

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE



The Effect of Workplace Design on Employee Performance: The Case of Addis Ababa City Administration Vital Events Registration and Information Office

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The Effect of Workplace Design on Employee Performance: The Case of Addis Ababa city Administration vital events registration and information office

A Research project submitted to Addis Ababa University School of Commerce in the partial fulfillment of the requirement for Masters degree in Business leadership.

Adviser Dr. Zegeye Muluye

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Declaration

I declare that this research project entitled “The effect of workplace design on employee performance: The case of Addis Ababa city administration vital events registration and information office” is composed independently by myself with the guidance of my advisor. It has not been either partially or fully been submitted to any higher education degree. All source of materials are stated by reference moreover by acknowledgment.

Nebat Yousuf

Signature.....

Date

Certification

This is to certify that this research entitled “The effect of workplace design on employee performance: The case of Addis Ababa city administration vital events registration and information office” is submitted to AAU school of commerce in the partial fulfillment of the requirement for Masters degree in Business leadership. This research is the original work of Nebat Yousuf and has not been submitted elsewhere previously and is free from plagiarism.

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Acronym/Abbreviation

Wereda – A.A city administration vital events registration & information office

Kebele I'd – Personal identification card indicating the city and the sub-city of the person.

A.A – Addis Ababa

AAU – Addis Ababa University

SPSS – Statistical Package for Social Sciences

ANOVA – Analysis of variance

Abstract

The design of a workplace environment affects the behavior and performance of an employee working on the space. Poorly designed space brings unfavorable moods to anyone visiting or staying in the place. This research aims to investigate the relationship between workplace design and employee performance in A.A city administration vital events registration & information office. The study focuses on the physical environment that evaluates and describes the various design factors that contributes to the change in employee performance. The factors studied in detail are the temperature of the room; ventilation; brightness; the acoustic factor; and the spatial arrangement and overall design of the office. In order to analyze this, quantitative research method is used with structured questionnaires conducted with 146 participants. Moreover, critically observing the study site also added a useful input to the research. Correlation analysis and multiple regression analysis were used in order to test the hypothesis. The study finding revealed that there is a strong relationship between workplace design and employee productivity. From workplace design factors, lighting seems to be the dominant factor that has more effect on employee performance.

Keywords: Workplace design, performance, environment

Chapter 1. Introduction

Introduction

In this chapter, background of the study and statement of the problem are described. The research questions and objectives of the study are also stated. The significance, scope, limitations and organization of the study are all composed in detail.

1.1 Background of the study

Employee behavior in the workplace is a fundamental factor that determines the entire work experience at a company. An individual's behavior and performance in any situation, whether it is in group or in isolation, has an influence and impact on the organization. If these behaviors are positive it leads to higher performance, productivity and effectiveness within a team as well as individually. It also creates a way for employees to be more creative and tolerant to others. However, if employees have negative attitude, the work suffers, they become inefficient and their performance level drops.

A leader is someone with a vision and the path to realizing it and the one who ensures their team has support and tools to achieve their goals. A leader in an organization usually focuses on the successes of their goals. They set goals for the team and encourage them to work confidently and enthusiastically. In organizations, a leader cannot function solely without employees. Employees are crucial to execute the work and realize the vision of the leader. Thus the performance of employees is vital for the success of the organization and the achievement of the leader's vision.

There are a lot of factors that contribute to the performance level of an employee like: leadership style, motivation, physical environment, psychological status, employee competence, company culture and many more. In this research, we are going to cover the environmental factor, specifically the physical workspace design and how it affects the performance level of employees.

Interior design is the art and science of enhancing the interior of a building to achieve a healthier, functional, comfortable and more aesthetically pleasing environment for the people using the space. Workplace design also falls into the interior category in this specific research because our study site is positioned inside a building. Workplace design is the way a space is organized and equipped in order to create optimal productivity by workers. It aims to create a safe work environment where employee performance is supported. Result of the employees' productivity can be increased from five to ten percent depending on the improvement of the physical workplace design at their workplace (Brill, 1992).

Beyond the aesthetic side, a workplace design must consider the office layout, lighting, ventilation, temperature and acoustic factors. To function well, an office must also be well-equipped and incorporate necessary amenities. A well-designed office space feels energizing, encourages employees to use their maximum ability to perform well and inspires them to be innovative and creative. On the other hand, poorly designed spaces have negative effect on workers as well as any person that walks into the room.

Vital events registration and information office (Wereda) is the well-known office in Addis Ababa, which is located in every sub-city. It is a place where service is given to the public. Every single person who is above 18 years old visits this office for different reasons. Different sectors are available in every Wereda like vital events registration, housing systems, small enterprises, building permit offices and many more. The subdivision of vital events registration provides services related to identification cards (Kebele IDs), registering vital information like birth certificate, marriage certificate, child adaptation certificate and death certificate. This is the segment that is chosen for this research purpose as a study site.

1.2 Statement of the problem

Workplace design plays a major roll in influencing employees' performance and quality of life at work. Numerous studies around the world discovered that characteristics of physical environment have significant impact on the mood, behavior, perception and

productivity of employees. According to (Kamarulzaman et al, 2011a), employees who produce better work outcomes are the ones who are satisfied with their physical environment.

In Ethiopia, the concept of interior design is just starting to develop recently. It is still regarded as a luxury instead of necessity. Interior design involves managing complex ideas and working with a certain space to make it functional, comfortable and aesthetically pleasing in a creative way. I have chosen to research in this topic because at the study sites, the problem seems to be neglected either due to lack of knowledge or not giving it significance. Due to this, problems arise from lacking to organize and design the working space efficiently which results in decrease in employee performance.

An employee spends most of his/her hours in a day at the workplace. Failing to design this environment well, might lead to working in uncomfortable space. Lacking natural daylight and lack of proper ventilation system causes discomfort for the employee and for the customers as well. It also leads to health problems due to lack of sufficient air circulation and could also lead to discouragement and depression. Good lighting design practice, particularly the use of daylight, can improve health without compromising efficiency. Visual discomfort of a person depends on both the lighting and the decor of a space, (Wilkins 1993a). Poor color selections and combinations, too much clutters, unorganized spaces, suffocating areas and insufficient circulation areas could cause visual discomfort as well.

The office space in most Wereda is located in the 1st floor of the building. Thus, the positioning of the workplace made it difficult for elderly and for people with physical disabilities to access the office easily. The interior space at the study site also lacks sufficient lighting both natural and electric lights thus the room appears to be darker during the day. Moreover, the temperature and lack of proper ventilation system affect the working condition of employees. The temperature of the room rises up profoundly during working hours and the office feels suffocating to stay in. The room lacks sufficient fresh air circulation creating uncomfortable indoor space. The furniture arrangements at

the study site are also not positioned in accordance with the necessary workflow resulting in reducing easy functionality for employees. Additionally, facilities like eating areas and washing rooms are not adequately available in reasonable proximity, which forced the employees to go far in searching for these facilities. These conditions impact the wellbeing of the person situated at the site.

Wereda is service-oriented sector where leaders' target is to make sure that customers get served in good quality, promptly and satisfy their needs. To ensure this, primarily employees need to be satisfied with their job and feel motivated to serve others. Job satisfaction is mostly affected by pollutant concentration like ventilation and temperature pollutant coming from poor air quality (Solange Leder et al. 2016). Dissatisfied employees wouldn't perform at their best in any situation. According to Deepika Pandita and Madhura Bedarkar (2015), employee engagement to their respective task is given significance since it is identified as a driver for employee performance. A person reflects how he/she feels internally, thus physical environment tend to influence a person's feeling in a positive or negative way. Consequently, a person's internal feeling reflects on their performance therefore physical environment has a relation with employee performance.

The fact that Wereda is devoted to serve the community, this research would like to identify the existing problems and pin out the specific areas where it needs enhancement to improve the wellbeing and the performance of the employees so that they can serve the society at their best. In this specific sector, such research has not been conducted previously, therefore this paper would like to add a positive input to enhance the productivity level of the employees and create a standard level, welcoming and inspiring office spaces.

1.3 Research Questions

This research attempts to answer these questions based on the collected data and facts in design methods.

- How can the interior design of a workplace affect employee performance?

- Which design factors play major roll to enhance or decrease employee performances?

1.4 Objective of the study

The objective of this research is to emphasize the importance of workspace design and identify the relationship between workplace design and employee performance.

1.4.1 General objective

This research tries to clarify the importance of designing the physical environment of an office and how it contributes to the well-being and performance of an employee.

1.4.2 Specific objective

- To recognize the environmental factors that most affect employees' productivity level.
- To assess the relationship between workplace design and employee performance
- To find out how employees' satisfaction level in their work environment affects their performance.
- To examine how physical environment affects employee performance.

1.5 Significance of the study

This research gives valuable insight for leaders at Addis Ababa administration as well as vital events and registration offices. These leaders and concerned personnel could benefit from this study by allowing them to recognize the problems and acquiring the knowledge on how to address the issue. The advantage of this study is that, it shares knowledge on the importance of getting proper design for a workplace. It also tries to identify the different factors like lighting, temperature, sound, ventilation and layout of the furniture. It makes the effort to study how the performance of employee is affected due to the surrounding environment. Based on these variables, it indicates in detail how the problems that occur from the variables affect the person working in the environment.

1.6 Scope of the study

Various factors that affect employee performance include: leadership style, physical environment, psychological and behavioral factors, company culture, and many more. This research focuses on the physical environmental factor affecting employee performance. This environmental factor is studied at the study site usually named Wereda. Wereda fundamentally includes different sectors like vital events registration and information; housing system; building permit sector, small enterprises and many more. From these subdivisions, this research selected to emphasize on the vital events registration and information sector. Focusing on the sector, the research tries to collect data from 15 Wereda located in various Sub-cities. The participants for this study ranges from the leaders, office operators and front line service providers.

1.7 Limitations of the study

The limitation of the study lays on the narrow time frame available to conduct this research in depth. The study sites are also geographically located in different parts of Addis Ababa, which makes it difficult to collect data in a tight schedule. The study site of this research is a place where every individual living in the city visits. The office doesn't have high and low season for their work, which makes the employees occupied all the time. Due to this, it was difficult to get cooperation from them to participate easily and in a timely manner. In some locations it was even difficult to access the leaders to get their permission and employees were too busy serving their clients, which forced us to change location.

1.8 Organization of the study

This research paper is organized into five chapters. The first chapter discusses the introduction part including the background of the study, statement of the problem, the research questions, objective of the study, significance of the study, the scope, limitations and organizations of the study. The second chapter is about literature review. The third is about the methodology. It deals about the study area, the source of data, sampling

method, data collection and analysis method. The fourth chapter is about analysis and discussion. It describes how the data is analyzed; it describes the statistics and analyzes the result. The final chapter concludes the research and indicates recommendations based of the findings.

Chapter 2. Literature Review

Introduction

In this chapter, the study attempts to review other similar researches that were conducted in relation to the environment of a working space and its relationship with employee performance. It describes theories, findings, opinions, principles and recommendations from related research of different individuals. It presents general facts from previous findings using literature and empirical review, additionally incorporated conceptual framework summarized from the findings.

2.1 Theoretical Literature Review

Definition of workplace design

Workplace design involves organizing and designing an office space to optimize employee performance. Employees need a safe, organized, comfortable and pleasant space to be able to produce their best work. The design of a certain space dictates how a person feels in the environment either consciously or unconsciously. Poorly designed workstations, unsuitable furniture, lack of ventilation, inappropriate lighting, excessive noise, insufficient safety measures in fire emergencies and lack of personal protective equipment: such environment are prone to occupational disease and it impacts on employee's performance and consequently productivity is decreased (Chandrasekar 2011a). Most people spend 50% of their lives within indoor environments, which significantly influence their mental status, actions, abilities and performance. Better results and improved productivity is assumed to be the result of better workplace environment. Better physical environment at the office boosts the employees and ultimately improve their productivity (Sundstrom et al. 1994). It is in line with the finding of M.V.S Mendis (2016a), that improvements in the physical environment result in the increase of employee productivity.

Spatial arrangement and design

Spatial arrangement and design includes the interior layout design (floor plan), the furniture arrangements, the color theme, selection of materials, the pattern, composition,

shapes and forms in order to provide cohesive structure to the design of the space. Spatial design signifies about how spaces feel and how it is organized in order to enrich the lives of those experiencing the space. By using specific design strategies and well thought spatial arrangement, it delivers a well-structured environment and provides a way to tie the spaces together to create a collective and organized as a whole. The physical layout of the workplace along with efficient management processes is playing a major role in boosting employees' productivity and improving organizational performance (Uzee 1999; Leaman and Bordass 1993). Researches indicate that the effects of workplace design and the relationships between perceived satisfaction of office workplace design factors (layout and storage) and work performance measures (individual performance, group collaboration and effectiveness) signifies positive impact of the intervention on environmental satisfaction for workstation layout. Satisfaction with workstation layout had a significant relationship with individual performance, group collaboration and effectiveness (Robertson and Huang 2006)

The color scheme of an interior space greatly affects the ambiance of the room. More than any other factor, color impacts the mood of the room, which makes it essential to consider the kind of atmosphere needed in the space when choosing the colors. The use of appropriate and/or correct colors in an interior environment would increase the functionality of the space (Sevinc Kurt and Kelechi Kingsley, 2014). By doing so, a person's mood changes to the better by using appropriate colors which consequently influences their performance level. Within-persons, periods of positive mood were associated with periods of improved task performance (Andrew G and Theresa M. 2010). Better mood is always essential to perform any type of task and strongly related to be able to produce the required output.

Coordinating workplace design with employee necessities is exceptionally fundamental to attain determined employees towards organization objectives (M.V.S Mendis, 2016b). The significance of office facilities and workplace environment within the office cannot be overemphasized because office facilities support in facilitating work schedules and increment staff's efficiency and productivity. Operational equipment is essential to execute the required works efficiently as well.

Acoustic

A research conducted by (Emmanuel, 2012) indicated that workers productivity increased in the absence of noise due to minimized distractions and decreased job related stress. Noise distractions can lag the speed of work output and might bring an opportunity to create more errors. Noise level in working environment has negative impact on human efficiency, which leads to reduced quality and quantity of service and products (Jafar et al. 2013a). In order to increase human productivity, creating healthy working environment is essential. Inappropriate inner environment has negative effect on human performance and their comfort during working hours and also causes million of dollars losses (Jafar et al. 2013b). These articles support that healthy environment provides comfortable working area and increasing employees' productivity and performance will increase organization productivity.

Temperature

Thermal comfort is one of the conditions where people need tremendously to feel relaxed in a room and be able to work smoothly. An indoor air quality was studied in a certain location during summer time in which the result showed that indoor temperatures rose above thermal comfort levels (maximum temperature 31.4°C). When the temperature rose above 25°C, neurobehavioral symptoms and the percentage of those dissatisfied with the indoor air quality increased, and self-estimated work efficiency decreased statistically significantly (Pirjo et al. 2010). According to Clements-Croome (2008a), when planning, it is imperative to design the occupancy density in relation to the ventilation, as crowded workspace usually allow rise to problems. Additionally, it is vital to have heights of spaces that permit the stagnant layer of air to rise over the head level. Several studies prove that indoor environmental conditions significantly impact wellbeing and efficiency (Seppanen, 2006).

Lighting

In an environment with good natural light, eyes are less strained as we focus on our tasks like looking at monitors or analyzing heaps of data and information on different mediums, like paper and the whiteboard. Headaches are less likely to occur and fatigue is

reduced (Jimmy, 2020). The lighting conditions tending to cause visual inconvenience are inadequate light for the duty at hand, sensational contrasts in luminance around the task, shadows, veiling reflections, glare and flash (Boyce et al. 2018). Additionally, according to the research finding by Mendis (2016), it gives evidence that good workplace layout, ventilation, lighting, availability of equipment and thermal comfort leads to increased job performance of operational level employees. These quotes support the idea that a space without proper lighting causes visual discomfort as well as bring fatigue and depression.

Ventilation

Air quality of a specific room is controlled by the ventilation system. A well-ventilated area has a better air quality than a place with less air circulation. In Ethiopia it is easy to get well-ventilated space if it is well considered because our natural weather is very convenient that we don't have to depend on artificial ventilation system. Poor indoor air quality can also reduce the performance of office work by 6-10% (Wilkins 1993b). The olfactory sense is very essential psychologically and physiologically. The air we breathe ultimately affects the efficiency and effectiveness of our thinking (Clements-Croome 2008b).

Health is the result of a complex interaction between the physiological, personal and organizational resources accessible to the individual and the stress places upon them by their physical environment, work, and domestic life. A deficiency in any one of these factors increases the stress and decreases human performance (Derek John Clements – Croome, 2006a). According to (Boles et al. 2004) a proper workplace environment helps in reducing the number of absenteeism and thus can increase the employee's productivity, which leads to increased productivity at the workplace. Subsequently, these articles indicated that the design of workplace environment is essential for accelerated productivity.

Employee performance

Employee performance is how an individual fulfills the duties of their role, completes required tasks and behaves in the workplace. It can be measured through quality, quantity and efficiency of their work. Employees are major assets of an organization, which is why their well-being and how they perform in their task emphasize the importance. Job satisfaction is among the important attitudes that influence human behavior in the work place. It is an emotional response to one's tasks as well as to the physical and social conditions of the work place (Hettiararchchi, Jayarathna 2014a). Job satisfaction is related to many aspects of the job behavior, one of which is the physical environment.

In the workplace, it is often assumed that employees who are more satisfied with the physical environment are more likely to produce better work outcomes (Kamarulzaman et al. 2011b). This shows us that the two variables have direct relationship. When physical work environment is welcoming and inspiring, the behavior of employees becomes positive and optimistic which leads to better performance. Others research have also shown that productivity bears a close relationship to the indoor environment quality (Kamarulzaman et al. 2011c).

A comfortable working environment is imperative to empower employees to center and do their work flawlessly. This will guarantee the quality of life at work as well as performance of employees for better organizational performance (Kamarulzaman et al. 2011d).

Leadership

“Workplace design can be a canvas for new-generation leaders to express strategies that entrust, enable and motivate people. The best leaders will create a cultural identity which they will allow to be brought to life by great design” (Eggers 2019a). This quote indicates that in order for leaders to perform well and motivate the employees, the environment plays a major roll. Additionally, (Eggers 2019b) mentions that the environment in which leadership operates emerges as a key factor in how leaders perform and that environment has grown in speed and complexity over time. The management that dictate how, exactly,

to maximize employee productivity center around two major areas of focus: personal motivation and the infrastructure of the work environment (Chandrasekar 2011b).

2.2 Empirical study

Several studies have shown that there is a positive relationship between workplace design and employee performance. The design of an office affects the behavior of an employee either positively or negatively. Consequently the employees' behavior is reflected in their performance. A study was conducted in Japan to examine the effect of work environment and job satisfaction on employee performance. The results of the study showed that the variable work environment and job satisfaction bring a positive and significant effect on employee performance partially and simultaneously (Badrianto & Ekhsan 2020a).

Another study was conducted at Sri Lanka about the effect of employee work related attitude on employee job performance. The result is that human relations might be described as an attempt to increase productivity by satisfying the needs of employees and subsequently increases the job performance (Hettiararchchi, Jayarathna 2014b).

A research conducted by Badrianto & Ekhsan (2020b), shows that in order to improve employee performance, work environment must be improved which indicates that work environment factors significantly influence employee performance. Additionally, another research by Derek John Clements – Croome, (2006b) indicates that there is an approximately linear relationship between the percentage dissatisfied with indoor air quality and the measured decrement in performance by 25-70%. Air quality is also related with the temperature of the room. If the temperature of a room rises due to suffocation, the air quality definitely reduces. Based on a research study by E. Islam and T. Ashraf (2017), productivity decreases by 2% per each degree over 25°C and presented the link between a decrement in productivity and high indoor temperature.

A study was conducted by Al-Omari and Okasheh (2017) in engineering company to analyze influence of work environment on job performance. From sample size of 85 employees, 40% of respondents agree that inconvenient lighting affects their enthusiasm

for work and causes substantial discomfort at the workplace. Regarding the influence of sound in a workplace, the reduction of noise in workplace reduces physical symptoms of stress by as much as 27% and performance of data – entry workers increased with a 10% improvement in accuracy (Bruce, 2008).

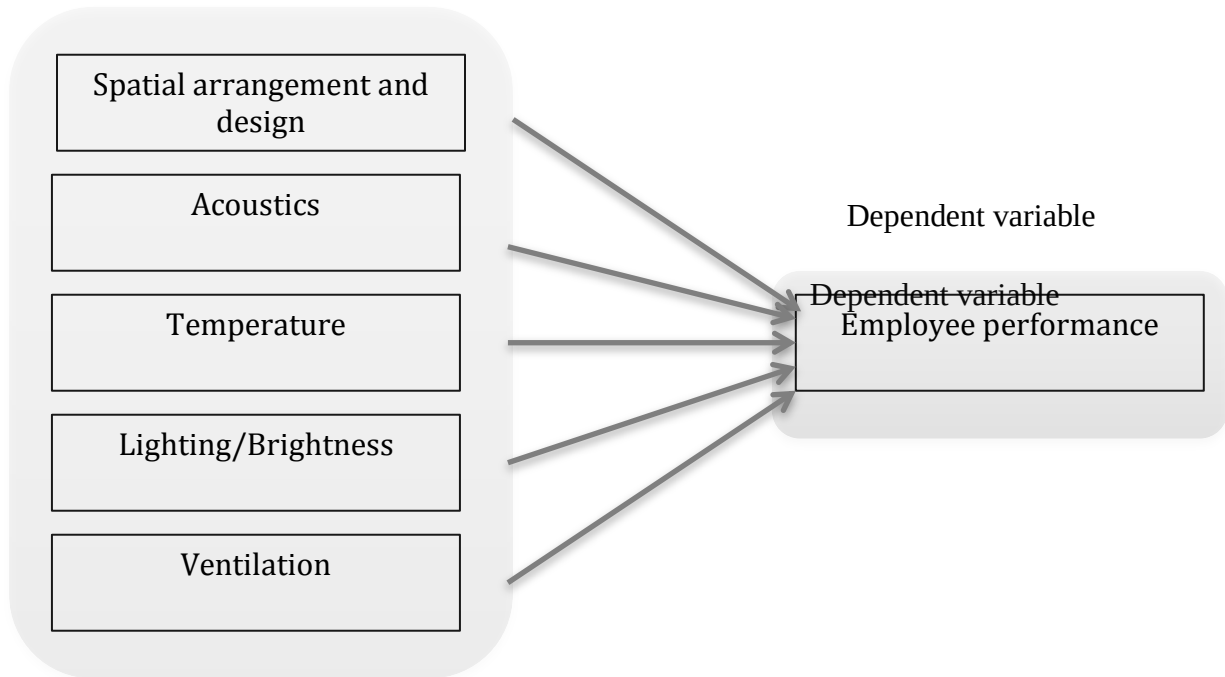
These are some researches that have been reviewed that relates with this research topic and study the scientific fact about to what extent the condition of an environment affects the health and behavior of a person. Majority of articles that have been published tend to emphasize the relationship between leadership and employee motivation while neglecting the link between workplace designs and leadership. Leaders that emphasis on the importance of workplace design gain the benefit of leading employees who are motivated and determined to their jobs. This relation also affects the interaction between leaders and employees. This is the gap that this research attempts to cover.

2.3 Conceptual framework

The variables of this research are classified into dependent and independent variables. Workplace design is the independent variable whereas employee performance is the dependent variable in this study. The independent variable (workplace design) has different factors, which are mentioned in figure 2.1.

Figure 2.1 The conceptual model of the independent and dependent variables.

Workplace design (independent variable)



Source: researcher's own construction

Based on the literature review and the above conceptual model, the succeeding hypotheses (H) have been formulated.

H1: Spatial arrangement and design has a positive relationship with employee performance.

H2: Acoustic factor affects the performance level of employees.

H3: The temperature level of a workplace affects the performance level of employees.

H4: Appropriate brightness level at the workplace has positive relationship with employee performance.

H5: Proper ventilation system at a workplace has positive relationship with employee performance.

Chapter three: Methodology

Introduction

This chapter describes the methodology used for this research. It indicates: the type and source of data that is required to address the research problems and questions; how the target population, sampling technique and sample size is selected; how the data is analyzed and it also covers the reliability and validity of the research.

3.1 Research design

This research adopted a quantitative research approach to study the link between employee performance and their workplace design in vital events registration and information office at Addis Ababa. This study topic tends to be experimental research type where it studies the casual relationship between workplace design and employee performance. Through manipulating the independent variables, the effect on dependent variables can be measured. Structured questionnaires were prepared to collect primary data at the study site. By doing so, numerical data is collected and analyzed in order to get generalized results for a wide population. Moreover, observation of the study site is conducted to add additional support data on top of the questionnaire. To achieve best results for this research, quantitative research approach is best suited.

3.2 Description of study variables

The variables in this research refer to the situation that is being measured. It is classified into dependent and independent variables. These variables are manipulated to test cause and effect relationships. In this study, the independent variable is the workplace design. It is defined “independent” because it is not influenced by any other variable in the study hence it is the cause for the relationship. However, the dependent variable is performance of employees. This variable can be altered by the influence of the independent variable. It is the effect or the result of the relationship in the study.

3.3 Description of study area and target population

In a workplace environment, employee behavior and their performance can be affected by different factors. Physical workplace design is one of the factors, even though it is not given much priority in most governmental sectors in Ethiopia. This research endeavors to address the knowledge gap as well as discuss the cause and effect of the variables. The study site selected for this research is Vital Events Registration and Information Office (Wereda) in Addis Ababa. This site is a place where every citizen gets served to acquire different personal Id's necessary for each individual. This study site is chosen because the community is served daily in this location and it is the place where the aspect of space design is usually neglected. Wereda is located under each sub-cities in Addis Ababa and each Wereda has different sectors. Vital events registration and information office is one of the sectors under Wereda and it is the study area for this research.

The target populations aimed for this study are the employees of the study sites. Vital events registration and information office consists around 10 employees on average in each office. These employees include the front line service providers, office operators and the managers for the site. Each individual in a selected site are the target population for this research.

3.4 Sampling technique

The sampling technique that is used to choose the specific Wereda sites from the total Weredas is through snowball sampling technique. From this method 15 Weredas are selected as study sites. Zooming in to a single Wereda, cluster sampling method is developed to use as a sample unit. Cluster sampling method involves employees from different work segments like managers, front line employees and office operators in a single subunit altogether as a sample unit. Addis Ababa has 11 sub-cities and each includes 11 Wereda on average. Within each Wereda, there are different sectors including the vital events and registration office. These offices have around 10 employees on average in each Wereda.

The total approximate population is:-

$$11 \times 11 = 121 \text{ Wereda}$$

$$121 \times 10 = 1210 \text{ employees}$$

The sample size for this research is determined using the sample method of (Yamane, 1967).

Size of population	Sample size (n) for Precision (e) of:			
	$\pm 3\%$	$\pm 5\%$	$\pm 7\%$	$\pm 10\%$
500	a	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1000	a	286	169	91
2000	714	333	185	95
3000	811	353	191	97
4000	870	364	194	98
5000	909	370	196	98
6000	938	375	197	98
7000	959	378	198	99
8000	976	381	199	99
9000	989	383	200	99
10,000	1000	385	200	99
a = Assumption of normal population is poor (Yamane, 1967).				

Table 3.1 Sample size for $\pm 3\%$, $\pm 5\%$, $\pm 7\%$ and $\pm 10\%$ precision levels where confidence level is 95% and $P = 0.5$

The margin of error appropriate for this research is $\pm 7\%$ and the confidence level is 95%. Our population is determined to be 1,210. From table 2, the sample size for population number 1000 is 169 and for population number 2000 is 185. The population size for this research lays between these numbers therefore an average number 177 is taken as a sample size.

3.5 Data collection

For the purpose of data enquiry, primary data collection method is used through questionnaires. They are carefully prepared including the workplace design aspect as well as the employee performance aspect. The type of response scale that the respondent use is the 5-point Likert scale, which are: - Strongly disagree, Disagree, Neutral, Agree and Strongly agree. Each survey questionnaire has been administered personally and the questionnaires are all filled out by the employees of the study sites.

Additionally, to support the research further, the researcher as a professional architect critically adds observation of the study site. Observing the design features of the site, the spatial arrangements, the lighting system and the thermal condition of the space is integrated. The perception upon entering the study site, the experience and the impression while staying there for a while gives us important information about the design factor of the space. For further information, secondary data are also collected from reference books, standard data, articles, and previously published researches.

3.6 Data Analysis

The variables of this study are the performance of employees as dependent variable and the physical environment of the space as independent variable. The relationship between these variables is analyzed using Pearson correlation analysis. The numeric data that are collected from the questionnaire is analyzed using descriptive statistics. This method allowed us to understand the features of the data transcribed into short summaries about the measures of data. Following this, multiple regression analysis is conducted in order to estimate the effect of workplace design on the performance of employees. The computer software used for these analyses is SPSS version 26. Correlation analysis is also prepared using SPSS software in order to measure the strength of the linear relationship between the two variables.

The observation part comprised examining the environment at the current existence. The space is observed critically by comparing it to the standard space designing method. The result of the observation is compiled into rightful summary to give additional support for the analysis result that is compiled from the questionnaire.

3.7 Reliability and validity analysis

Reliability of the research measures the consistency of data collection method and validity of the research measures the accuracy of the data. To ensure the reliability of this research, the population is carefully selected trying to incorporate sample from diverse locations. The questionnaire is addressed to each individual in a consistent manner. It includes all essential questions that must be incorporated in order to get appropriate data. Identical questionnaire is given out to all sample population in order to keep consistent output and maintain the reliability of the research. Additionally, the researcher does the observation part exclusively, which gives it similar and consistent view throughout the study sites.

Reliability can be measured using Cronbach's Alpha developed by Lee Cronbach in 1951 (Mohsen and Reg, 2011). It measures internal consistency of a scale and it is expressed as a number between 0 and 1. In most researches, alpha value higher than 0.7 is considered acceptable. The alpha value for each variable is calculated and shows in table 3.2 that workplace design has value of 0.879 and employee performance has value of 0.722. They are both above 0.7 so it signifies consistency of the data. Based on table 3.2, the alpha value for this study shows 0.845 over all, which is above 0.7 therefore; it indicates that it is suitable to use the data for further analysis.

Table 3.2 Reliability statistics

Instruments	Cronbach's Alpha	N of items
Workplace design	0.879	27
Employee performance	0.722	10
Over all scale	0.845	37

Source: Own survey SPSS output

To ensure the validity of the research, appropriate research methods and measurement systems are developed. The population of the study is clearly defined as employees of vital events of registration and information office. Data is collected exclusively from

these study sites in different locations of Addis Ababa. For this study, standardized questionnaire is adapted from journal of Hameed A, Amjad S. (2009). Responses of the questionnaire, which held the same response throughout the questions were rejected and not included in the sample because it may bring invalid data.

3.8 Ethical consideration

Ethical considerations are certain code of conduct that must be maintained when collecting data from people. These principles are carefully measured during data collection stage for this research. The participants were informed about the purpose and the benefit of the research and they were granted to either join or decline to participate according to their desire. During the data collection, the leaders of the office are contacted primarily to brief them about the purpose of this research and take permission from them to ask their and the employees' time to participate in this data collection. The participants' personal information is kept confidential and their anonymity is maintained so that their responses wouldn't be linked to other data and they become free to respond liberally. This study also ensures that it is free from falsifying, manipulating and misrepresentation.

Chapter four: Data Analysis and Interpretation

Introduction

This chapter describes how the raw data is analyzed and interpreted in order to summarize the findings. The information retrieved from the questionnaire is transcribed into different statistical methods. The demographic information of the respondents; the descriptive statistics; the correlation analysis test and the regression analysis test is described in this chapter.

4.1 Response rate

In the survey, 177 questionnaires were distributed but the returned one was 149 questionnaires. From these, 3 questionnaires were filled with all similar responses therefore it had to be rejected to protect the research from invalid data. Thus, this research analysis used 146 properly filled questionnaires, which makes the survey response rate 82.4%.

4.2 Demographic information

The primary part of the questionnaire contains the demographic information of the respondents. The factors include gender, age education level, number of years worked in the sector, and their department. The frequency and the percentage of each category are described in the following table 4.1.

Table 4.1 Demographic characteristics of respondents

Factor	Category	Frequency	Percent
Gender	Male	80	54.8%
	Female	66	45.2%
	Total	146	100%
Age	20-30	101	69.2%
	31-40	28	19.2%
	41-50	15	10.3%
	>51	2	1.4%

	Total	146	100%
Education level	Grade-12 completed	5	3.4%
	Diploma	16	11%
	Graduate	124	84.9%
	Post graduate	1	0.7%
	Total	146	100%
Number of years worked in the sector	<2 years	49	33.6%
	2-5 years	63	43.2%
	6-10years	18	12.3%
	>10years	16	11%
	Total	146	100%
Department	Manager	14	9.6%
	Customer service	101	69.2%
	Office operator	31	21.2%
	Total	146	100%

Source: Own survey SPSS output

From what is presented in table 4.1, the dominating gender of the respondents is male, which makes 54.8% whereas the female makes the remaining 45.2%. Most respondents are in the young generation with age between 20-30. They make 69.2% from the total while only 1.4% of respondents are above age 51. Respondents who hold bachelor's degree make 84.9% of the total respondents. Additionally, the dominating respondents' experience year in the sector is 2-5 years with 43.2% of the total, however the minimum is more than 10years with 11% of the total. Finally, most respondents work in customer service department that makes 69.2% of the total.

4.3 Descriptive statistics

This chapter organizes the responses from part two of the questionnaire. The questions are scaled in five point Likert scale from strongly disagree, disagree, neutral, agree and strongly agree. The data collected from the sample population is summarized, and the characteristics of the responses are described. It is categorized according to the variables and further more based on the factors like design, acoustics, temperature, light and ventilation. The response scale of the questions with negative items is reversed before the analysis is started. This permits to acquire similar coding system for low and high scores and accurate mean can be originated. In table 4.2 the frequency, mean and standard deviation of each question are described.

Table 4.2 Spatial arrangement and design

No.	Questions	Frequency					Mean	St. dev
		Rating						
		1	2	3	4	5		
1,	My office is aesthetically pleasing to work.	39	50	49	7	1	2.18	0.9
2,	My office size (area) is sufficient for a smooth workflow.	29	50	51	11	5	2.4	1
3,	My work area is sufficiently equipped for my typical needs (computers, storage, shelves, etc.).	47	56	32	5	6	2.08	1.02
4,	My furniture is comfortable enough so that I can work without getting tired till 5pm.	56	50	35	5	0	1.92	0.87
5,	The layout of the furniture arrangement and design allows a smooth workflow.	45	58	36	6	1	2.04	0.88
6,	The layout allows me to work	38	60	39	9	0	2.13	0.87

	efficiently.							
7,	In the office there is sufficient circulation area to move around freely.	23	50	48	17	8	2.56	1.06
8,	Appropriate facilities like lounges and rest rooms are adequately available.	73	49	21	0	3	1.7	0.86
9,	The position of my office (being in the 1 st floor) affects my productivity. (Frequency result reversed)	20	38	65	17	6	2.66	0.99
10,	The physical conditions at work influence my productivity. (Frequency result reversed)	28	40	46	21	11	2.63	1.16
11,	I like the color scheme of my office space.	39	35	35	27	10	2.54	1.25
12,	My supervisor gives attention to the general physical environment of the office.	40	31	31	30	14	2.63	1.33
	Aggregate average mean						2.28	

Source: Own survey SPSS output

Table 4.2 describes about the spatial arrangement and design of the workplaces. From the total inquiry, the least mean figure is 1.7, which is for obtaining appropriate facilities in the office. Facilities like restrooms and eating areas are very unsatisfactory according to the responses of the employees. The figure shows mean value of 1.7, which is far below the average. The aesthetic design side is also below the average. The color scheme and total aesthetics of the office infers 2.54 and 2.18 mean respectively. Which are both below the average indicating that the office is not pleasing enough for the employees.

The spatial arrangement including the efficiency of layout designs, the circulation space and comfort of the furniture is inadequate according to the response from the data. All integers regarding this category are below 2.6, which

indicate that it is even below the average 3. Therefore this category also falls behind in the case of the study sites. Most employees disagree about having good layout design, sufficient space and the availability of satisfactory equipment for their offices. The values of all these show that employees of the study site are not satisfied with their working environment.

The highest mean figure in table 4.2 is 2.66, which is for: “the position of the office affects the employees productivity”. Even though it is the highest from all, it is still below the average. It indicates that, their office being in the first floor affects their productivity level.

The mean value of 2.63 indicates that the involvement of leaders on the design of their office is insufficient. Above average respondents agree that their leaders don’t give much attention for their office design. Generally, the aggregate mean infers 2.28, which is still below average. The respondents agree that the spatial arrangement and the design of their office are not in the level of comfort. This is inline with the finding of Mendis (2016) that “It is the quality of the employee’s workplace environment; how well they engage with the organizations, especially with their immediate environment that most impacts on their level of motivation and subsequent performance”.

Table 4.3 Acoustics

No.	Questions	Rating					Mean	St. dev
		1	2	3	4	5		
13,	My work environment is quiet.	47	39	42	14	4	2.23	1.09
14,	My workspace has many noise distractions. (Frequency result reversed)	31	29	47	22	17	2.76	1.27

15,	The Noise in my office affects my productivity. (Frequency result reversed)	71	53	15	6	1	1.72	0.86
	Aggregate average mean						2.23	

Source: Own survey SPSS output

Table 4.3 describes about the acoustic factor at the study site. According to the respondents, the mean value 2.76 indicates that their office has noise distractions. The aggregate mean is also 2.23 that is below the average which indicates that their office environment is not a quite area and the noise somehow affects their productivity level.

Table 4.4 Temperature

No.	Questions	Rating					Mean	St. dev
		1	2	3	4	5		
16,	The climate in my office environment is comfortable.	29	38	60	15	4	2.5	1.01
17,	The temperature of the office rises up when more people gather in. (Frequency result reversed)	57	55	24	5	5	1.94	1
18,	The temperature of my office affects my productivity. (Frequency result reversed)	58	39	29	19	1	2.08	1.08
	Aggregate average mean						2.17	

Source: Own survey SPSS output

Table 4.4 describes the level of temperature in the office environment. The lowest mean is 1.94 for the inquiry “the temperature of the office rises up when more people gather in” indicates that the office environment warms up when more people accumulate. According to the respondents’ total mean 2.17; the rising of

temperature in the office affects the productivity level of the employees. This is in line with the finding of (Pirjo et al. 2010), that when the temperature rose above 25°C, neurobehavioral symptoms and the percentage of those dissatisfied with the indoor air quality increased, and self-estimated work efficiency decreased statistically significantly.

Table 4.5 Lighting (brightness)

No.	Questions	Rating					Mean	St. dev
		1	2	3	4	5		
19,	My workspace is provided with efficient lighting so that I can work easily without strain on my eyes.	34	38	44	21	9	2.54	1.17
20,	Ample amount of natural light comes into my office.	23	27	46	38	12	2.92	1.18
21,	The amount of light at the office is sufficient to do my work.	11	44	47	31	13	2.93	1.08
22,	The brightness of the office is motivating and inspiring to work.	25	30	55	30	6	2.73	1.09
23,	The number and size of the windows is sufficient for adequate natural light.	30	33	39	30	14	2.76	1.26
24,	The amount of light at the office affects my productivity level. (Frequency result reversed)	37	48	38	18	5	2.35	1.09
Aggregate average mean							2.7	

Source: Own survey SPSS output

Table 4.5 describes about the brightness situation inside the office environment. Natural light is essential to do an office job however, the mean value for sufficient amount of natural light in the office is 2.92. The value is slightly lower than the average, which indicates that the amount of natural sunlight is

inadequate in the office. Brightness for the office comes from either natural or electrical lights. The combination of both should give sufficient illumination for the spaces. According to the respondents, the brightness level of the office is given mean value below 3. This indicates that the office require more brightness and the current illumination level in insufficient. Additionally, with the mean value of 2.35, the respondents agree that the brightness of their office affects their productivity level. Generally, the aggregate mean value of 2.7 implies that the illumination level of the office either through natural or electrical is inadequate.

Table 4.6 Ventilation

No.	Questions	Rating					Mean	St. dev
		1	2	3	4	5		
25,	There is sufficient fresh air circulation in the office.	36	41	37	30	2	2.45	1.11
26,	There is poor ventilation (air circulation) when more people gather in the room. (Frequency result reversed)	61	39	29	16	1	2.02	1.06
27,	The office air quality affects my performance. (Frequency result reversed)	56	44	34	11	1	2.02	0.99
	Aggregate average mean						2.16	

Source: Own survey SPSS output

Table 4.6 describes about the ventilation system of the office environment. According to the responses from the inquiry, with mean value of 2.45, fresh air circulation is insufficient inside the office environment. Moreover only one person strongly disagreed that the ventilation system suffers when more people gather in the room. Due to many factors, most respondents strongly agreed that

poor air circulation occurs when a lot of people gather in the office. Generally the aggregate mean value of 2.16 implies that their office has inadequate fresh air circulation and due to this, the employees' productivity level is affected. This outcome is aligned with the finding of Wilkins (1993), that the performance level of employees in the office reduces by 6-10% when the indoor air quality is poor.

Table 4.7 Employee performance

No.	Questions	Rating					Mean	St. dev
		1	2	3	4	5		
28,	I accomplish my goals within the predicted time frame.	9	20	39	45	33	3.5	1.16
29,	I am fully engaged and motivated to do my job.	8	22	20	48	48	3.72	1.22
30,	I perform in my job maintaining good quality.	8	16	24	45	53	3.81	1.19
31,	The customers who visit my office are usually satisfied with the service they get.	7	25	35	45	34	3.5	1.16
32,	I arrive to the office on time.	5	15	33	44	49	3.8	1.11
33,	I often take day off from the office. (Frequency result reversed)	6	17	32	44	47	3.74	1.15
34,	I often make error while doing my work. (Frequency result reversed)	16	17	18	45	50	3.65	1.34
35,	Due to overall office environment I can complete my daily tasks easily.	31	26	63	14	12	2.65	1.15
36,	Favorable environmental conditions (less noise, suitable temperature etc.) in the office building will increase my productivity at work.	4	16	38	40	48	3.76	1.1
37,	Unfavorable environmental conditions	2	12	33	43	56	3.95	1.03

	(noise distractions, unsuitable temperature etc.) in the office building will decrease my productivity at work.							
	Aggregate average mean						3.6	

Source: Own survey SPSS output

Rating scale

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Table 4.7 describes about the dependent variable of the research, which is about the employees performance level. The employees responded to questions about the performance level of their own activities. According to the collected data, most employees replied to their actions in a positive manner. The mean value that is computed in table 4.7-performance section, lays between 3.5 to 3.81. This indicates that the employees have somewhat good performance level in their work unit according to their own rating because the mean levels are all above the average. On the other hand, the mean value of 2.65 is for the enquiry “Due to overall office environment I can complete my daily tasks easily” implies that the environment is not smooth and easy enough to facilitate the job on hand. Further more, most employees agree that favorable environments enhance productivity while unfavorable environment decreases the level of productivity with the mean value of 3.76 and 3.95 respectively. These values are both above 3 (the average) therefore it is a positive value.

4.4 Correlation analysis

In this research, Pearson correlation analysis was used to examine the relationship between the two variables. The value of the correlation coefficient lays between -1 and +1 denoting the strength of the relationship between the

variables. If the coefficient is greater than zero; the value implies a positive relationship, whereas if it is below zero; it implies negative relationship between the variables. The range of correlation coefficient interpretation is indicated in table 4.8.

The significance level measures the strength of the evidence and it is compared with the p-value. P-value represents the maximum level of risk that we are willing to take that our inference is incorrect. This maximum value is 0.05. A p-value less than this number are considered statistically significant.

Table 4.8 Correlation coefficient interpretations

Correlation coefficient (r)	Interpretation
0	No relationship
+1	Perfect positive linear relationship
-1	Perfect negative linear relationship
Between 0 & 0.3 (-0.3 & 0)	Weak positive (negative) linear relationship
Between 0.3 & 0.7 (-0.7 & -0.3)	Moderate positive (negative) linear relationship
Between 0.7 & 1 (-1 & -0.7)	Strong positive (negative) linear relationship

Source: Bruce Ratner (2009)

Table 4.9 Correlation analysis

		V1	V2	V3	V4	V5	V6
V1	Pearson correlation	1					
	Sig. (2 tailed)						
V2	Pearson correlation	0.055	1				
	Sig. (2 tailed)	0.507					
V3	Pearson correlation	0.159	0.280 **	1			
	Sig. (2 tailed)	0.055	0.001				
V4	Pearson correlation	0.401**	- 0.007	0.065	1		
	Sig. (2 tailed)	0.000	0.937	0.434			

V5	Pearson correlation	-0.082	0.368 **	0.344 **	-0.085	1	
	Sig. (2 tailed)	0.322	0.000	0.000	0.310		
V6	Pearson correlation	0.374**	0.086	0.246	0.406**	0.069	1
	Sig. (2 tailed)	0.000	0.300	0.003	0.000	0.407	
* Correlation is significant at the 0.05 level (2-tailed)							
** Correlation is significant at the 0.01 level (2-tailed)							

Source: Own survey SPSS output

Independent variables

- V1 (Spatial arrangement and design)
- V2 (Acoustics)
- V3 (Temperature)
- V4 (Lighting)
- V5 (Ventilation)

Dependent variable

- V6 (Employee performance)

In this study, the independent variables are spatial arrangement & design; acoustic factors; temperature; lighting and ventilation factors. These variables are believed to affect the performance level of employees, which is the dependent variable in the study. The relationship between each of the independent variables with the dependent variable is analyzed using correlation analysis method.

According to table 4.9, the Pearson correlation between spatial arrangement & design (independent variable) and employee performance (dependent variable) is 0.374, which indicates moderate positive linear relationship implying; when design enhances, performance also increases. The significance is 0.000 which is less than 0.05 therefore it implies that it is highly significant.

The correlation coefficient between acoustics (independent variable) and employee performance (dependent variable) is 0.086, which indicates weak positive linear relationship however it is leaning more towards “no relationship” because it is even below 0.1. The significance level is 0.300, which implies that it is statistically insignificant because the integer is above 0.05.

The correlation coefficient between temperature (independent variable) and employee performance (dependent variable) is 0.246, which indicates weak positive linear relationship. The significance level is 0.003, which implies that the relationship is statistically significant because the value is below 0.05.

The correlation coefficient between lighting (independent variable) and employee performance (dependent variable) is 0.406, which interprets as moderate positive linear relationship because the integer lays between 0.3 and 0.7. The significance level is 0.000, which indicates that it is highly significant.

The correlation coefficient between ventilation (independent variable) and employee performance (dependent variable) is 0.069, which interprets as weak positive linear relationship. The significance level is 0.407 which is above 0.05 therefore the relationship is statistically insignificant.

The correlation analysis in this study focuses on the relationship between the dependent and independent variables even though every variable's correlation with each other is indicated in table 4.9. The significant relationships are the ones between employee performance and lighting; employee performance and temperature, as well as with spatial arrangement and design. Pearson correlation value indicating moderate positive linear relationship exists between lighting and employee performance; and between employee performance and spatial arrangement & design. These findings relate with the objective of this research. The correlation analysis shows how workplace design relates with employee performance.

4.5 Regression analysis

In this study, multiple regression analysis is conducted in order to estimate the effect of workplace design on the performance of employees and additionally to test the formulated hypotheses. Multiple regression is preferred for this research because multiple independent variables exist to predict the dependent variable.

Table 4.10 Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.506 ^a	0.256	0.230	0.46274

a. Predictors: (constant), independent variables

The model summary in table 4.10 illustrates the strength of the relationship between the model and the dependent variable. The R-value 0.506 is the correlation between the dependent and the independent variable. The adjusted R² is 0.230, which indicates that 23% change in employee performance can be encountered by the five-workplace design factors jointly.

Table 4.11 ANOVA^a

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	10.332	5	2.066	9.650	0.000 ^b
	Residual	29.978	140	0.214		
	Total	40.310	145			

a. Dependent variable

b. Predictors: (Constant), independent variables

Table 4.11 reveals that, workplace design significantly predicted employee performance $F(5,140)=9.650$, $p<0.001$ which indicates that workplace design plays a significant role in influencing employee performance. The ANOVA output shows the summarized output collecting from all the independent

variables. It is in line with, good workplace interior design can bring a difference in employee performance and have significant impact on the organization's productivity (Rasha Mahmoud, 2013). The finding in table 4.11 maintains the objectives of this research that the relationship between workplace design and employee performance exists and that it is significant.

Table 4.12 Coefficients^a

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	1.288	0.409		3.153	0.002
	V1	0.226	0.081	0.227	2.802	0.006
	V2	0.010	0.087	0.009	0.115	0.908
	V3	0.173	0.082	0.169	2.100	0.038
	V4	0.218	0.056	0.309	3.876	0.000
	V5	0.058	0.091	0.053	0.639	0.524

Source: Own survey SPSS output

a. Dependent variable

V1 (Spatial arrangement and design)

V2 (Acoustics)

V3 (Temperature)

V4 (Lighting)

V5 (Ventilation)

The beta coefficient expresses the degree of change in the employee performance for every unit of change in the workplace design. The higher the absolute value of the beta, the stronger the effect. The t value measures how many standard errors the coefficient is away from zero. A t-value greater than +2 or less than -2 is acceptable. Moreover, as it is described in the correlation analysis,

significance level is measured comparing with p-value (0.05). A p-value less than this number are considered statistically significant. Based on these standards, the values are interpreted and the hypotheses are tested.

The study seeks to investigate the effect of spatial arrangement & design, acoustics, temperature, lighting and ventilation on employee performance. Based on these, the following hypotheses were proposed.

H1: Spatial arrangement and design has a positive relationship with employee performance.

H2: Acoustic factor affects the performance level of employees.

H3: The temperature level of a workplace affects the performance level of employees.

H4: Appropriate brightness level at the workplace has positive relationship with employee performance.

H5: Proper ventilation system at a workplace has positive relationship with employee performance.

In order to test the hypotheses, coefficients were evaluated to determine the influence of each independent variable on the dependent variable (employee performance).

H1 evaluates if spatial arrangement and design has positive relationship with employee performance. The result from table 4.12 reveals that ($\beta = 0.227$, $t = 2.802$, $p = 0.006$) spatial arrangement & design has a positive relationship with employee performance and the relationship is statistically significant. Hence, H1 is accepted. This is in line with, the ergonomics of office furniture has great importance because an employee has to work with them all the time and if they are neither comfortable nor user friendly, their working style and efficiency will get hamper considerably (Rasha Mahmoud, 2013). The result proves that giving attention to spatial arrangement and design is essential in an office environment for an employee to execute their top performance.

H2 evaluates if acoustic factor affects employee performance. The result reveals that ($\beta = 0.009$, $t = 0.115$, $p = 0.908$) acoustic factor does not affect employee performance and the relationship is statistically insignificant. Hence, H2 is rejected.

H3 evaluates if temperature level affects employee performance. The result reveals that ($\beta = 0.169$, $t=2.100$, $p=0.038$) temperature level affects employee performance and the relationship is statistically significant. Hence, H3 is accepted. It is in line with, from a study about room temperature and productivity in Helsinki University, it is found that the percentage of performance increase per degree increase in temperature up to 21-22°C, and decreases with temperature above 23-24°C (Seppanen et al. 2006). It indicates that when the temperature increases above the optimum level, employee performance decreases.

H4 evaluates if brightness level has positive relationship with employee performance. The result reveals that ($\beta = 0.309$, $t=3.876$, $p<0.001$) brightness level has positive relationship with employee performance and the relationship is highly significant. Hence, H4 is accepted. This is in line with; good lighting will promote employee's health, reduction of workplace accidents and increased productivity (Emmanuel, 2012). It also indicates the answer for one of the objectives in this study. Lighting seems to be the top influencer of employee performance from the rest of the variables.

H5 evaluates if ventilation system has positive relationship with employee performance. The result reveals that ($\beta = 0.053$, $t=0.639$, $p=0.524$) ventilation system doesn't have positive relationship with employee performance and the relationship is statistically insignificant. Hence, H5 is rejected.

As it is shown in table 4.12, every factor of independent variable has its own beta coefficient. From the result the highest value is 0.309, which is for light factor. This indicates that, more than other variables, light factor provides more change in employee performance whenever there is a single unit change in the amount of light. This is in line with the research finding of Mendis (2016), that it is recommended to have appropriate and satisfactory natural as well as artificial light to enhance the workplace design for better performance. Additionally, the significance level of lighting is <0.001 indicating that it is highly significant and the significance level is better than the other independent variables.

Based on the regression analysis, the accepted hypotheses are spatial arrangement & design, temperature and lighting. However, the rejected ones are acoustics and ventilation systems. Due to the nature of the job, the study sites are somewhat noisy because the work system requires communication between employees and clients. In result, employees might got used to the environment noise and accept to work in the same condition. Similarly, based on the statistical collected data, employee projected that ventilation system does not affect their performance level.

4.6 Direct Observation

Apart from the questionnaire survey, the researcher critically observed the study site as an architect regarding the workspace design. The visible factors that got assessed are the spatial arrangement & design, lighting, temperature and ventilation factors. Through visiting more than 15 branches of study sites, most of the offices were unattractive and unappealing to spend time in. The offices had insufficient window to let sun light in. On top of that, several offices put thick and dark colored curtains, which diminishes the brightness even more. Few places put sufficient electric lights whereas the others were visibly dim spaces due to lack of natural as well as electric lights.

The other factor that enhances the unappealing effect is the spatial arrangement and the overall design. The arrangements of the furniture also affected the space design and the availability of sufficient circulation area. Arranging furniture and storage areas in so much proximity created cluttered space and made moving across difficult. Moreover regarding the design part, color was the other issue at the study sites. According to several studies, the color of interior space affects human psychology greatly. From what is observed at numerous study sites, the color scheme of the interiors was not well thought at all. It was clearly visible that any kind of design professional was not involved in choosing the colors for the surfaces. Besides, the interior partition materials were in darker shades of

color. Darker colors tend to visually minimize a given room. Thus, it created unbalanced color scheme and created somewhat depressing mood for the office.

Furthermore, temperature and ventilation factors contributed for the unappealing space. Due to the nature of the work, a lot of clients visit the office daily, which results in numerous customers who wait in line to be served at once. The entire area of the office is inadequate to serve the extent of people they serve at a time. Consequently, when there was crowd of people in the office, proper airflow got disrupted plus the temperature of the room increased. This kind of room is suffocating and uncomfortable to work in as well as to visit the place as a customer. These factors all together affect the performance level of the employees.

The study sites were located in different locations of Addis Ababa while all of them share similar condition that vital events registration and information offices being located in the 1st floor of the building. Stating this, the position became a problem for senior citizens and for people with disabilities. To serve these populations, the employees had to go downstairs and serve them on the compound, which brought inconvenience for both parties and reduced major productivity time of the employees.

Some of the study sites color scheme, level of standard as a design, and brightness levels can be seen in figure 4.1.

Figure 4.1 Pictures of study sites





Chapter five: Conclusion and Recommendation

Introduction

This chapter describes how the result of the research analysis is summarized and suggests for further research areas. The research problem is restated and all the findings are summarized under the conclusion part.

5.1 Summary of findings

The importance of well-designed interior office space is inevitable although A.A city administration fail to recognize this issue, as it deserves. Various interior design factors that affect employees' performance are studied in this research. Analysis of the collected data demonstrates that workplace design has considerable impact on employee performance in general. Descriptive statistics of the analysis signifies that all factors (spatial arrangement & design, acoustics, temperature, lighting and ventilation) have mean value below average, which indicates that currently these factors are not adequate and they need to be addressed in the office areas. Emphasizing on individual factors, spatial arrangement & design, temperature and lighting correlates well with employee performance and the relationship between each variable with the employee performance is significant. Moreover, proposed hypotheses regarding spatial arrangement & design, temperature and lighting are supported. However, regarding acoustics and ventilation, the discovered statistics didn't support the formulated hypotheses. On the other hand, lighting is the leading factor that affects employees' performance greatly and correlates with performance level more than the other factors. Generally, the finding of this analysis reveals that there is direct relationship between workplace design and employee performance.

The discoveries from the observation part positively support the results of the quantitative survey regarding spatial arrangement & design, temperature as well as lighting. It is observed that, concerning the design of the space; the existing situation at vital events and registration office is not in good condition. The

inadequacy of lighting, the uncomfortable internal climate and aesthetically unpleasing space is observed in several study sites. Working in this condition leads to stress, job dissatisfaction exhaustion, decrease in production, and create less concentration. These kinds of spaces created challenging working conditions for employees. Consequently, it would be difficult to develop motivated employees with increased productivity level.

5.2 Conclusion

This research began by arguing that the design of a workplace would affect the performance level of employees. As this study demonstrates, it is discovered that employee performance increases along with better workplace design. The research finding signals that good workplace design, spatial arrangement, optimal temperature and lighting increases the performance level of employees.

To study this, data was collected from 146-sample population with structured questionnaire in A.A city administration vital events registration and information office. The responses of the survey indicates the aggregate mean for spatial arrangement & design – 2.28, acoustics – 2.23, temperature – 2.17, lighting – 2.7 and ventilation 2.16. These results imply that the respondents are not pleased with the existing situation of their workplace design because all the values are below average (3). Moreover, the beta coefficient from the regression analysis indicates the independent factor that holds the highest value for change in employee performance for every unit of change in design is the light factor with β value 0.309 whereas the lowest value goes to noise with 0.009. This indicates that light has the highest impact on changing the performance level of employees.

The deduction from the findings implies that most factors of workplace design influence employee performance. The study site lacking ample lighting, being suffocating and generally lacking proper interior design created a negative effect

on employee performance. This is supported from the statistical findings in the analysis phase.

Currently, most public organizations in Addis Ababa do not give significance to workplace design. Based on this research, it is likely the case that designing the interior of an office space is worthwhile. This research gives plenty reason why the city administration of Addis Ababa should consider to emphasize on workplace design at vital events registration and information office in order to benefit from gaining better service providers and motivated employees. Additionally, leaders also benefit from a well designed workspace in a way that they themselves become motivated to work in an inspiring space plus, the performance level of subordinates increase therefore there is a high chance that the leaders' goal gets achieved in a timely manner.

5.3 Recommendation

Based on the analysis, the major factor that affected employee performance is the lighting (brightness) of the space. Principally, it is recommended to captivate as much natural light as possible. While doing this, direct sunlight might come that disturbs the situation. In this case it is better to use window treatments like light curtains with lighter monochrome colors that doesn't obstruct the brightness of the room. If the window sizes are inadequate in relation to the size of the room, it becomes essential to add sufficient amount of electric lights.

The succeeding factor that must be addressed is spatial arrangement and design. Furniture arrangements must be done professionally envisioning the workflow and by considering the amount of circulation space. Smallest amount of space can be utilized to the maximum if it is designed well. The aesthetic design must also involve professionals to consider the color scheme and the interior materials in order to get appealing and inspiring space to work in.

Temperature level of the room can be maintained through using the available windows to make the air circulation easy. Although, if there is too much crowd, the window sizes might not be sufficient at the current state. In this case the first option is to consider installing artificial air conditioning system. The second option could be through managing the number of people gathering in the room at a given time. These methods reduce the high temperature and suffocation by bringing easy fresh air circulation in the case of current building at the study sites.

5.4 Research limitation

- There are around 121 Wereda in Addis Ababa each holding approximately 10 employees. While collecting data, less than 10 participants were involved in a single Wereda, which made it essential to contact several sites to get adequate sample population.
- From the survey, participants replied to the questions based on only to the extent of their knowledge, not comparing it to what the place could have looked. For example, some replied that their office is bright while it was clearly dim for an interior space. This might bring bias to the evaluation of the research.

5.5 Suggestion for future study

In order to acquire broader knowledge in this research area, it would make sense to do a research on the psychological effect of working in a poorly designed space. This topic would bring out the link of office space with employees' personal health and behavior.

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Appendix 1

Questionnaire

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

**RESEARCH TOPIC – The Effect of Workplace design on Employee Performance:
The Case of Addis Ababa city administration Vital Events Registration and
Information Office.**

Researcher – Nebat Yousuf

Dear Participants

This research is organized to study the effect of workplace design on employee performance in the case of A.A city administration vital events registration & information office in partial fulfillment of the requirement for masters degree in business leadership. In order to assess the relationship between a workplace design and the performance of employees, this questionnaire is developed to find out the problems and identify possible gaps existing at the study site. By getting your answers, we would be able to identify the gap and lead us to give possible suggestions. Your valuable responses are required to fulfill this research therefore you are kindly requested to fill out this questionnaire with accurate responses. Your answers are used only for academic purpose and are kept strictly confidential.

Thank you in advance for your cooperation

Nebat Yousuf

Questionnaire for research study on “The effect of workplace design on employee performance”

Instruction

Please do not state your name.

Try to address all the questions frankly.

Mark (X) in the appropriate box only.

Part one: General information

1, Gender

☐ Female

☐ Male

2, Age

☐ 20-30

☐ 31-40

☐ 41-50

☐ >51

3, Education level

☐ Grade 12 completed

☐ Diploma

☐ Graduate

☐ Post Graduate

4, Number of years worked in this sector

☐ <2years

☐ 2-5 years

☐ 6-10years

☐ >10 years

5, Department

☐ Manager

☐ Customer service

☐ office operator

Part two: Workplace design and performance survey

Please mark (X) in the appropriate box provided.

Use the following rating

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

No.	Spatial Arrangement and design	1	2	3	4	5
1,	My office is aesthetically pleasing to work.					
2,	My office size (area) is sufficient for a smooth workflow.					
3,	My work area is sufficiently equipped for my typical needs (computers, storage, shelves, etc.).					
4,	My furniture is comfortable enough so that I can work without getting tired till 5pm.					
5,	The layout of the furniture arrangement and design allows a smooth workflow.					
6,	The layout allows me to work efficiently.					
7,	In the office there is sufficient circulation area to move around freely.					
8,	Appropriate facilities like lounges and rest rooms are adequately available.					
9,	The position of my office (being in the 1 st floor) affects my productivity.					
10,	The physical conditions at work influence my productivity.					
11,	I like the color scheme of my office space.					
12,	My supervisor gives attention to the general physical environment of the office.					

No.	Acoustic (Noise)	1	2	3	4	5
13,	My work environment is quiet.					
14,	My workspace has many noise distractions.					
15,	The Noise in my office affects my productivity.					
	Temperature					
16,	The climate in my office environment is comfortable.					
17,	The temperature of the office rises up when more people gather in.					
18,	The temperature of my office affects my productivity.					
	Lighting (brightness)					
19,	My workspace is provided with efficient lighting so that I can work easily without strain on my eyes.					
20,	Ample amount of natural light comes into my office.					
21,	The amount of light at the office is sufficient to do my work.					
22,	The brightness of the office is motivating and inspiring to work.					
23,	The number and size of the windows is sufficient for adequate natural light.					
24,	The amount of light at the office affects my productivity level.					
	Ventilation					
25,	There is sufficient fresh air circulation in the office.					
26,	There is poor ventilation (air circulation) when more people gather in the room.					
27,	The office air quality affects my performance.					
	Employee Performance					
28,	I accomplish my goals within the predicted time frame.					
29,	I am fully engaged and motivated to do my job.					
30,	I perform in my job maintaining good quality.					

No.	Description	1	2	3	4	5
31,	The customers who visit my office are usually satisfied with the service they get.					
32,	I arrive to the office on time.					
33,	I often take day off from the office.					
34,	I often make error while doing my work.					
35,	Due to overall office environment I can complete my daily tasks easily.					
36,	Favorable environmental conditions (less noise, suitable temperature etc.) in the office building will increase my productivity at work.					
37,	Unfavorable environmental conditions (noise distractions, unsuitable temperature etc.) in the office building will decrease my productivity at work.					

Appendix 2

Letter of cooperation for data collection

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To whom it may concern

The Addis Ababa University School of Commerce currently runs five Masters level programs and one Doctoral Program: Human Resource Management (MA), Project Management (MA), Marketing Management (MA), Supply Chain and Logistics Management (MA), Business Leadership (MA, PhD) In addition to this, the School is also Preparing itself to launch some more expedient Programs very soon.

As an immediate and direct stakeholder to this socioeconomically pragmatic move, we would like you to cooperate with us by way of assisting our students to conduct academic researches and case analyses in your organization. As such, we kindly request your esteemed organization to provide student Nebat Yousuf ID No. GSD/4932/12 With information pertaining to _____ a copy of the paper produced may be provided to you if so demanded.

Thank you for your earnest cooperation.

Sincerely

Tadesse Getachew _____
Distance Program Coordinator

