



# Office Physical Proximity and Employee Efficiency of Manufacturing Companies in Port Harcourt

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**Abstract:** *This study examined the relationship between office physical proximity and employee efficiency of manufacturing companies in Port Harcourt. The study adopted the cross-sectional survey design. Primary data was generated through structured questionnaire. The population of the study was 253 employees of seven (7) selected manufacturing companies in Port Harcourt. The sample size of 154 was determined using the Taro Yamane's formula for sample size determination. The research instrument was validated through supervisor's vetting and approval while the reliability of the instrument was achieved by the use of the Cronbach Alpha coefficient with all the items scoring above 0.70. The hypotheses were tested using the Spearman's Rank Order Correlation Coefficient. The tests were carried out at a 95% confidence interval and a 0.05 level of significance. The findings of the study revealed that there is a significant relationship between office physical proximity and employee efficiency of manufacturing companies in Port Harcourt. The study thus recommends manufacturing companies should provide sufficient and flexible furniture supported by suitable height panels to facilitate communication as well as visual and acoustical privacy.*

**Keywords:** *Office Physical Proximity, Employee Efficiency, Task Accomplishment, Timeliness Manufacturing Companies*

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## INTRODUCTION

There is a long history of research and experimentation regarding the spatial layout and design features of offices and their effects on employees and organizational efficiency. Office physical work environment have also witnessed paradigm shift towards open office away from closed cellular offices since Frederick W. Taylor published "The Principles of Scientific Management" in 1911. The early shift in office design was influenced by the need to increase surveillance and control of the workforce by management according to (Charles, Farley & Newsharm, 2007). Currently, the larger and antiquated open plan designs are being adapted for modern offices for strategic purposes due to changing technology and a reflection of the hierarchical structures of many modern organizations. Within the organizational literature, offices have been typically described as either traditional (sometimes referred to as enclosed or cellular offices) or open. Traditional closed offices tend to house one or two individuals in private rooms, enclosed by

walls, often containing most of the amenities required for their job (Danielsson & Bodin, 2008). Alternatively, open-plan offices are characterized by a lack of interior walls, tend to be larger and contain greater numbers of workers, with individual workstations arranged within the office in groups (Brennan, Chugh & Kline, 2002).

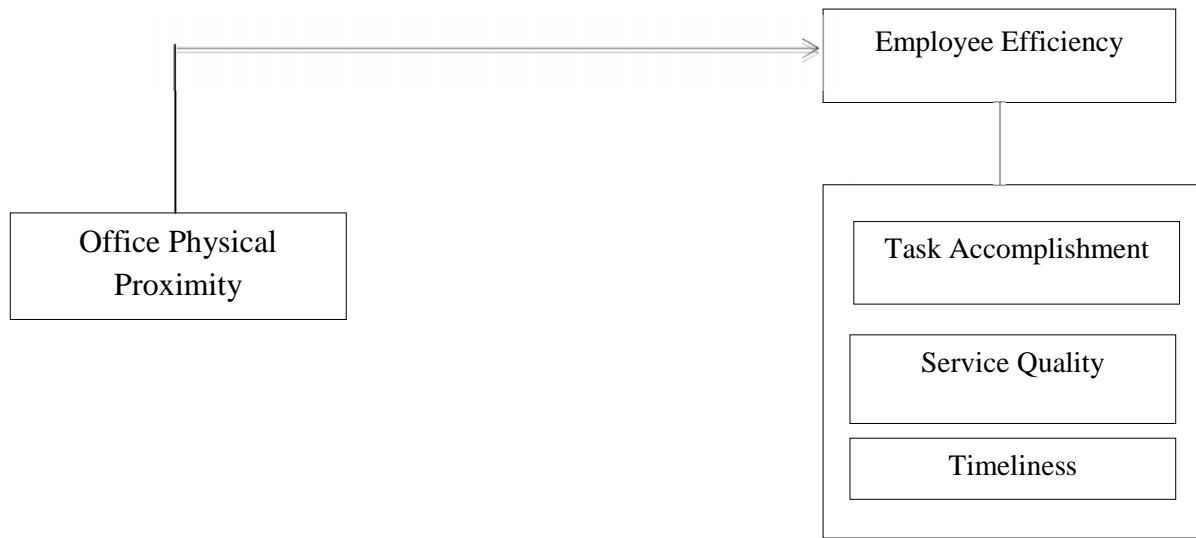
Debate on the pros and cons of open office strategy setting have dominated architectural and psychological literature. Initially, open office design were considered cost savings through a reduction in space required while enabling increased productivity through open access. In addition, they were originally designed for people to move around and interact freely as a way of promoting creative, better thinking and problem solving technique through improved internal communication. In the contrary, working in an open-space office have been linked to high levels of stress, mental workload, poor performance, conflict, high blood pressure, lower job satisfaction and internal motivation and a high staff turnover (Danielsson & Bodin, 2008).

The type of workplace environment in which employees operate determines whether or not such organizations will prosper (Chandrasekhar, 2011). Physical workplace environment contextualizes the office layout and design while psychosocial factors include working condition, role congruity and social support from supervisors. Policies encompass employment conditions of employees derived from industrial instruments and agreements negotiated with employees and unions, along with our human resources policies. Employees spend fifty percent of their lives within indoor environments, which greatly influence their performance capabilities (Sundstrom & Sundstrom, 1994). Better physical workplace environment will boosts employees' performance and ultimately improve their productivity (Challenger, 2000). Workplace environment is a concept, which has been operationalized by analyzing the extent to which employees perceive the immediate surroundings' as fulfilling their intrinsic, extrinsic and social needs and their reason of staying with the organization (Haynes, 2008). He further adds that environment is a key determinant of the quality of their work and their level of performance. Heath (2006) states, the biggest goal of all the business organization are to increase their performance, thus making high profits.

The benefits of creating and maintaining a positive working environment are huge. Greater productivity, happier people, employee stability, business advantage, higher profits, greater security, and better health (Shrestha, 2007). Improving working environment results in decrease in the number of error rates, complaints, absenteeism and hence increases performance. Govindarajulu (2004) also highlighted that in twenty-first century, businesses are moving towards more strategic approach of environmental management to enhance their performance through improving and managing performance level of employees. The modern physical environment is distinguished by technology, computers, machines, general furniture and furnishings which continually affect the brain and health of employees (Stoessel, 2001). Organisations must ensure that the physical layout is covering all need of employees such as communication and privacy, formality and informality, functionality and cross-disciplinarily (White, 2001). This study therefore examined the relationship between office physical

proximity and employee efficiency of manufacturing companies in Port Harcourt. Furthermore, this study was guided by the following research questions:

- i. What is the relationship between office physical proximity and task accomplishment in manufacturing companies in Port Harcourt, Nigeria?
- ii. What is the relationship between office physical proximity and service quality in manufacturing companies in Port Harcourt, Nigeria?
- iii. What is the relationship between office physical proximity and timeliness in manufacturing companies in Port Harcourt, Nigeria?



**Fig.1:** Conceptual Framework for the relationship between office physical proximity and fittings and employee efficiency

**Source:** Author's Desk Research, 2019

## LITERATURE REVIEW

### Physical Proximity

Another office layout feature commonly investigated is physical proximity. This refers to the physical distance between people, measured in units, such as metres (Kiesler and Cummings, 2002). A large body of research has found that physical proximity increases the frequency and quality of communication between people (Allen, 1977; Boutellier, Ullman, Schreiber, and Naef, 2008; Kraut, Fish, Root and Chalfonte, 1990). In turn, having teammates in close proximity to one another can provide an environment for the efficient information exchange that is necessary for teamwork.

While the use of information and communication technologies is increasing, face-to-face communication is more effective than virtual communication methods for complex team tasks

(Santoro and Saporito, 2003), remaining important for organizations that value teamwork and collaboration. Physical proximity has also been shown to increase the level of collaboration between employees (Kraut et al., 1990). Kraut et al. (1990) investigated the impact of physical proximity on the probability of collaboration between 164 researchers within a large telecommunications organization. Their results indicated a strong positive relationship with a relatively large effect size.

Further, research has demonstrated that physical proximity can facilitate the development of relationships between employees (Griffin & Sparks, 1990) and that people feel closest to those who are in close physical proximity (Kiesler and Cummings, 2002). Previous research has suggested that physical proximity may be an important feature of the physical work environment that can be modified to increase the level of communication and collaboration (Allen, 1977), as well as being a tool to promote relationships between people (Griffin and Sparks, 1990).

### **Employee Efficiency**

Efficiency refers to how an organization uses its resources such as available funding and staff to achieve organization objectives. Efficiency measures include, per unit costs which refers to a measure of per unit cost and reveals how many resources are consumed in producing a unit of service, Cycle time: Measures the amount of time it takes for a process to be completed. Response time: Measures the amount of time it takes to respond to a request for service. Backlog: Measures the amount of work in queue, waiting to be processed. One way is to measure total work in queue waiting to be processed. Another way is to measure backlog as the amount of work not processed within a required or targeted time frame. Staffing ratios: Another way of looking at staffing is computing a ratio of staffing to a particular function or in comparison to the total organization and per unit equipment utilization: Measures the efficient use of equipment. Efficiency is all about resource allocation across alternative uses (Kumar and Gulati, 2010).

Efficiency measures relationship between inputs and outputs or how successfully the inputs have been transformed into outputs (Low, 2000). To maximize the output Porter's Total Productive Maintenance system suggests the elimination of six losses, which are: reduced yield –from start up to stable production; process defects; reduced speed; idling and minor stoppages; set-up and adjustment; and equipment failure. The fewer the inputs used to generate outputs, the greater the efficiency. According to Pinprayong and Siengthai (2012) there is a difference between business efficiency and organizational efficiency. Business efficiency reveals the performance of input and output ratio, while organizational efficiency reflects the improvement of internal processes of the organization, such as organizational structure, culture and Community.

## **Measures of Employees' Efficiency**

### **Task Accomplishment**

Task accomplishment is a measure of an employee's productivity and involves their contribution to overall organizational productivity and effectiveness, it refers to actions that are part of the formal reward system and addresses the prescription as indicated in the descriptions of the role (Williams and Karau, 1991). It shows the level or the extent an employee achieves a given target. In general, task accomplishment comprises of activities that translates the organizations policies, missions and resources into tangible and intangible goods produced by the organization and to enable efficient operation of the organization (Motowidlo, Packard & Managing, 1997). Thus, task accomplishment covers the fulfilment of the requirements that are part of the agreement between the employee and the organisation. Borman and Motowidlo (1993) pointed out that task accomplishment is the effectiveness and efficiency with which job incumbents perform activities that contribute to the organization's technical core and assist in moulding the psychological state of the organization (Borman & Motowidlo, 1993). They further suggested that in accomplishing a given task there are two aspects to it, which are interpersonal facilitation and job dedication. Interpersonal facilitation includes cooperative and helpful acts that help the effectiveness of co-employee. While job dedication includes self-disciplined and motivation to support organizational objectives and goals (Van Scotter & Motowidlo, 1996).

### **Service Quality**

Service delivery is a continuous, cyclic process for developing and delivering user focused services. It is further defined in four stages as user engagement, service design and development, service delivery and lastly assessment and positive change of service (Dachs, Ebersberger & Pyka, 2004). Other scholars have propounded other definitions and according to Carrillat, Jaramillo and Mulki (2007), service delivery is the physical access or reachability of services that meet a base standard. The later regularly requires detail as far as the components of service delivery, for example, essential equipment, medications and products, healthy workforce, and rules for treatment. Service delivery denotes the ability of the client to pay for the services where data can be collected by facility visits or by household interviews (Berghman *et al.*, 2006). In this study, service delivery was defined as the willingness and readiness of a workforce to provide services in a dependable, accurate and responsive manner while utilizing the available resources.

The SERVQUAL model was developed by Parasuraman, Zeithaml and Berry (1988) to define service quality by means of the gap between the customers' perceptions and the expectations about organization's service quality performance. The model distinguishes five determinants of administration quality as effects, unwavering quality, responsiveness, confirmation and sympathy. It is measured administration conveyance since it is a settled instrument that has been utilized as a part of different reviews and its psychometric properties have been examined by some of the studies (Asubonteng, McCleary & Swan, 1996). Consequently, service quality is composed of perceived quality and expected quality.

### **Timeliness**

When the employees are productive, they accomplish more in a given amount of time. In turn, efficiency saves their company money in time and labour. When employees are unproductive, they take longer time to complete projects, which cost employee's more money due to the time lost (Olajide, 2000). The importance of higher productivity of the employees in public enterprise cannot be overemphasized, which include the following; Higher incomes and profit; Higher earnings; Increased supplies of both consumer and capital goods at lower costs and lower prices; Ultimate shorter hours of work and improvements in working and living conditions; Strengthening the general economic foundation of workers (Banjoko, 1996). Armstrong (2006) stated that productivity is the time spent by an employee actively participating in his/her job that he or she was hired for, in order to produce the required outcomes according to the employers' job descriptions. As suggested by Bloisi (2003) the core cause of the productivity problems in the South African society are people's motivation levels and their work ethics. Time is an essential resource since it is irrecoverable, limited and dynamic (Downs, 2008) Irrecoverable because every minute spent is gone forever, limited because only 24hours exist in a day and dynamic because it's never static (Claessens, Roe & Rutte, 2009)

### **Relationship between Office furniture and fittings and Employee Efficiency**

Several studies have attempted to provide a link between the layout of office environment and the performance of the occupiers. To commence with, Felstead & Walters (2005) carried out a longitudinal study on corporations that have shifted office strategy from closed office to open plan offices. With a focus to match the office environment to the work processes and productivity, the study found out that switching from closed offices to open-plan offices facilitated employees' communication and creativity, increased control over the workers. The study also reports an increased satisfaction on lower staff basically based on their nature of work which calls for collaboration. On the contrary, the study reported a decreased satisfaction with senior managers due to loss of privacy and autonomy. Another interesting study, Ilozor & Oluwoye (1999) conducted a research that investigated the impact of open plan measures and the effectiveness of facilities space management. The study showed that organizations with open plan office offer a more productive workplace than closed office design. Furthermore, the study showed that open plan office designs offer an innovative work setting that improve employees vis-a-vis organizational performance. Thus the study concluded that physical properties of the office environments can be used to influence organizational performance.

In an endeavour to establish the impact of workplace on worker performance, Brill & Weidemann, (2001) carried out an evaluation of individual performance, team performance and job satisfaction with regards to different office setting designs i.e. single-occupant rooms, double-occupant rooms and open plan office. Their study findings revealed that closed office designs were more preferred by managers contrary to lower level staff who preferred medium office size. Accordingly, Brill & Weidemann (2001) identified ten of the most important workplace qualities of an ideal office design as: ability to do distraction-free solo work, support

for impromptu interactions, support for meetings and undistracted group work, workspace comfort, ergonomics and enough space for work tools. Other are workspace side-by-side work and “dropping in to chat”, located near or can easily find co-workers, workplace has good places for breaks, access to needed technology, quality lighting and access to daylight, temperature control and air quality.

Privacy need have also been related to several facets of job satisfaction. Montgomery (2004) noted that employees who left an open-plan office in order to go to either a low-density open-plan office or to a partitioned office experienced significant improvement in ask-privacy, communication privacy, crowding, and office satisfaction. Positive consequences of change from cellular closed office to open plan office are more effective for employees with low levels of stimulus screening or high privacy needs. In support of this, Becker (1990) assessed the states of “more open team-oriented environments on perceived visibility and accessibility, increased face-to-face interaction and improved privacy. The study supported an improved work effectiveness of individuals and teams in open cubic environments i.e. cubicles than open environment or closed environment. Besides, the study also showed that changing from enclosed workspaces to open workspaces results to perceived better visibility and accessibility, increased face-to-face interaction, and improved perceived privacy. All these have implications in job satisfaction and commitment on occupier service delivery (Becker, 1990).

From the foregoing point of view, the study thus hypothesized that:

- Ho<sub>1</sub>** There is no significant relationship between office physical proximity and employee task accomplishment in manufacturing companies in Port Harcourt, Nigeria.
- Ho<sub>2</sub>:** There is no significant relationship between office physical proximity and employee service quality in manufacturing companies in Port Harcourt, Nigeria.
- Ho<sub>3</sub>:** There is no significant relationship between office physical proximity and employee timeliness in manufacturing companies in Port Harcourt, Nigeria.

## **METHODOLOGY**

The study adopted the cross-sectional survey design. Primary data was generated through structured questionnaire. The population of the study was 253 employees of seven (7) selected manufacturing companies in Port Harcourt. The sample size of 154 was determined using the Taro Yamane’s formula for sample size determination. The research instrument was validated through supervisor’s vetting and approval while the reliability of the instrument was achieved by the use of the Cronbach Alpha coefficient with all the items scoring above 0.70. The hypotheses were tested using the Spearman’s Rank Order Correlation Coefficient. The tests were carried out at a 95% confidence interval and a 0.05 level of significance.

**DATA ANALYSIS AND RESULTS**

**Tests of Hypotheses**

**Table 1: Correlation for physical proximity and measures of employee efficiency**

|                |                     |                 | Physical Proximity | Task accomplishment | Service Quality | Timeliness |
|----------------|---------------------|-----------------|--------------------|---------------------|-----------------|------------|
| Spearman's rho | Physical Proximity  | Correlation     | 1.000              | .517**              | .400**          | .792**     |
|                |                     | Coefficient     |                    |                     |                 |            |
|                |                     | Sig. (2-tailed) | .                  | .000                | .000            | .000       |
|                |                     | N               | 138                | 138                 | 138             | 138        |
|                | Task accomplishment | Correlation     | .517**             | 1.000               | .846**          | .469**     |
|                |                     | Coefficient     |                    |                     |                 |            |
|                |                     | Sig. (2-tailed) | .000               | .                   | .000            | .000       |
|                |                     | N               | 138                | 138                 | 138             | 138        |
|                | Service Quality     | Correlation     | .400**             | .846**              | 1.000           | .342**     |
|                |                     | Coefficient     |                    |                     |                 |            |
|                |                     | Sig. (2-tailed) | .000               | .000                | .               | .000       |
|                |                     | N               | 138                | 138                 | 138             | 138        |
| Timeliness     | Correlation         | .792**          | .469**             | .342**              | 1.000           |            |
|                | Coefficient         |                 |                    |                     |                 |            |
|                | Sig. (2-tailed)     | .000            | .000               | .000                | .               |            |
|                | N                   | 138             | 138                | 138                 | 138             |            |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Source: Research Data 2019 and SPSS output version 23.0**

The table 1: illustrates the test for the three previously postulated bivariate hypothetical statements.

***Ho<sub>1</sub>: There is no significant relationship between physical proximity and employee task accomplishment in manufacturing companies in Port Harcourt, Nigeria***

The correlation coefficient (r) shows that there is a significant and positive relationship between physical proximity and employee task accomplishment. The rho value 0.517 indicates this relationship and it is significant at  $p < 0.000 < 0.05$ . The correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate held. Thus, there is a significant relationship between physical proximity and employee task accomplishment in manufacturing companies in Port Harcourt, Nigeria.

***Ho<sub>2</sub>: There is no significant relationship between physical proximity and employee service quality in manufacturing companies in Port Harcourt, Nigeria***

The correlation coefficient (r) shows that there is a significant and positive relationship between physical proximity and employee service quality. The rho value 0.400 indicates this relationship and it is significant at  $p < 0.000 < 0.05$ . The correlation coefficient represents a moderate relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby



rejected and the alternate held. Thus, there is a significant relationship between physical proximity and employee service quality in manufacturing companies in Port Harcourt, Nigeria.

***Ho<sub>3</sub>: There is no significant relationship between physical proximity and employee timeliness in manufacturing companies in Port Harcourt, Nigeria***

The correlation coefficient ( $r$ ) shows that there is a significant and positive relationship between physical proximity and employee timeliness. The  $\rho$  value 0.792 indicates this relationship and it is significant at  $p\ 0.000 < 0.05$ . The correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate held. Thus, there is a significant relationship between physical proximity and employee timeliness in manufacturing companies in Port Harcourt, Nigeria.

### **DISCUSSION OF FINDINGS**

The hypotheses examined the relationship between office physical proximity and employee efficiency of manufacturing companies in Port Harcourt. The study findings reveal that there is a significant relationship between physical fittings and employee efficiency of manufacturing companies in Port Harcourt. The study finding agrees with the works of Allen and Gerstberger, 1973; Allen, 1977; Boutellier, Ullman, Schreiber, and Naef, 2008; Kraut, Fish, Root, and Chalfonte (1990) that physical proximity increases the frequency and quality of communication between people (In turn, having teammates in close proximity to one another can provide an environment for the efficient information exchange that is necessary for teamwork.

While the use of information and communication technologies is increasing, face-to-face communication is more effective than virtual communication methods for complex team tasks (Santoro & Saporito, 2003), remaining important for organizations that value teamwork and collaboration. Physical proximity has also been shown to increase the level of collaboration between employees (Kraut et al., 1990). Kraut et al. (1990) investigated the impact of physical proximity on the probability of collaboration between 164 researchers within a large telecommunications organization. Their results indicated a strong positive relationship with a relatively large effect size.

Further, research has demonstrated that physical proximity can facilitate the development of relationships between employees (Griffin & Sparks, 1990; Homans, 1950) and that people feel closest to those who are in close physical proximity (Allen, 2007; Festinger, Schachter, and Back, 1950; Kiesler and Cummings, 2002). Previous research has suggested that physical proximity may be an important feature of the physical work environment that can be modified to increase the level of communication and collaboration (Allen, 1977, 2007; Kraut et al., 1990, 2002), as well as being a tool to promote relationships between people (Griffin and Sparks, 1990).

## CONCLUSION AND RECOMMENDATION

This study thus concludes that office furniture and fittings significantly influences employee efficiency of manufacturing companies in Port Harcourt. Specifically, the study concludes that, furniture and fittings significantly influence task accomplishment, service quality and timeliness. The study thus recommends manufacturing companies should provide sufficient and flexible furniture supported by suitable height panels to facilitate communication as well as visual and acoustical privacy.

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