

# The Work Environment as Constituting Factor to Productivity in Public Offices in Minna, Niger State

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Productivity is not limited to how skill is acquired by employees within their work environment, but also on the output of employees. The work environment has been strongly linked with productivity because; the work environment contributes to productivity. An unproductive working environment such as poorly designed workstation, lack of ventilation, poor visual lighting quality, excessive noise, poor workspace, poor communication, poor maintenance culture, poor and unsuitable furniture can all affect the productivity and morale of workers. However, it has been observed that some factors within the physical work environment have greater impact level than others within offices. This paper aims to evaluate the impact level of different factors that constitute the physical work environment to enhance productivity. Five departments within the State secretariat Minna were assessed. 100 Closed ended structured questionnaires were administered to administrative workers in which 94 were returned. The data generated was analysed using a descriptive analytic method to rank the different variables examined. Results indicated that, factors such as lighting, Office design and performance feedback within office environment are integral to productivity of workers.

**Keywords:** Environmental factors, Physical work environment, Productivity, Public offices, Workplace.

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## Introduction

Employees often spend more than 40 hours per week within their various offices, thus the office environment where work takes place exerts a significant impact upon the lives of a great number of people (Danielsson, 2007). According to Sarode and Shirsath (2014), the physical aspect of the work environment has direct impact on productivity, health and safety, comfort, job satisfaction and the morale of the employees who work within these offices.

Productivity according to the dictionary is defined as the state of producing rewards or results. 'Productive' means fruitful, lucrative and profitable. In this milieu, productivity is synonymous with output. In scientific literature, according to Voordt (2004), 'productivity' is defined as the relationship between output and input.

Productivity often times is limited to

acquisition of skills of many employees, but 86% of productivity problems have been identified to reside within the work environment where work is carried out (Serhan, 2015). It is needful to provide office spaces with basic needs to get the best output from workers (Becker & Steele, 1995; Sundstrom *et al.*, 1994). As identified by Annika *et al.* (2013), the internal and external aspects of the work environment affects the workers level of comfort, which implies that their productivity can be influenced as a result of this. The nature of the work environment however, has experienced changes over the years, due to factors such as advancement in technology, socio-economic change and even telecommunication (Sullivan & Barbara, 2014). Despite these changes, research concerning factors that constitute the work environment on employees' productivity has been undertaken extensively (Sarode & Shirsath, 2014). Although the bulk of the

research showed that there are various factors that contribute both positively and negatively to productivity; thus these factors have direct level of impact on productivity.

As the case of Nigeria, efforts have been made to look into stimulating productivity consciousness among Nigerian workers, which involved the introduction of welfare packages, as a source of motivation, and strategy for higher performance and productivity (Egbe, 2001; Emmanuel, 1999). Despite all these efforts by the government, it is still evident that there is a decline in workers' productivity in Nigeria, and it has become a persistent concern of economic and business analyst over the past years. The search for a solution to this decline is still ongoing (Akinyele, 2009).

The aim of this paper is to evaluate the impact level of different factor that constitute work environment in an office in order to realize productivity of employees. To achieve this goal, the paper will identify and describe factors of the physical and social environment in order to find out which of these factors have a greater level of impact on productivity. The existing work environment will be studied and examined; these factors will be ranked in their order of importance as identified by the employee of the offices.

The office workspace can be designed to positively or negatively influence employees and their organisation (Arnoff & Kaplan, 1995; Sarode & Shirsath, 2014). There are several factors that contribute to this. Some of the factors identified by several researchers include lighting, air quality, noise, office furniture, communication and work station design. These factors make up the physical and social environment of the office. According to Pepple *et al.* (2017), the physical environment within an office plays a vital role on productivity. Some studies have identified other factors such as job aids, goal setting, supervisors support, workplace incentives, performance feedback, defined

processes to influence productivity, (Chapins, 1995). However this study will dwell majorly on the factors that affect the physical and social work environment of the office.

### **Work Environment Factors**

The work environment according to Kohun (1992) comprises the totality of factors, actions and other influential factors that contend with the activities and performance of employee. What exists between the employee and the work environment is what sums up to become the work environment. Pepple *et al.* (2017), further buttressed this assertion by implying that it is the quality of the employees workplace environment that most impacts on the level of motivation and subsequent performance of these employees.

Furthermore, in an observation based study by Opperman (2002), the findings defined the work environment to comprise three major sub-environments. The technical environment which deals majorly with the tools, equipment and infrastructure put in place to enhance work; the human environment which deals with communication, interaction, relaxation, leadership and management issues within the work environment and lastly, organisational environment which involves systems, measures and principles and value.

Elywood (1999) and Leaman (1995) also found similar results where management functions; supervision and environmental factors are key functions that drive higher productivity which in turns contributes positively or negatively to achieving maximum efficiency and productivity in employees. In recent studies by Sarode and Shirsath (2014); Pepple *et al.* (2017), they reasserted that the most important work environment factors that can affect office employees include; Air Quality, Lighting, Office design, Office furniture, Noise, Performance feedback and Social factors as shown in figure 1.

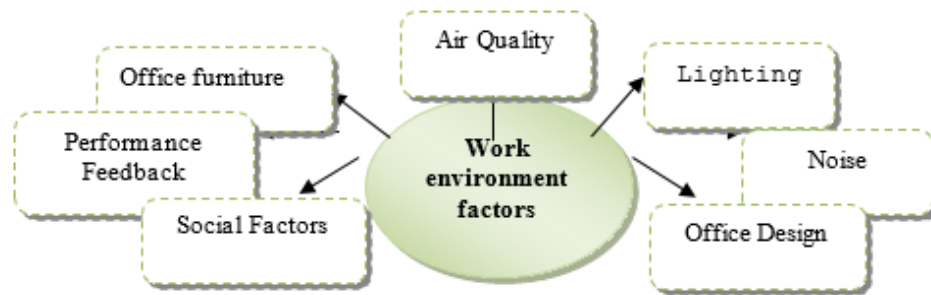


Figure 1: Work Environment Factors  
Source: Adapted from Sarode and Shirsath (2014) and Pepple *et al.*, (2017).

**Air quality:** Air quality comprises of temperature, humidity, ventilation and cleanliness, (Rashid, 2002). Air quality has impact on employees' productivity. However, if it tends to the negative, it creates problems such as headaches, respiratory problems and fatigue.

**Lighting:** There are two major sources of light available within an office; natural and artificial light. However, poor lighting system may reduce an employee's performance as well as productivity (Vietch & Newsham, 2000). Sarode and Shirsath (2014) and Vischer (2007), emphasized that a dim light or over bright work environment can result in eye strain, headaches, irritability, which all causes reduction in productivity.

**Noise:** Noise is a work environment factor, which also plays a role of affecting the productivity of employees. Noise is an unwanted disturbance caused either from sounds of office equipment, tools and peoples conversation. This may prevent employees from concentrating on their jobs, consequently decreasing productivity. However, according to Sundstrom *et al.* (1994), a very silent environment can deter good performance because sometimes, sound help to create a healthy background to assist employees in accomplishing their task. The impact of noise can be felt both positively and negatively. Many studies have proffer several methods for controlling noise within the office work environment, such as sound absorbing materials, proper contractions as well as masking.

**Office design:** In the design of an office, three major elements are involved. They are; workstation design, workspace design and general office design. According to Danielsson (2009), these factors constituent the physical frame where activity takes place in the office and as such each of these design related factor interact and influence individual productivity. Sundstrom (1986), ascertained that besides ambient factors, the workstation is the most important part of the workplace for employees. This implies that the design of office types is closely related to the productivity of employees.

**Office furniture:** Office furniture comprises of the following, desk, chairs, filling cabinets, shelves and worktops. Each of these furniture items has its role in ensuring the proper running and day to day activities of any office (Mccoy, 2000). Ergonomics is one factor to consider when buying office furniture. Ergonomics ensures the ease of use of equipment, furniture and its users (Skikdar, 2002). Ergonomic office furniture ensures that each employee gets well with the things around him, like desk, chairs, computer alignment and environmental factors (Nemecek & Grandjean, 1973). Sarode and Shirsath (2014) further buttressed the fact that, office furniture helps organisation in increasing its productivity as well as the general wellbeing of the employees.

**Performance feedback:** Performance feedback involves employees performance assessment been fed back to them. It also requires supervisors support and report, gathering and monitoring of resources

needed to carry out good jobs. It also requires having a defined process within the organisation, where organisation determines what motivates its employees and structures for rewarding employees with incentives and job aids. All performance feedback is after is to make the work environment easier in order to minimise error rate and improve satisfaction of workers and customers (Chapins, 1995).

**Social factors:** This factor deals with the relationship between workers and employees. According to Tayler (2012), a poor interpersonal skill and attitude among colleagues can affect productivity. Some of the social factors involve communication, interaction as well as spaces for relaxation. Communication is highly functional for work and it takes place all the time within a workspace (Ying, 2007). While communication takes place, interaction occurs. Interaction brings about spontaneous communication, which sometimes is unplanned at impromptu encounters among co- workers when they move around in a workplace. Interaction according to Tayler, (2012) accounts for a large proportion of informal social interaction and networking at work. Relaxation spaces however, create more room for socialisation, interaction and communication. According to Onwuka (2015), relaxation spaces can be incorporated in office designs provided the employees feel comfortable within their workplaces.

### Research Methodology

The study was conducted in Minna city, Niger State. The data analysed was collected through the use of structures questionnaires. Five (5) departments within the state secretariat office were randomly selected. 100 administrative workers within the 5 department were given the questionnaires and 94 were returned. The survey was conducted using a questionnaire with three (3) sections. The first section contained demographic information of respondents. The next section addressed aspects of the work environment which involved air quality, lighting, noise, office

design, office furniture, performance feedback and social factors. Respondents were asked to state their level of agreement and satisfaction on a 5 point scale. The data collected and gathered was analysed using the SPSS analytic tool to analyse the results. The last section involved ranking of the environmental factor variables based on their level of impact, the data generated was analysed using a descriptive analytic method to rank the different variables examined in order to determine which variable had the highest level of impact on employees' productivity at work.

### Work environment factors analysis

**Lighting:** The workplace requires adequate lighting for day to day running and activity within the office. Working in dim or over bright work environment can result in eyestrain, headaches, irritability and inevitably reduce productivity. Table 1 shows the response of workers to question regarding lighting within the workspace. Most of the employees (45.7%) were satisfied with the lighting provision provided in their offices. This shows that productivity will be enhanced as a result of this.

**Table 1:** Satisfaction of employees towards lighting provisions in the office

S/N	Responses	Percentage (%)
1	Highly satisfied	29.8
2	Satisfied	45.7
3	Partially satisfied	8.5
4	Dissatisfied	11.7
5	Highly dissatisfied	4.3
	Total	100

**Source:** Authors' Survey, 2017

**Air quality and Noise level:** Ventilation, temperature, noise level on employees' productivity was considered. 53.2% of the respondents agreed that poor environmental factor such as poor ventilation, temperature, and noise level within their immediate work area can have negative impact on their productivity as shown in Table 2.

**Table 2:** Effect of air quality and noise parameters on employees' productivity

S/N	Responses	Percentage (%)
1	Strongly agree	20.2
<sup>1</sup>	Agree	53.2
3	Partially agree	19.1
4	Disagree	5.4
5	Highly disagree	2.1
	Total	100

Source: Authors' Survey, 2017

**Nature of office design and quality of office furniture:** Enhancing productivity through proper design of office spaces, office sizes as well as provision of the required quality and furniture type was assessed. 52.2% of the respondents agreed that office sizes as well as their furniture type has positive impact on their productivity as shown in Table 3.

**Table 3:** Effect of office design and office furniture on employees' productivity

S/N	Responses	Percentage (%)
1	Strongly agree	31.9
<sup>1</sup>	Agree	52.2
3	Partially agree	7.4
4	Disagree	5.3
5	Highly disagree	3.2
	Total	100

Source: Authors' Survey, 2017

**Performance feedback at workplace:**

Supervisors help to advocate for junior staff. They also ensure work processes and resources needed to work are distributed in order to do a good job, this in turn provides a platform for positive encouragement for a job well done. From Table 4, it can be observed that, 44.6% respondents maintain a strong relationship with their supervisors at the office. Therefore it can be concluded that there is strong performance feedback support for the employees.

**Table 4:** Performance feedback level within the office

S/N	Responses	Percentage (%)
1	Very Strong	16
<sup>1</sup>	Strong	44.6
3	Partially strong	26.6
4	Not very strong	8.5
5	Not strong	4.3
	Total	100

Source: Authors' Survey, 2017

**Social factors at work place:**

Communication system within the workplace promotes trust and loyalty among employees and it encourages a better team work. 59.6% respondents are of the opinion that a formal communication system exist within their workplace and this helps interaction, which is vital for social life among the employees.

**Table 5:** Social factors at workplace

S/N	Responses	Percentage (%)
1	Very good	21.2
<sup>1</sup>	Good	59.6
3	Fairly good	10.6
4	not good	4.3
5	Bad	4.3
	Total	100

Source: Authors' Survey, 2017

**Impact of work environment on productivity**

In other to examine the impact level of the different factors that constitute work environment for productivity, the workplace environment conditions were analysed. It involved further breaking down of the seven environment factors earlier evaluated into 30 variables that were measured on a 4 Likert Scale of High Positive Impact (HPI), Positive Impact (PI), Negative Impact (NI) and lastly, High Negative Impact (HNI).

**Table 6:** Opinion of respondents on impact level of variables on productivity

S/N	Factors	High positive Impact	Positive Impact	Negative Impact	High Negative Impact	Total
<b>Air Quality</b>						
1	Number of window openings	28	60	5	1	94
2	Number of door openings	25	37	14	13	89
3	Type of window	30	41	5	1	77
4	Ventilation within office spaces	44	32	8	5	89
5	Air cleanliness	26	62	1	1	91
<b>Lighting</b>						
6	Visual lighting quality	32	47	11	4	94
7	General lighting of office	41	27	18	8	94
8	Adequacy of artificial lighting	29	39	16	4	88
9	Adequacy of natural lighting	35	47	5	4	91
<b>Noise</b>						
10	Distraction from office equipment and tools	5	9	35	45	94
11	Distraction by peoples conversation	11	7	51	20	89
12	Distraction by soft background sounds	28	33	19	10	90
13	Distraction by loud background sounds	14	19	35	25	93
14	Distraction by external noise	9	11	42	22	84
<b>Office design</b>						
15	Size of office space	30	52	12	0	94
16	Layout of office space	30	51	8	5	94
17	Circulation space within office	28	50	12	4	94
18	Storage space for office items	24	46	15	6	91
19	Maintenance of workspace	35	34	13	8	90
<b>Office furniture</b>						
20	Furniture type	32	43	8	2	85
21	Furniture arrangement	41	46	5	0	92
22	Quality of furniture	29	49	7	2	87
23	Ability to adjust furniture to job requirement	28	41	9	6	84
<b>Performance Feedback</b>						
24	Supervisors support	28	48	6	7	89
25	Defined work processes	35	46	5	6	92
26	Workplace incentives	44	49	1	0	94
27	Management relationship	30	54	1	1	87
<b>Social Factors</b>						
28	Communication	45	37	6	1	89
29	Interaction with co workers	37	41	5	3	86
30	Relaxation spaces within office	35	47	5	4	91

**Source:** Authors' Survey, 2017

To determine the impact level of each variable, a weighted score of 1-4 was used as shown below;

High Positive Impact (HPI) 1 (X1)  
Positive impact (PI) 2 (X2)

Negative Impact (NI) 3 (X3)  
High Negative Impact (HNI) 4 (X4)

The result in Table 7 is based on the weighted score calculated for each variable.

To ascertain the impact level of the different factors, the mean value will be calculated using this formula,

Mean=  $\frac{\text{total weighted score}}{\text{Total valid response for each variable}}$ , as shown in Table 8

The scale of measurement is given as follows;

- 1.0 – 1.49 High Positive Impact
- 1.5 – 1.99 Positive Impact
- 2.0 – 2.49 Negative Impact
- > 2.5 High Negative Impact

**Table 7:** Weighted scores of respondents on impact level of work environment on productivity

Item Description	HP(X1)	PI(X2)	NI(X3)	HNI(X4)	Total
1 Number of window openings	28	120	15	4	167
1 Number of door openings	25	74	42	52	193
3 Type of window	30	82	15	4	131
4 Ventilation within office spaces	44	64	24	20	152
5 Air cleanliness	26	124	6	4	160
6 Visual lighting quality	32	94	33	16	175
7 General lighting of office	41	54	54	32	181
8 Adequacy of artificial lighting	29	78	48	16	171
9 Adequacy of natural lighting	35	94	15	16	160
10 Distraction from office equipment and tools	5	18	105	180	308
11 Distraction by peoples conversation	11	14	153	80	258
12 Distraction by soft background sounds	28	66	57	40	191
13 Distraction by loud background sounds	14	38	105	100	257
14 Distraction by external noise	9	22	126	88	245
15 Size of office space	30	104	36	0	170
16 Layout of office space	30	102	24	20	176
17 Circulation space within office	28	100	36	16	180
18 Storage space for office items	24	92	45	24	185
19 Maintenance of workspace	35	68	39	32	174
20 Furniture type	32	86	24	8	150
21 Furniture arrangement	41	92	15	0	148
22 Quality of furniture	29	98	21	8	156
23 Ability to adjust furniture to job requirement	28	82	27	24	161
24 Supervisors support	28	96	18	28	170
25 Defined work processes	35	92	15	24	166
26 Workplace incentives	44	98	3	0	145
27 Management relationship	30	108	6	4	148
28 Communication	45	74	18	4	141
29 Interaction with co workers	37	82	15	12	146
30 Relaxation spaces within office	35	94	15	16	160

Source: Authors' Survey, 2017

It can be observed that 23 variables have positive impact level in the work environment for productivity, however, adequacy of artificial lighting ranked first. This implies that, artificial lighting greatly enhances productivity among employees within the office. Distractions and noise from office equipment and tools can be seen to create a very high negative impact on productivity. This implies that every form of distraction should be reduced to the barest

minimal within the work environment so that employees can achieve productivity.

It can therefore be deduced from this findings that architects involved in the design of office buildings can approach the design with an understanding of the key issues that relate to the work environment within an office building as it affects the employees who use the office spaces.

**Table 8:** Impact Level of different factors that constitute work environment on productivity

Item Description		Sum	Weighted score	Mean	Decision	Ranking
S/no						
1.	Adequacy of artificial lighting	88	171	1.943181	Positive Impact	1st
2.	Maintenance of workspace	90	174	1.933333	Positive Impact	2 <sup>nd</sup>
3.	General lighting of office	94	181	1.925531	Positive Impact	3 <sup>rd</sup>
4.	Ability to adjust furniture to job requirement	84	161	1.916666	Positive Impact	4 <sup>th</sup>
5.	Circulation space within office	94	180	1.914893	Positive Impact	5 <sup>th</sup>
6.	Supervisors support	89	170	1.910112	Positive Impact	6 <sup>th</sup>
7.	Layout of office space	94	176	1.872340	Positive Impact	7 <sup>th</sup>
8.	Visual lighting quality	94	175	1.861702	Positive Impact	8 <sup>th</sup>
9.	Relaxation spaces within office	86	160	1.860465	Positive Impact	9 <sup>th</sup>
10.	Size of office space	94	170	1.808510	Positive Impact	10 <sup>th</sup>
11.	Defined work processes	92	166	1.804347	Positive Impact	11 <sup>th</sup>
12.	Quality of furniture	87	156	1.793103	Positive Impact	12 <sup>th</sup>
13.	Number of window openings	94	167	1.776595	Positive Impact	13 <sup>th</sup>
14.	Furniture type	85	150	1.764705	Positive Impact	14 <sup>th</sup>
15.	Air cleanliness	91	160	1.758241	Positive Impact	15 <sup>th</sup>
16.	Adequacy of natural lighting	91	160	1.758241	Positive Impact	15 <sup>th</sup>
17.	Ventilation within office spaces	89	152	1.707865	Positive Impact	17 <sup>th</sup>
18.	Type of window	77	131	1.701298	Positive Impact	18 <sup>th</sup>
19.	Management relationship	87	148	1.701149	Positive Impact	19 <sup>th</sup>
20.	Furniture arrangement	92	148	1.608695	Positive Impact	20 <sup>th</sup>
21.	Interaction with co workers	91	146	1.604395	Positive Impact	21 <sup>th</sup>
22.	Communication	89	141	1.584269	Positive Impact	22 <sup>nd</sup>
23.	Workplace incentives	94	145	1.542553	Positive Impact	23 <sup>rd</sup>
24.	Distraction from office equipment and tools	94	308	3.276595	High Negative Impact	24 <sup>th</sup>
25.	Distraction by peoples conversation	89	258	2.898876	High Negative Impact	25 <sup>th</sup>
26.	Distraction by soft background sounds					26 <sup>th</sup>
27.	Distraction by loud background sounds	93	257	2.763440	High Negative Impact	27 <sup>th</sup>
28.	Number of door openings	89	193	2.168539	Negative Impact	28 <sup>th</sup>
29.	Distraction by soft background sounds	90	191	2.122222	Negative Impact	29 <sup>th</sup>
30.	Storage space for office items	91	185	2.032967	Negative impact	30 <sup>th</sup>

Source: Authors' survey, 2017



The findings revealed that factors such as lighting, office design, and performance feedback all drive greater productivity level in offices. A better lighting at workplace helps prevent accidents, improves workers eye hand coordinating, reduces accidents and as such makes employees work better. Factors associated with noise within workplace environment can give negative impact on productivity if not properly put to check.

### Conclusion

A good work environment that has all factors which can help achieve efficiency of workers enhances productivity to a large extent. The research has provided an insight into factors seen to influence and enhance productivity in the work environment. However, satisfaction of employees within their workplace is associated with intent to stay, and this is necessary for the provision of high quality services to the society. Results from this study have shown the impact level of the different environmental factors on workers' productivity, and it suggest that effort should be made towards improving on the current physical and social environmental factors that are associated with the workplace. It is therefore needful for organisations to incorporate factors that will maintain better lighting system, better office design, improved office furniture and better performance feedback and reduction of noise. Once done, organisations will spend less on running cost and get greater efficiency and productivity on the part of employees.

### Recommendation to improve Workplace Environment

The following recommendations may be taken as initiatives to public offices in order to achieve more productivity.

- A form of system that allows for feedback can be initiated by organisations for workers performance to be communicated to them so that a platform for improvement can be created.
- Office space and workspaces can be further brightened by lighting the offices up with wall colours, decorations and ornaments to create a more lively

impression for employees.

- The line of communication between employees and organisation, employee to employee should be developed and encouraged. This will help to find out programs that motivate employees.
- Relaxation spaces can be created and incorporated within office workplace. It enhances interaction and communication of ideas that can help move the organisation forward.
- Distraction from noise can be avoided and reduced properly if the proper measures to reduce noise are put into place.
- Organisation polices can be created to enhance annual training, supervision and management welfare packages for employees.

### References

- Akinyele S.T (2009). Examination of motivation and work performance of the sales people; Role of supervisors' Behaviour. *Resource Journal Business Management*. 3(1), 20-27
- Aronoff, S. & Kaplan, A. (1995). 'Total Workplace Performance: Rethinking the Office Environment', Ottawa. WDL Publications,
- Becker, F. & Steele, F. (1995). *Workplace by design: mapping the high-performance workspace*. San Francisco: Jossey-Bass Publisher
- Boles, M., Pelletier, B. & Lynch, W. (2004).The relationship between health risks and work productivity. *Journal of Occupational and Environment Medicine*, 46(7), 737-745.
- Chapins A. (1995). *Workplace and the Performance of Workers*. Reston: USA
- Danielsson C.B. (2009). Difference in satisfaction with office environment among employees in different office types. *Journal of Architectural and Planning Research*. 26(3), 240-256.
- Egbe E.V., (2001). Welfare Package as a source of Motivational Strategy for Higher Outcomes: The Strength of Variables, Contingent and Content-Bound Relationships. *Journal on Human Resource Management*. 12,

- 508-585.
- Emmanuel M. A., (2012). The Influence of workplace environment on workers welfare, performance and productivity. *An online journal of the African Educational Research Network*. 12 (1), 142-149.
- Elywood J. (1999). Models for productions and operation Design. Berkerly University of California.
- Kohun, S. (1992). Business Environment. Ibadan: University Press Limited.
- Leaman, A. (1995). Dissatisfaction and office productivity. *Facilities*, 13(2), 13-19.
- Mccooy J. (2000). The Creative work environment: The relationship of the physical environment and creative teamwork at a state agency- A case study. Milwaukee: University of Wisconsin-Milwaukee.
- Nemecek, J., & Grandjean, E. (1973). Result of n ergonomic investigation of large space offices. *Human Factors*, 15, 111-124.
- Opperman C. S. (2002). Tropical business issues. Partner Price Water House Coopers.
- Pepple, N. M., Akpan, E.U., & Edem, M. J. (2017). Impact of Workplace Environment on health Workers. *International Journal of Occupational Medicine and Health Affairs*.5(2), 261- 266.
- Sarode, A. P. & Shirsath, M. (2014). The Factors affecting Employee work environment & its Relation with Employee Productivity. *International Journal of Science and Research*. 3(11), 2735-2737.
- Serhan A. A., (2015). The Effect of Work Environment on Employees Productivity. *International Journal of Science and Research*. 5(4), 1554-1558.
- Shikdar A.A. (2002). Identification of ergonomics issues that affect workers in oilrigs in desert environment. *International Journal of Science and Environment*. 10, 169-177.
- Sundstrom, E. & Sundstrom, M.G. (1986). *Work places: The psychology of the physical environment in offices and factories*. Cambridge: Cambridge University Press.
- Sundstrom, E., Town, J. P., Rice, R. W., Osborn, D., & Brill, M. (1994). Office noise, satisfaction, and performance. *Environment & Behaviour*, 26(2), 195-222.
- Sullivan, & Barbara. (2014), workplace design trends. Building design and construction, office spaces. Newsletter of Aia continuing education. 40-47.
- Taylor B. (2012). Creating a psychologically healthy workplace: The role of communication. Retrieved August 15, 2017 from [http://www.phwa.org/resources/creating\\_a\\_healthy\\_workplace](http://www.phwa.org/resources/creating_a_healthy_workplace).
- Veitch, J.A., & Newsham, G.R. (2000). Exercised control, lighting choices and energy use: An Office simulation experiment. *Journal of environmental psychology*, 20. 219-237.
- Vischer, J.C. (2007). The effects of the physical environmental on work performance: Towards a model of workspace stress. *Stress and Health*, 23(3), 175-184.
- Voordt, T.J.M. (2004). Productivity and employee satisfaction in flexible workspaces. *Journal of corporate Real Estate*. 6(2), 133-148.
- Ying hua (2007). Designing for open –plan workplaces for collaboration: An exploration of the impact of workplace spatial settings on space perception and collaboration effectiveness. Unpublished Master’s thesis, School of architecture, Carnegie Mellon University Pittsburgh.

