A Critical Analysis Model on Design of Office Interiors in Hyderabad

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***Abstract*— In the changing scenario of pre and post covid, the commercial sector, specifically the corporate sector of Hyderabad India, endeavors to foster their financial status by taking strategic measures like the corporate interior from an employer perspective, sustainability. The research intends to exclusively determine all interior design's prominent (attributes) for an effective and productive workplace. Moreover, Physical parameters of the office workplace in cooperation with pandemic transformation. The study emphasizes critical analysis for evaluating numerous parameters to analyze the interior of the IT companies and try to incorporate them with the working culture and productivity of the organization. To obtain a smooth output, two hundred thirteen participants responded to the specific questionnaire based on the research question. The study utilizes the linear regression method and the ANOVA approach to adequately extract the consequences and evidence favoring the hypothesis to determine the correlation. The research analysis is divided into three prominent physical attributes: workplace culture, occupational well-being, and interior parameters. The outcome shows a significant correlation among the work productivity incorporated with interior parameters, and the work culture in the organization is significantly and directly correlated with office interior designing.**

***Index Terms*—Pre-Covid design observations, office interiors, physical attributes, well-being, occupants productivity, post-Covid impact.**

I. Introduction

In today's dynamic, growing commercialization, work culture is intensifying operations in the indoor physical atmosphere. The factors played a significant role in indoor working culture, encompassing light, temperature, furniture, interior design, the color of the walls, and so on. A pleasant indoor atmosphere is advantageous in progressing potency, satisfaction, and overall well-being of the employee. Designing and planning a workplace context consisting of a physical climate indicate creating ambient approaches that are appropriately satisfactory and do not negotiate with work commitment, performance, productivity, and working goals [12]. Acceptability and completion of the inhabitant/occupant are afflicted by numerous constituents such as light, air quality, thermal conditions, or natural touch in every sphere, color, and vibes of the workplace.

The indoor environment's appearance significantly impacts the vitality, stress level, work productivity, work culture and wellness of building inhabitants, and the companies' investments in their lifecycle, including sustainable green technology. Scanty indoor atmosphere quality is associated with impaired and unhealthy building symptoms. It is highly responsible for diminishing the productivity, performance quality, innovative approach and eventually declining the organization's growth graph.

Modern office buildings are traditionally associated with non-openable windows where heating ventilation and concerning systems use heating ventilation and cooling to create a constant uniform climate [4]. However, recently concerns for improving environmental performance and energy saving in buildings have led to the integration of natural ventilation creating a synthesis mode system that allows employees to choose better air conditioning and natural ventilation for twin approaches to save energy and well-being. The covid-19 highly influences the human lifestyle and their working behavior by introducing new work from home culture, Hybrid, physical distancing, mask-wearing, and immunity concerns. When physical distancing is applied in layouts, it reshapes the office design. Thus, the architect's initiating the layout of innovative concepts of sustainable design in office indoor environments emphasize post covid 19.

This critical analysis comprehensively evaluates numerous parameters to analyze the interiors of the

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"ITO" and try to incorporate them with the working culture and productivity of the organization [11].The following section of the paper comprehensively analyzes two prominent case studies that are case study A and case study B which are operating office buildings. Followed by the methodology section where the appropriate methodology like the linear regression method and the ANOVA approach to comprehensively extract the consequences and the evidence which favor the hypothesis followed by the discussion and result section and conclusion of the research. This paper was the extended part of the initial paper which highlighted the correlation of workplace culture with the implication of well-being in corporate interiors. [7]. Henceforth in this paper, various parameters are exclusively and keenly observed to analyze the office interior and how it is correlated with the workforce (Occupants) productivity.

A. Hypothesis

H0: Office interiors have directly correlated with work productivity.

H1: Office interiors have not directly correlated with work productivity.

B. Research Questions

Q. How did the paradigm shift with respect to pandemics impact the productivity of the employees in correlation with the physical parameters of the interior design of an office in Hyderabad?

Q. The DATA collected and analyzed DATA reflecting the contrast of change in the design factors/attributes to indicate the variable.

II. Review of Literatures

Because of covid-19, pandemic vulnerability has overwhelmed the health care system abruptly all over the world. Moreover, recent experience in building community and time sentences to contain and isolate close contact of covid-19 patients to mitigate community outbreaks (Building a Healthy Future, 2020). Effective infectious manageable measures master we will design and readily available when required. There should be flexibility intended to be sustainable under normal circumstances yet agile enough to transform into an infectious disease isolation facility during pandemic circumstances [3]. In the changing scenario, the commercial sector, specifically the IT sector of Hyderabad India, endeavors to foster their financial status by taking strategic measures like the IT interior from an employer perspective, sustainability [1].

The physical design influences the employee to work productively with an innovative and enhanced capacity that affects the workplace's individual and organizational performance and work culture. The paper utilizes 86 random samples which determine the data regarding interior designer strategy emphasizing workplace flexibility and its optimistic influence to strive for high job productivity and satisfaction of human capital working under the roof [6]. The paper determined that interior designing is directly correlated with productivity, dedication, the well-being of the workforce, and a stress-free environment Organizations plan for the phased return to the office in front of mid-corporate leaders who discuss their knowledge workers in their homes The real estate and IT sectors take technical assistance to make appropriate plans to welcome their employees in office-based work under pandemic situations. The data illustrate that seven percent of the experts reported that the company would require all workers back to the office to a standard facility work environment following the social norms prerequisite for the pandemic situation such as social distancing, hygiene, and sanitizing [5].

Another research analyzes multiple strategies and control mechanisms for preventing or limiting coronavirus transmission in the indoor office workplace [1]. The report focuses on three prominent areas encompassing clinical behavior and building environment, which they implemented to draw the output. The research demonstrates that the interior or indoor environment parameters for post-pandemic IT organization should emphasize indoor infectious agents, low brightness luminaries, preparing building with distinct parameters like cleaning and disinfection, surveillance of air quality, strategically installed sanitization equipment, hygiene practices such as furniture and the surface material conveniently to clean with the technical assistance.

III. Methodology

This critical analysis comprehensively evaluates numerous parameters to analyze the interior of the industries and try to incorporate them with the working culture and productivity of the organization. The sample size is determined by quantitative sample analysis as around two hundred thirteen participants responded to the specific questionnaire based on the research question to obtain a smooth output [15]. Meanwhile, the paper also keenly observes the two representative case studies of IT-based offices, A and B, to practically enhance the knowledge regarding the workplace interior and investigate the appropriate patterns (IEQ) and work culture of the offices along with the Ambience, among others. With the intention to determine the correlation of interior parameters with the office work culture reflecting the occupant's comfort and satisfaction with IEQ and its attribute and occupants performance component with regards to productivity and work culture[9].

A. Hypothesis Analysis

To determine the correlation paper utilizes the linear regression method and the ANOVA approach to comprehensively extract the consequences and the evidence which favor the hypothesis.

TABLE I. ANOVA Analysis

Factors	DF	Sum of Square	Mean Square	F-statistic	P-value
Regression	2	788.663	394.331	660.764	0.00000
Residual	21.2	126.512	0.59678		

TABLE II. STATISTICAL DETAIL OF VARIOUS COMPONENTS.

	coeff	SE	t-stat	Lower t0	Upper t0	Stand Coeff	p-value
b	0.16524	0.11111	1.4865	-0.0538	0.3843	0.0000	0.1386
Individual work environment	0.23353	0.03647	6.4022	0.1616	0.3054	0.2939	9.690e-10
Overall work environment	0.65962	0.04523	14.5829	0.5704	0.7478	0.6695	2.220e-10

Coefficient Table (R-square =0.860)

The linear regression model

$Y = b0 + b1X1 + b2X2$

Provides a better fit than the model without the independent variables resulting in, Y = b0. All the independent variables (Xi) are significant.

Y- Interior design

X1- individual work environment

X2-overall work environment

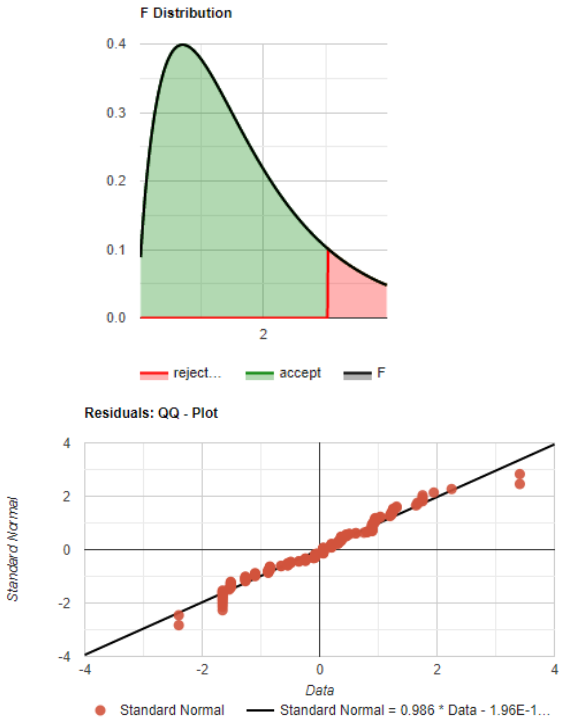


Figure 1. (a)- Correlation of X and Y (b)- Linear regression plot representation Accepted H0; Rejected H1:F=0.955284

IV. RESULTS

This section comprehensively analyses all the prerequisite attributes that play a significant role in evaluating the smooth outcome from the obtained sample and performing critical analysis.

Q. Determine the productivity of the employees in correlation with the physical parameters of the interior design of an office in Hyderabad?

The critical analysis keenly observes the productivity of the employees working in the industrial sector, and the evaluation can be divided into three prominent parameters: workplace culture, occupational well-being, and interior parameters. All these things are incorporated with interior parameters to comprehensively determine the employee's productivity and the work culture they are following in their organization and how all these things are correlated with their interior design.

The graph reveals the numerous components which show the productivity of the workplace; one of the questions was related to office space assisting the employee is working correctly, and around 73.9 % of the participants agreed with this another question was based on the work efficiency that with the workplace helps to work effective[14]. The data reveals that about 77% of the participants agreed. Questions related to the satisfaction of the spatial environment provided by the office building indicate that 75.8% of the respondents agreed with another question based on the spatial environment whether it could support employees to complete their task, and about 80.9 % of the participants agreed. One of the main questions was the working of organizations to provide the environment distraction-free.

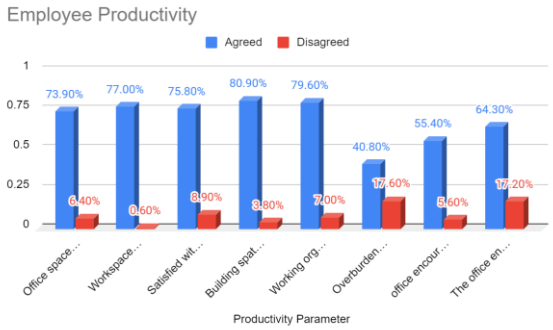


Figure 2. Determining employee productivity.

The prominent component demonstrates the physical parameters of interior design, which in hands the productivity of the employee are the question when asking about the office ventilation about 82.8 % of participants for agreed that the ventilation is well satisfied and their work in a healthy manner another question was ask related with the temperature of the workspace whether it is comfortable or not about 74.6% participants agreed. In comparison, 9.6% have disagreed that the temperature was not up to the satisfactory level, which made them uncomfortable.

When the questions were asked regarding the furniture about whether office furniture is comfortable so that employees can work for long hours without getting tired, the survey revealed that 71.9 % of the participants agreed that they comfortably worked as their furniture was comfortable while 12.4% disagreed. Another question related to the furniture is whether the office is well organized in the aspect of furniture fulfilling employees' needs.

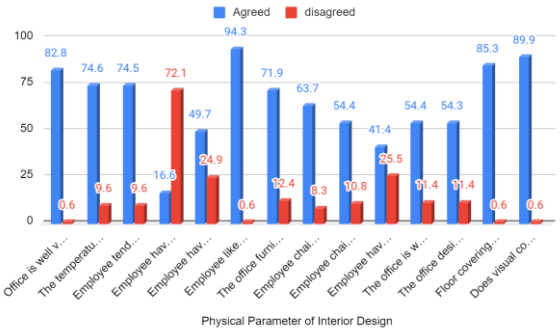


Figure 3. Determining physical parameters of interior design.

Thus it may be extracted from the sample survey that physical parameters of the interior designing have immense role employee working capability and effectively can enhance the productivity of the employee through their comfort ability, likeability, and appropriate light in the desk, ambiance, and furniture, among others [10].

Q. The DATA collected and analyzed DATA reflecting the contrast of change in the design factors/attributes to indicate the variable.

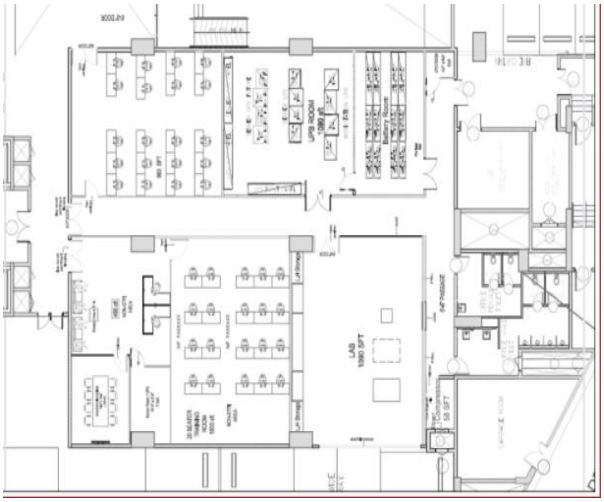
The data analysis can be illustrated from the below table which clearly demonstrates the changes in the design factor and the various attributes that indicate the correlation between the workplace and its interior outlook.

TABLE III. THIS TABLE COMPRISES THE ESSENTIAL INFORMATION OF ALL THE THREE SIGNIFICANT PARAMETERS COMPRISING THE WORKPLACE CULTURE, OCCUPATIONAL WELLBEING AND THE INTERIOR PARAMETERS.

Work Culture	Interior Parameters
Office space assists me to work properly. Agreed - 73.9% Disagreed-6.4% Neutral-19.7%	The office is well ventilated. Agreed - 82.8% Disagreed-0.6% Neutral-16.6%
Workspace helps to work efficiently. Agreed-77% Neutral-30%	The temperature in my own office/work space is comfortable. Agreed-74.5% Disagreed-9.6% Neutral-15.9%
Satisfied with the Spatial environment of the building Agreed -75.8% Disagreed-8.9% Neutral -15.3%	Employee tend to feel sick after spending many hours in the office Agreed-74.5% Disagreed-9.6% Neutral-15.9%
Building spatial environment support ability to complete your work. Agreed- 80.9% Disagreed- 3.8% Neutral- 15.3%	There is glare from lighting fixtures. Agreed-11.5% Disagreed-49.6% Neutral-16.6%
Working organization is distraction free. Agreed- 79.6% Disagreed-7% Neutral-13.4%	Employees have hard time concentrating due to poor acoustics. Agreed-72% Disagreed-7.6% Neutral- 50.3%
Management is accessible to common employee. Agreed-42% Disagreed-7.6% Neutral- 50.3%	Employees have access to daylight from my desk. Agreed-49.7% Disagreed-24.5% Neutral- 25.8%
Overburden and extra working hours. Agreed-40.8% Disagreed-17.6% Neutral- 50.3%	Employee like the interior ambience of my office/workspace. Agreed-94.3% Disagreed-0.6% Neutral-5.1%
Policies can handle any discrimination, misconduct, IPR, Disputes. Agreed-48.4% Disagreed-10.8% Neutral- 40.1%	The office furniture is comfortable so you can work for a long time without getting tired. Agreed-71.9% Disagreed-12.4% Neutral-15.9%
Encourage teamwork and Interaction with colleagues. Agreed-55.4% Disagreed-5.7% Neutral-38.8%	My chair is comfortable and fits my shape. Agreed-63.7% Disagreed-8.3% Neutral-28%
Office environment supports work that requires concentration. Agreed -66.9% Neutral -24.2% Disagreed- 8.9%	The office is well organized in aspects of furniture fulfilling your typical needs. Agreed-54.3% Disagreed-11.4% Neutral-34.4%
I frequently stay in office for more than 8 hours a day. Agreed -55.4% Neutral -26.1% Disagreed- 18.5%	The office design motivates me to spend more time in the office. Agreed-54.3% Disagreed-11.4% Neutral-34.4%
My occupation requires me to walk frequently throughout workday. Agreed -74.5% Neutral -21% Disagreed- 4.5%	Floor coverings in different laying patterns and colours can be used to highlight and separate different working areas. Agreed-85.3% Disagreed-0.6% Neutral-14.0%
Building layout is efficient enough for me to get to most spaces. Agreed -81.5% Neutral -17.8% Disagreed- 0.6%	Does visual comfort of different spaces of the Office are comfortable. Agreed-89.9% Disagreed-0.6% Neutral-9.6%

In the workplace culture, the data obtained from diverse attributes encompass the individual environment, overall environment, managerial aspect, informal meeting space, and individual behavior habits. In occupational wellbeing, the vital components that are involved are attentiveness, productivity, stress, distraction, calm, and smoothness [8]. Moreover, in the interior parameter, the attributes which perform a significant role are ambient environment, Ergonomics related factors, and interior design parameters.

Case Study A manifested all the prominent attributes-



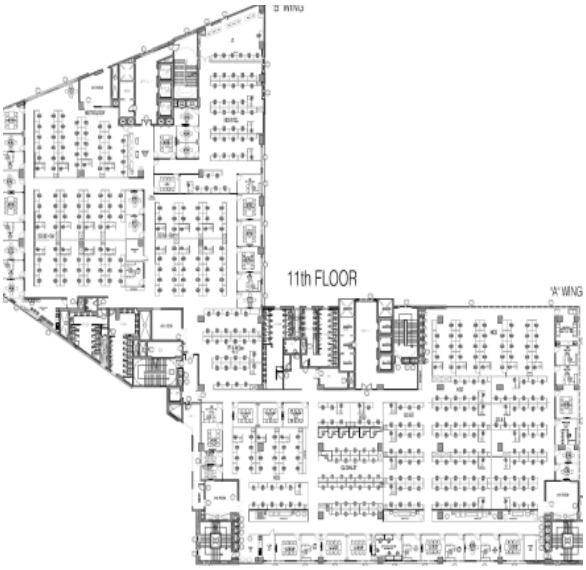


Figure 4. The figure shows various flooring plans of Case study A.

Figure 5. The images are taken from Case Study A which demonstrates the color of the flouring, workspace, furniture, and the interior of the rooms.

Case Study B manifested all the prominent attributes-

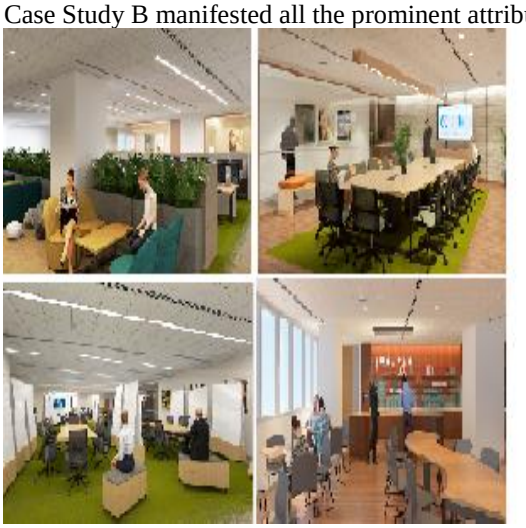


Figure 6. The images are taken from Case Study B which demonstrates the color of the flouring, work space, furniture, and the interior of the rooms.

Figure 7. The figure shows various flooring plans of Case study B.

V. Conclusion

The physical design influences the employee to work productively with an innovative and enhanced capacity that affects the workplace's individual and organizational performance and work culture. The consequences determined that interior designing is directly correlated with productivity, dedication, the well-being of the workforce, and a stress-free environment. The environment resilience workplace feature enables employees to take innovative measures which pave the way for a high growth rate and enhance the skill.

Because of the covid-19 pandemic outburst, the industrial sector paid attention to occupational safety and health administration, which suggested that the workforce allow resilience working when adequate circumstances provide them, with the ambiance atmosphere, stress-free workplace, comfortable working environment with the appropriate influence of light, color and the furniture that eventually strive for effective interior parameters. The critical analysis keenly observes the productivity of the employees working in the IT sector, and the evaluation can be divided into three prominent parameters: workplace culture, occupational well-being, and interior parameters. All these things are incorporated with Interior parameters to comprehensively determine the employee's productivity and the work culture they are following in their organization and how all these things are correlated with their interior design.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

The author's confirm contribution to the paper as follows: Study conception and design: Ar. Pratima Kiran Mandadi, Dr.Aanchal Sharma and Dr. Ramesh Raghavedran, Methodology and proof reading Dr. Ramesh Ragavendran and Dr. Aanchal Sharma, DATA collection, conducted research and DATA analysis Ar. Pratima Kiran Mandadi and Dr. Ramesh Ragavendran, Interpretations of Results and draft manuscript by Ar. Pratima Kiran Mandadi. All authors reviewed the results and approved the final version of manuscript.

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References

[1] K. P. Mandadi and S. N. Zutshi, "Correlation of workplace culture with implication of wellbeing in corporate interiors - a case of Hyderabad (India)," *The Turkish Online Journal of Qualitative Inquiry (TOJQI)*, vol. 12, no. 6, 2021.

[2] J. Sanjog, T. Patel, and S. Karmakar, "Indoor physical work environment: An ergonomics perspective," *Int J Sci Eng Technol Res*. vol. 2, pp. 507-513, 2013.

[3] C. Candido, J. Zhang, J. Kim, R de Dear, L. E. Thomas, P Strapasson, and C Joko, "Impact of workspace layout on occupant satisfaction, perceived health and productivity," *Network for Comfort and Energy Use in Buildings*, 2016.

[4] D. Heinzerling, S. Schiavon, T. Webster, and E. Arens, "Indoor environmental quality assessment models: A literature review and a proposed weighting and classification scheme," *Building and Environment*, vol. 70, pp. 210-222, 2013.

[5] J. H. Choi, V. Loftness, and A. Aziz, "Post-occupancy evaluation of 20 office buildings as basis for future IEQ standards and guidelines," *Energy and Buildings*, vol. 46, pp. 167-175, 2012.

[6] A. E. I. Stella, E. B. J. Iheriohanma, and J. I. Iheanacho, "Workplace flexibility in the post Covid-19 Era: Teleworking, the new normal," *Sumerianz Journal of Social Science*, vol. 4, pp. 44-52, 2020.

[7] S. Addyman, E. Chrysikou, A. Marmot, E. Burman, L. Ciric, E. Hernandez, and E. Savvopoulou, "Guidance notes for commercial offices: Safe return to work during COVID-19," *UCL Consultants Ltd*, 2020.

[8] N. A. Megahed and E. M. Ghoneim, "Indoor air quality: Rethinking rules of building design strategies in post-pandemic architecture," *Environmental Research 110471*, 2020.

[9] N. A. Megahed and E. M. Ghoneim, "Antivirus-built environment: Lessons learned from Covid-19 pandemic," *Sustainable Cities and Society*, vol. 61, p. 102350, 2020.

[10] A. Nediari, C. Roesli, and P. M. Simanjuntak, "Preparing post Covid-19 pandemic office design as the new concept of sustainability design," in *Proc. IOP Conference Series: Earth and Environmental Science IOP Publishing*, 729 012095, 2021.

[11] F. Pataki-Bittó and K. Kapusy, "Work environment transformation in the post COVID-19 based on work values of the future workforce," *Journal of Corporate Real Estate*, 2021.

[12] E. Fortini, "Workplace wellbeing," The impact of interior design on the health of inhabitants of contemporary office spaces, 2020.

[13] A. Cheshmehzangi, "Revisiting the built environment: 10 potential development changes and paradigm shifts due to COVID-19," *Journal of Urban Management*, vol. 10, pp. 166-175, 2021.

[14] L. Mason, "Possible futures of the workplace: How has the Covid-19 pandemic amplified the need for a change towards an evidence-based, human-centered approach to office design?" 2021.https://interioreducators.co.uk/uploads/submitted-files/127.W_.CS_.2021.c_.pdf

[15] G. Ozenen "Practical, rapid, and cost-efficient interior architectural precautions for prevention of COVID-19 in the workplace," *Work, (Preprint*, 1-12), 2020.

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