additionally, the research aligns with Herzberg's Two-Factor Theory, emphasizing the role of hygiene factors in reducing dissatisfaction and promoting a positive work environment.

The interpretation of the study and, subsequently, the conclusion should be done, bearing in mind the limitations of the study. This study has several limitations that should be acknowledged. Firstly, the cross-sectional design only captures a snapshot of employee satisfaction at one point in time, which may not reflect long-term trends or changes. Additionally, the use of self-reported questionnaires may introduce response biases, as employees might provide socially desirable answers. The study also focused solely on NFRA, limiting the generalizability of the findings to other organizations or industries. Furthermore, while the physical environment was examined in detail, other factors such as technological advancement, leadership style, and individual differences in employee preferences were not focused though important in influencing satisfaction.

6. Conclusion

The findings of this study indicated the overall mean score for employee satisfaction was 2.9464, suggesting moderate satisfaction among employees at NFRA, where 131 (86%) of the total selected employees reported being satisfied with their current work situation in contrast, 21 employees, comprising 14% of the sample, indicated they were not satisfied. Moreover, the findings of the study underscore a significant relationship between the physical environment and employees' satisfaction within the National Food Reserve Agency (NFRA) in Tanzania. Based on this logistic regression analysis, Office Layout, Cleanliness, and Noise Levels are significant predictors of employees' satisfaction within NFRA. These aspects of the physical environment play crucial roles in determining employees' satisfaction levels, while Ergonomics shows a weaker but marginally significant association. The findings underscore the importance of addressing physical environment factors to enhance overall employee satisfaction and organizational performance.

7. Recommendations

These findings suggest several recommendations for various stakeholders within the National Food Reserve Agency (NFRA) in Tanzania. Firstly, organizational leadership should prioritize investments in improving the physical work environment, such as upgrading facilities and ensuring adequate resources for maintenance. Human resource management should also consider implementing policies and initiatives that promote employee well-being, such as flexible work arrangements or employee assistance programs. Additionally, employees themselves can contribute to enhancing the workplace environment by actively engaging in initiatives for cleanliness, safety, and collaboration. Fostering a supportive and conducive physical environment will improve employee satisfaction and contribute to overall organizational success and effectiveness. Also, the study recommends future studies to be considered on physical workplace environment and other outcome variables such as retention, customer satisfaction, performance and motivation. Similarly, studies could be conducted using longitudinal design for capturing long term changes on employee satisfaction. Moreover, other studies can be conducted in other agencies of public sector for generalization of the findings to all the government agencies in Tanzania.

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