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WORKPLACE DESIGN AND COMPETITIVENESS OF ROAD CONSTRUCTION COMPANIES IN RIVERS STATE

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ABSTRACT

The study examined workplace design and competitiveness of road construction companies in Rivers State. The objective of the study was to examine the relationship between dimensions workplace design (cubicles, open workspace and ergonomic design) and measures of competitiveness such as strategic planning, experienced workforce and new technology of road construction companies in Rivers State. Thus, the study was anchored on Person-Fit Environment Theory as its theoretical foundation. The study adopted the explanatory cross-sectional survey research design, the population of the study consists of Forty-Two (42) road construction companies operating in Rivers State. Due to accessibility and manageability, only fifteen (15) functional road construction companies are studied. Since the population is small, the sample size of the study consists of the entire population. Thus, the study adopts a census method of sampling. In terms of respondents, three (3) top level managers were taken from each of the fifteen (15) road construction companies in Rivers State. Structured questionnaire served as the instrument for data collection. The reliability of the instrument was ascertained using test-retest. After validation by the test and measurement, a total of forty-five (45) copies of the validated questionnaire were distributed to the targeted audience. The researcher was able to retrieve thirty-eight (38) and were used for the data analysis. Mean and standard deviation was used for research questions analysis while Pearson Product Moment Correlation Coefficient was used to test hypotheses. It was found that there is a significant positive relationship between dimensions of workplace design and measures of competitiveness of road construction companies in Rivers State. It was concluded that Road construction companies that fall short of designing their workplace properly in terms of cubicles, open workspace and ergonomic design will find it difficult to compete favourably in the global market. Consequently, management of road construction company should ensure office workers are isolated to plan strategically through adoption of cubicle designs; management of road see company should ensure adequate provision of good office furniture that relaxes employees to be innovative.

INTRODUCTION

A widely accepted assumption is that better work environment produces better results. Mostly, the workplace is designed with due importance to the nature of job and the individuals that are going to work in that office. The performance of an employee is measured actually by the output that the individual produces and it is related to productivity. At corporate level, productivity is affected by many factors such as employees, technology and objectives of the organization (Uzee, 2019). It is also dependent on the physical environment and its effect on health and employees' performance. Different work environments be it construction or manufacturing companies require carefully thought ideas that could influence the overall layout. Generally speaking, workplace design benefit employees and the environment they are set in. according to Stallworth and Kleiner (2016), the design and structure of the workplace can affect the personal effectiveness of workers and make them feel more valued.

Thus, it is operationally defined as the way a work environment is organized and equipped in order to create optimal productivity by workers as well as providing maximum safety. Workplace design aims to create a safe work environment where employee performance is supported. It is recommended for all kinds of job sites ranging from high-risk workplaces to low-risk job environments (Stallworth & Kleiner, 2016). Within the context of this study, workplace design is characterized through cubicles, open workspace and ergonomics design.

This study defined a cubicle as a space commonly within a building that is partitioned or separated off from other areas normally for privacy or to reduce distraction. It is often used to describe the layout of shared toilets, expressing how each individual is separated from the next by a partition, for privacy (Joe in Brill, 2021). Working in an open environment makes it easier for employees to communicate with each other and share ideas. However, open workspace as the second dimension of workplace design refers to as a type of office layout where all employees work on the same floor and in the same uncluttered space. Whether you work in a co-working or traditional office space, having an open plan, social workspace boosts moral and optimizes workflow (Leaman & Bordass, 2017). Lastly, ergonomic design refers to the availability, functionality and general condition of furniture, machines, light and air quality in the workplace. Ergonomics causes productivity, increased production, increased efficiency and prevention from absenteeism and fatigue at work if implemented at all organizations. The essential goals of ergonomics are improving the procedure of performing works and tasks, tools of work and adapting them with human mental and physical features (Chris in Karsh, 2013).

Organizations feel a great sense of belonging when they compete favourably at whatever level that satisfy them for the now. The reason is because factors such as market share, quality service delivery, and corporate reputation amongst others, are taken into consideration before an organization is termed to be competing favourably. An organization that is on the same level or has a higher market share, quality service delivery, corporate reputation than its counterparts within a time period and a geographical entity is said to be a favourable competitor (Smith, 2017). However, competitiveness is the ability of an organization to design, produce and/or market products superior to those offered by competitors, considering the price and non-price qualities. The competitiveness process can be viewed as a balancing process that complements traditional functional processes such as operations management and human resources management (D'Cruz, 2017). Competitiveness in this study is measured through strategic planning, experienced workforce and new technology.

Statement of Problem

Over the years, there has been a reasonable level of competition among construction companies. This could be drawn from the changing business environment as most companies are technologically stable than others. Every organization strive to compete favourably so as to remain in business (Smith, 2017).

Thus, it appears that some of the construction companies have lapses in areas of planning strategically, retaining quality workforce and employing new technology. This has hampered organization productivity, profitability, sustainability, efficiency, effectiveness among all, competitiveness. Organizations feel a great sense of belonging when they compete favourably at whatever level that satisfy them for the now (Murths, 2018; D'Cruz, 2017).

It equally seems that the reasons most construction companies could not compete adequately points to the fact that their workplace is design against their operation in terms of inadequate structure of cubicles, open workspace and lack of proper furniture, lightening, ventilation among others. There have been several research efforts on how workplace design relates with organizational outcome. Thus, Mendis (2016) examined workplace design and job performance: A study of operational level employees in the apparel industry of Sri Lanka. Findings of the

study indicate that there is a strong positive relationship between workplace design and job performance of operational level employees in the apparel industry of Sri Lanka; Hansika and Amarathunga (2016) studied the impact of office design on employees' productivity: A case study of banking organizations of North Western Province in Sri Lanka. It was found that office environment plays a vital role in encouraging employees of banking organizations of North Western Province in Sri Lanka to perform their assigned work successfully; Roma, *et al.* (2019) investigated the effect of workplace design on employee engagement, collaborative capability, and on perceived work performance in coworking spaces.

Michael, *et al.* (2019) examined the relationship between workplace design, ergonomics and organizational performance: a case study of West African Examination Council (WAEC), Lagos State of Nigeria. Results revealed that good ergonomics and workplace design practices can significantly improve profitability of WAEC, Lagos. Furthermore, well designed workstations significantly relate to organizational performance in WAEC. However, none of the aforementioned study empirically examined the relationship between workplace design (cubicles, open workspace and ergonomic design) and competitiveness (strategic planning, experienced workforce and new technology) of road construction companies in Rivers State. Therefore, there is need to close this gap.

Objective of the Study

The objective of the study was to examine the relationship between workplace design and competitiveness of road construction companies in Rivers State. Specifically, the study seeks to achieve the following objectives:

1. To determine the relationship between cubicles and strategic planning of road construction companies in Rivers State.
2. To ascertain the relationship between open workspace and experienced workforce of road construction companies in Rivers State.
3. To investigate the relationship between ergonomic design and new technology of road construction companies in Rivers State

Hypotheses

In line with the research objectives, the following null hypotheses were formulated and tested at 0.05 level of significant:

H01: There is no significant relationship between cubicles and strategic planning of road construction companies in Rivers State.

H02: There is no significant relationship between open workspace and experienced workforce of road construction companies in Rivers State.

H03**:** There is no significant relationship between ergonomic design and new technology of road construction companies in Rivers State.

REVIEW OF RELATED LITERATURE

Conceptual Review

Concept of Workplace Design

Workplace design is one of the major determinants of employee job performance in all organization. Matching work place design with employee necessities is very essential for obtain maximum contribution of employees towards organization objectives. According to Carmen (2013), workplace design considerations include thermal comfort which indicates the right combination of temperature, airflow and humidity. A combination of these elements is required for physical comfort in the workplace. Good indoor environmental quality starts with a well-

designed lighting system, which involves more than just providing windows and incandescent lighting.

So to say, Uzee (2019) opined that workplace design refers to the process of scheming, organizing, and planning a work environment to optimize employee performance, productivity, safety, and above all, health and wellbeing. Different work environments be it construction or manufacturing companies require carefully thought ideas that could influence the overall layout. Generally speaking, workplace design benefit employees and the environment they are set in. The design and structure of the workplace can affect the personal effectiveness of workers and make them feel more valued. Also, employees are more likely to remain at an organization if they're comfortable with the layout and ergonomics of the workspace.

Stallworth and Kleiner (2016) averred that workplace design is the process of organizing a workplace to optimize worker performance and safety. It is an important health and safety issue for workers in both high-risk environments (such as construction sites). Workplace design principles involve efforts to optimize the safety and health conditions of regular work activities through measures such as ergonomic seating and temperature control, as well as efforts to protect workers in high-risk industries through measures like designing safe navigation routes through construction sites. Some workplaces use detailed aesthetic designs to reduce worker stress. These might involve the use of plants to improve mood, the use of specific types of lighting, and the use of alterations to make a space "feel" less crowded.

Conceptually, workplace design is the way a work environment is organized and equipped in order to create optimal productivity by workers as well as providing maximum safety. Workplace design aims to create a safe work environment where employee performance is supported. It is recommended for all kinds of job site's ranging from high-risk workplaces to low-risk job environments. For instance, high-risk industries like construction companies can benefit from an ergonomic workplace design where possible hazards are identified with a strategic approach to minimize them. Some examples include jobs related to working at heights, with chemicals, with heavy objects, or in confined spaces. These jobs not only depend on the right equipment but also a blueprint that features easy maneuverability, effective exit strategies and accessibility to safety equipment, all of which are part of a safe workplace design.

Modern workplace design helps to boost employee engagement and improve productivity. Employees who can choose where and how they want to work are much more engaged based on their type of work. Employees spend most of their time in the workplace. Thus, it would help if you considered the physical work environment. It includes factors like air quality, lighting, interior layout plan many more. All these impact employee health, satisfaction, wellbeing, and creativity. (Ryan & Deci, 2010). There are several heights of indicating workplace design, but this study focuses on cubicles, open workspace and ergonomic design as dimensions of workplace design within the context of road construction companies.

Dimensions of Workplace Design

Cubicles

According to Blumberg and Pringle (2020), a cubicle is a partially enclosed office workspace that is separated from neighboring workspaces by partitions that are usually 5-6 feet (1.5-1.8 m) tall. Its purpose is to isolate office workers and managers from the sights and noises of an open workspace so that they may concentrate with fewer distractions. Cubicles are composed of modular elements such as walls, work surfaces, overhead bins, drawers, and shelving, which can be configured depending on the user's needs. Installation is generally performed by trained personnel, although some cubicles allow configuration changes to be performed by users without specific training. Within the walls of a cubicle workstation, employees are free to take

advantage of the wall space and show a little personality (Brill, 2021). Items within an employee's cubicle can be a conversation starter with colleagues and may help them get to know one another on a more personal level.

Of recent, cubicles are usually equipped with a computer, monitor, keyboard and mouse on the work surface. Cubicles typically have a desk phone. Since many offices use overhead fluorescent lights to illuminate the office, cubicles may or may not have lamps or other additional lighting. Other furniture that is often used in cubicles includes an office chair, a filing cabinet for locking documents away, a bookcase and a coat rack. Without a door to close or shades to draw in a personal office, there is less room for slacking off during the workday. Cubicle workstations create more visibility and a sense that your co-workers know what you're up to at any given time (Campbell, *et al.,* 2018).

Thus, this study defined a cubicle as a space commonly within a building that is partitioned or separated off from other areas normally for privacy or to reduce distraction. It is often used to describe the layout of shared toilets, expressing how each individual is separated from the next by a partition, for privacy (Joe in Brill, 2021). It may also be used to describe how partitions are used in office layouts to create smaller individual working areas, to reduce social interactions or disruptions to office workers seated at work stations. With the recent concerns about post COVID-19 and transmission in the workplace, cubicle workstations could be an excellent solution. We have learned that bigger spaces with more airflow are healthier and less likely to contain particles than say a small office with only a door to let airflow in and out. Cubicle workstations are more open while still providing a barrier between people so that air can flow, but no one is face-to-face.

Open Workspace

Working in an open environment makes it easier for employees to communicate with each other and share ideas. Even if you aren't actively networking, talking to like-minded employees and sharing your ideas is bound to spark creativity and increases the potential of collaboration projects. This technically only applies to open offices that adopt a coworking or hot desk policy (where employees from different industries work in the same). Being sat next to someone new every day helps form new relationships and potentially collaboration possibilities (Carmen, 2013).

However, open workspace is defined as a type of office layout where all employees work on the same floor and in the same uncluttered space. Open workspaces have essentially made office cubicles redundant in favour of a more collaborative and creatively engaging workspace environment as it's enhances relaxed atmosphere. Gone are the days of office cubicles with no light and little human interaction. Whether you work in a co-working or traditional office space, having an open plan, social workspace boosts moral and optimizes workflow (Leaman & Bordass, 2017).

According to Dheerasinghe (2013), most common issue people have with working in an open plan office is the noise level. Some employees may find it difficult taking phone calls if the office is particularly loud or you are easily distracted. Additionally, noise travels easier through an open space and with no barriers or cubicles to shield you from office talk traffic. However, if you're looking for an open plan office noise reduction solution, try investing in some noise-cancelling headphones. Working in an open office does limit your privacy and some people may find it difficult focusing on their tasks if they are easily distracted by coworkers. However, if you're used to this kind of environment, this shouldn't become a problem.

Ergonomic Design

Ergonomics is always trying to create an effective, safe, and convenient workplace. Effective application of ergonomics in the design of the system can provide balance between jobs and features of the employees. This can lead to labor force productivity, increased safety, physical and mental well-being and job satisfaction of the employees.

Nowadays, as structure and performance of organizations become complex, organizing the workplace and creating a relaxed and productive atmosphere in organizations leading to activation of more human force, their vitality, reduced risks, increased quality at work, reduced depression, growth of services and ultimately desired productivity are the main concerns of CEOs and heads of organizations (John in Stekel, 2013). The essential goals of ergonomics are improving the procedure of performing works and tasks, tools of work and adapting them with human mental and physical features. However, it should be noted that by observing ergonomics principals, undue working pressure and fatigues are reduced. Ergonomics causes increased production, increased efficiency and prevention from absenteeism and fatigue at work if implemented at all organizations.

Conceptually, ergonomic design refers to the availability, functionality and general condition of furniture, machines, light and air quality in the workplace. This field of ergonomic considers how key workplace elements such as workstations, computers, chairs, lighting, noise level, room temperature, ventilation etc. could be tailored to fit and enhance employee health, safety and performance (Chris in Karsh, 2013).

Ergonomics design also is concerned with how to achieve the right human posture and fit in an office environment. This includes sitting posture, angles, distances and the arrangement of the chair, workstation, monitor, keyboard and mouse best support human function in the office and promotes employee health, safety and performance.

Ergonomic design is applied to products and equipment that have been created to be interacted with efficiently and safely. In the workplace, ergonomic equipment is intended to boost people's ability to work effectively whilst also reducing the risks of injury (Karsh, 2013).

Working without the right equipment or setup could result in injuries. These injuries can begin as small aches and pains but can develop into more serious problems if you continue to work with the incorrect equipment or setup. Whether you're working in a corporate workplace, you should always implement ergonomic tools and equipment (Stekel, 2013). This will reduce the need and likelihood of straining your muscles and joints, overusing certain muscle groups, and working for prolonged periods with poor posture. The wrong equipment placed in the wrong location, working too long in one position, and working too quickly can all result in injuries. However, using the right ergonomics can go a long way in reducing the risk of injuries whilst working. When the right ergonomics equipment are used, it will not only reduce the risk of long-term injuries, but will also avoid fatigue. This will help you to stay focused and continue working productively and efficiently all day. However, it's important that you still take regular breaks away from your desk, even when working with ergonomic equipment. This will support your body's need to change position, give muscle groups a chance to rest and, just as importantly, give your mind an opportunity to rest, so you can come back refreshed (Stekel, 2013).

Concept of Competitiveness

Competitiveness originated from the Latin word, competer, which means involvement in a business rivalry for markets (Murths, 2018). Thus, in organizational settings competitiveness refers to the capability of a profit or non-profit organization to produce goods and services that are of higher quality and perhaps quantity than those of its rivals in the regional, national, or global level (D'Cruz, 2017). Organizations feel a great sense of belonging when they compete

favourably at whatever level that satisfy them for the now. The reason is because factors such as market share, net profit, and brand reputation amongst others, are taken into consideration before an organization is termed to be competing favourably. An organization that is on the same level or has a higher market share, net profit, brand reputation than its counterparts within a time period and a geographical entity is said to be a favourable competitor (Smith, 2017).

Conceptually, competitiveness is the ability of an organization to design, produce and/or market products superior to those offered by competitors, considering the price and nonprice qualities. Organizational competitiveness happens through the instrumentality of what is known as competitive processes. Competitive processes are those processes, which help identify the importance and current performance of core processes such as strategic management processes, human resources processes, operations management processes and technology management processes (D'Cruz, 2017). The competitiveness process can be viewed as a balancing process that complements traditional functional processes such as operations management and human resources management.

Measures of Competitiveness

Strategic Planning

Strategy is a "military" term. It was Peter Drucker who pointed out the importance of strategic decision in 1955 in his book, "The Practice of Management". Here he defined strategic decision as "all decision on business objectives and on the means to reach them." However, before effective decision will be reached, there must be planning (David, 2009). Thus, strategic planning is a process of looking into the future and identifying trends and issues against which to align organizational priorities of the Department or Office. Within the departments and offices, it means aligning a division, section, unit or team to a higher-level strategy. For everyone, strategic planning is about understanding the challenges, trends and issues; understanding who are the key beneficiaries or clients and what they need; and determining the most effective and efficient way possible to achieve the mandate. A good strategy drives focus, accountability, and results (Joe in David, 2009).

However, strategic planning is a managerial activity that is used to set priorities and strengthen operations to ensure that employees and other stakeholders are working toward common goals so as to establish agreement around intended outcomes/results. It also assesses and adjust the organizational direction in response to a changing environment. Strategic planning provides a blueprint for achieving organization's goals. When creating a strategic plan, there are certain objectives that the organization is trying to satisfy during the execution of the strategic plan. Understanding the organizational objectives of a strategic corporate plan will help to create efficient plans to guide organization's growth (Root, 2014). A strategic plan is a document used to communicate with the organization the organizations goals, the actions needed to achieve those goals and all of the other critical elements developed during the planning exercise.

Rothaermel (2012) averred that effective strategic planning articulates not only where an organization is going and the actions needed to make progress, but also how it will know if it is successful. It is a disciplined effort that produces fundamental decisions and actions that shape and guide what an organization is, who it serves, what it does, and why it does it, with a focus on the future. Strategic planning is one of the most important responsibilities of the senior management of an organization. It is the vehicle that senior management should use to set the organizational vision, determine the strategies required to achieve that vision, make the resource deployment decisions to achieve the selected strategies, and build alignment to the vision and strategic direction throughout all levels of the organization.

Experienced Workforce

Workforce occupies an indispensable position in any establishment, be it an industry, firm, commercial, educational institution, etc. This means that without experienced workforce no construction company can function. In essence, human effort is greatly desirable and crucial in achieving the goals and objectives of the organization. Therefore, experienced workforce is defined in this study as excellent individuals who are employed or available in an organization for a particular project assignment or work (researcher's definition). In construction companies, the workforce needed for a particular work and in future is estimated and planned through different techniques available (Schott, *et al.,* 2015). Workforce quality or experienced workforce is the force of a human, or the combined strength of a group of people to execute tasks. This ranges from the managers and employees of different level in the organization. It is advisable to keep experienced employees. This could be tied to the fact that most times organizations suffers set back. It only takes a staff with high sense of reasoning to engage on critical thinking so as to ready the organization in their deteriorated times (Schott, *et al.,* 2015). Thus, the firm's capability in expanding their services beacons on its workforce.

However, experienced workforce could equally be seen as set of individuals in a firm that their good effort intended to strengthen the capability to fulfill firm's mission effectively and efficiently. If the numbers of people available are more than the work it indicates that the organization has surplus workforce. In this type of organization, having this quality staff will trigger their productivity extent and make them gain competitive advantage over others (Akamute in Schott, *et al.,* 2015). Nevertheless, experienced workforce as noted by Pat (2017) is the intellectual workforce an organization has at her disposal which is capable of matching with services it is designed to serve. Organizations such as construction companies in Rivers State with unintellectual workforce will obstruct cooperate reputation through rendering of poor services and low productivity.

New Technology

Technology is a concept of transforming research and potential of scientific institutions into new products and services, which ominously increases benefits to consumers and results in a faster economy growth in the future. New technologies are electronic tools, systems, devices and resources that generate, store or process data. Well known examples include social media, online games, multimedia and mobile phones (Cerere, 2013).

Operationally, new technology is a modern tools/facilities organization (commercial bank) adopts in executing task with ease. The concept of new technology is an interesting proposition that aims to limit these short comings and develop innovativeness of enterprises. As part of the concept, research and potential of scientific, research and development institutions are transformed (through the engagement of institutions of business environment) into products and services distributed on market principles and providing new values and desired benefits to clients (Garud, 2003; Bailetti, in Cerere, 2013). New technology can help improve communication, collaboration, content management, access to analytics data and social networking as well as staff and customer experience. Successful enterprises are embracing technology to create digital workplaces that improve business cohesion.

Ibrahim (2013) addressed new technologies as innovations that support construction procurement, management, and delivery of building projects. New technologies appear to offer benefits throughout the construction supply chain and digital disruption could change the future of New Zealand's construction industry. New technologies depict an intricate occurrence that encompasses not only multiple disciplines and levels of analysis to be investigated using different perspectives, but also a case-by-case style for the analysis to be meaningful. New technology is clearly considered as a key growth area in this century, specifically, in a dynamic

and highly competitive business environment which requires utilizing advanced new technology tools to improve efficiency, cost effectiveness, and deliver high quality products and services to customers (Allen & Morton, 2004). New technology is also considered as a tool of marketing, contacting customers and looking for possible customers, as well as presenting IT services as distinguished potential services for customers (UNDP, 2001; Werthner & Klein, 2005).

Theoretical Review

The study was anchored on Lewin and Edwards' Person-Environment Fit Theory. Lewin and Edwards' Person-Environment Fit Theory was popularized in 1962. Person- Environment Fit Theory of psychological stress describes the interaction between the person and environment (P x E) as the key to comprehending people's cognitive, emotional and behavioural reactions such as stress as well as operational productivity level. Two relevant assumptions of this theory are as follows:

i. A mismatch between a person and his work environment will lead to tension and uneasiness capable of hampering his level of productivity;
ii. Worker's capabilities (experience or value) will determine the level of work pressure and how environmental press affects their output. This aspect of the theory amplifies the fact that a match on the ability of an employee to his or her work, determines his or her level of outcome.

The adoption of Person-Environment Fit Theory as the theoretical framework for the study is predicated majorly on the first assumption that states that "a mismatch between a person and his work environment will lead to tension and uneasiness capable of hampering his level of productivity". This implies that if there is an adequate match between employee's willingness and its work environment contributes at a very high extent in ensuring better organizational competitiveness.

If there is a mismatch, it is assumed that there will be low level of performance.

Empirical Review

Mendis (2016) examined workplace design and job performance: A study of operational level employees in the apparel industry of Sri Lanka. The aim of the study was to examine the relationship between dimensions of workplace design and job performance of operational level employees in the apparel industry of Sri Lanka. The sample of this study is 90 operational level employees from a leading garment manufacturing organization in Sri Lanka. The simple random sampling technique was used to draw this sample from a population of 293 employees. Data collection was done by using selfadministrated structured questionnaires. The questionnaire consists of 38 questions and the first section of the questionnaire designed to obtain demographic characteristics, including age, gender, the length of work experience etc. In the second section there are 17 questions regarding workplace design factors. Finally, the third section consists of 16 questions regarding job performance. Some ofthe questions were close ended, whiles others scored on a 5-point Likert scale. Point 5 for strongly agree, 4 for agree, 3 for neutral, 2 for disagree and 1 for strongly disagree have been given in order to analyze data. To test the hypotheses, Pearson's product moment correlation analysis, and multivariate analysis were used. The statistical computer package SPSS version 20.0 was utilized to analyze the data. Study confirmed that workplace design is significantly correlated with employee job performance. Findings of the study indicate that there is a strong positive relationship between workplace design and job performance of operational level employees in the apparel industry of Sri Lanka.

Hansika and Amarathunga (2016) studied the impact of office design on employees' productivity: A case study of banking organizations of North Western Province in Sri Lanka. The

main objective of this study is to investigate the impact of office design on employees' productivity with the focus on banking organizations which are located in North Western province, Sri Lanka. For the study sample of 82 respondents from 8 reputed banks located in the North-Western Province were taken into considered. Random sampling technique is adopted in the selection of 8 reputed banks and the particular respondents. Self-developed structured questionnaires were distributed among the respondents to identify how furniture, noise, temperature, lightning and spatial arrangements which are consider under the workplace environment have an influence on employees' productivity. It was found that office environment plays a vital role in encouraging employees of banking organizations of North Western Province in Sri Lanka to perform their assigned work successfully. It was concluded that t most of times the office environments are unsafe and unhealthy. So, office design should be done in a careful manner otherwise employees get frustrated and they will not perform at their best.

Roma, *et al.* (2019) investigated the effect of workplace design on employee engagement, collaborative capability, and on perceived work performance in coworking spaces. The research study aims to describe the causal relationship of workplace design to perceived work performance through the mediating roles of employee engagement and collaborative capability with the use of Structural Equation Modeling (SEM).The total of 350 co-workers aged 18-60 years old, from 27 different co-working spaces in Metro Manila, Philippines participated in the study. The findings of this research revealed that workplace design has no direct effect on perceived work performance; however, perceived work performance improves when coworkers are more engaged and have better collaborative capability. Nonetheless, the rest of the hypothesized premises were affirmed in the result of this study. This paper can help the HR managers and the business centers to create a more flexible and constructive workplace setting for their employees. Further, the results can be used as a basis for the fundamental shift of the traditional workspace into a new creative workplace.

Michael, *et al.* (2019) examined the relationship between workplace design, ergonomics and organizational performance: a case study of West African Examination Council (WAEC), Lagos State of Nigeria. The aim of the study was to examine the influence of ergonomics and workplace design on organizational performance in WAEC, Lagos State of Nigeria. Descriptive survey research design was used. Primary data were obtained using questionnaire administered to employees of West African Examination Council, Lagos State of Nigeria. Books, journal and the internet were used for literature

review. The population of the study was 105 drawn from staff of West African Examination Council, Lagos State of Nigeria. A sample of size of 83 was determined from the population using Taro Yamane's sample size determination method. A 5-point Likert scale was used to collect data from respondents. Out of 83 copies of questionnaire distributed, 75 copies were returned and used for our analysis. The instrument was validated by a panel of management scholars and practitioners for face validity and comprehensiveness. The reliability test was done using Cronbach alpha. The reliability coefficient results of 0.89, suggest a high degree of internal consistency. We descriptive statistic in form of frequency tables and chi square to test three hypotheses formulated at 0.05 level of significance. SPSS version 22 was used for different analyses conducted. Results revealed that good ergonomics and workplace design practices can significantly improve profitability of WAEC, Lagos. Furthermore, well designed workstations significantly relate to organizational performance in WAEC. The study recommended that organizations should pay more attention to their work environment as it impacts on their overall performance.

METHODOLOGY

Research Design

Cross sectional explanatory survey research design was adopted for the study. The research design is deemed suitable and most appropriate for this study because of two reasons: (i) the study was conducted across different road construction companies in Rivers State at the same time which makes it a survey study; (ii) it involves the test of hypotheses which is explanatory in nature.

Research Population

The population of the study consists of Forty-Two (42) road construction companies operating in Rivers State. Due to accessibility and manageability, only fifteen (15) functional road construction companies are studied. Details of the population distribution are provided in the table below:

Table 1: Population Distribution

S/N	Road Construction Companies in Rivers State
1	Alcon Nigeria Limited
2	Arrow Construction Company Limited
3	Barley Field Nigeria Limited
4	Ferotex Construction Company Limited
5	Gama Consulting and Construction Engineering Limited
6	Germains Construction
7	Gilbraltar Construction Nigeria Limited
8	Flanac Construction and Supply Company
9	Julius Berger
10	Lubrik Construction Company
11	Mercury Engineering and Construction Company
12	Prime Projects Construction Company
13	Setraco Nigeria Ltd
14	Sirpi Alusteel Construction Limited
15	Skymide Engineering Company Nigeria Limited

Source: Rivers State Yellow Page Directory, 2024

Validity of Instrument

The work adopted the face and content validity. To achieve this, the questionnaire that was used for this study was subjected to thorough scrutiny and adjustment by the test and measurement. Their comments were used to validate the questionnaire items.

Reliability of Instrument

Test-retest method was used to test the reliability of the instrument. The response obtained from the respondents on the two occasions was correlated using SROCC (Spearman Rank Order Correlation Coefficient) which yielded a coefficient of 0.84.

Administration of the Instrument

In line with the study sample, a total of forty-five (45) copies of the validated questionnaire were distributed to the targeted audience. The researcher was able to retrieve thirty-eight (38) and were used for the data analysis.

Method of Data Analysis

Arithmetic mean and standard deviation were used for the research question analyses while the test of hypotheses was done using Correlation Statistical tool such as Pearson Product Moment Correlation Coefficient. The formula is presented below:

$$\gamma = \frac{n\Sigma xy - \Sigma x \Sigma y}{\sqrt{[n\Sigma X^2-(\Sigma X)^2]\,[n\Sigma Y^2-(\Sigma Y)^2]}}$$

Where:

N= total number

X = number of data in group A

Y= number of data in group B

Σ = Summation

$\sqrt{\quad}$ = Square root

Decision Rule: Using a level of significance of 0.05 (confidence interval of 95%), when a calculated significant value is less than 0.05 the null hypothesis will be rejected, if otherwise, the null hypothesis will be accepted.

Test of Hypotheses

Ho1: There is no significant relationship between cubicles and strategic planning of road construction companies in Rivers State.

Table 1: Relationship Between Cubicles and strategic planning

S/N	X	Y	XY	X^2	Y^2
1	9	8	72	81	64
2	6	4	24	36	16
3	5	4	20	25	16
4	1	1	1	1	1
5	10	8	80	100	64
6	7	5	35	49	25
7	3	3	9	9	9
8	1	1	1	1	1
9	8	7	56	64	49
10	6	6	36	36	36
11	4	3	12	16	9
12	2	2	4	4	4
13	8	9	72	64	81
14	5	6	30	25	36
15	4	3	12	16	9
16	2	1	2	4	1
	ΣX- 81	ΣY=71	ΣXY=466	ΣX^2= 531	ΣY^2= 421

Source: Survey 2024

$$\gamma = \frac{n\Sigma xy - \Sigma x\Sigma y}{\sqrt{[n\Sigma X^2-(\Sigma X)^2]\,[n\Sigma Y^2-(\Sigma Y)^2]}} = \frac{16X466-81X71}{\sqrt{(16x531-81)\,(16x421-71^2)}}$$

$$\gamma = \frac{7456-5751}{\sqrt{(849-6561)\,(6736-5041)}} = \frac{1705}{\sqrt{(182751)(1695)}}$$

$$= \frac{1705}{\sqrt{3279825}} = \frac{1705}{\sqrt{1811.0287}} = 0.9415$$

$\therefore \gamma = 0.941$ (approx)

Table 1 shows that a calculated r value is 0.941. Since the calculated r value 0.941 is greater than the critical r value 0.05, the null hypothesis (Hoi) which states that there is no significant relationship between cubicles and strategic planning of road construction companies in Rivers State was rejected while the alternate was accepted. This implies that there is a significant positive relationship between cubicles and strategic planning of road construction companies in Rivers State.

H02: There is no significant relationship between open workspace and experienced workforce of road construction companies in Rivers State.

Table 2: Relationship between Open Workspace and Experienced Workforce

S/N	X	Y	XY	X^2	Y^2
1	11	8	88	121	64
2	5	4	20	25	16
3	4	3	12	16	9
4	1	2	2	1	4
5	9	11	99	81	121
6	5	4	20	25	16
7	3	4	12	9	16
8	1	1	1	1	1
9	9	10	90	81	100
10	5	6	30	25	36
11	2	3	6	4	9
12	2	1	2	4	1
13	10	8	80	100	64
14	7	5	35	49	25
15	2	4	8	4	16
16	1	1	1	1	1
	$\Sigma X= 77$	$\Sigma Y=75$	$\Sigma XY=506$	$\Sigma X^2= 547$	$\Sigma Y^2= 499$

Source: Survey 2024

$$\gamma = \frac{n\Sigma xy - \Sigma x\Sigma y}{\sqrt{[n\Sigma X^2-(\Sigma X)^2]\,[n\Sigma Y^2-(\Sigma Y)^2]}} = \frac{16X506-77X75}{\sqrt{(16x547-77^2)(16x49975^2)}}$$

$$\gamma = \frac{8096-5775}{\sqrt{(8752-5929)\,(7984-5625)}} = \frac{2321}{\sqrt{(2823)\,(2359)}}$$

$$= \frac{2321}{\sqrt{6659457}} = \frac{2321}{\sqrt{2580.5924}} = 0.8994$$

$\therefore \gamma = 0.899$ (approx)

Table 2 shows that the calculated r value is 0.899. Since the calculated r value 0.899 is greater than the critical r value 0.05, the null hypothesis (H02) which states that there is no significant relationship between open workspace and experienced workforce of road construction companies in Rivers State was rejected and the alternate was accepted. This implies that there is a significant positive relationship between open workspace and experienced workforce of road construction companies in Rivers State.

H03: There is no significant relationship between ergonomic design and new technology of road construction companies in Rivers State.

Table 3 Relationship between Ergonomic Design and New Technology

S/N	X	Y	XY	X^2	Y^2
1	10	9	90	100	81
2	5	6	30	25	36
3	2	3	6	4	9
4	1	2	2	1	4
5	7	12	84	49	144
6	4	6	24	16	36
7	2	4	8	4	16
8	1	2	2	1	4
9	8	12	96	64	144
10	4	5	20	16	25
11	3	4	12	9	16
12	1	1	1	1	1
13	7	10	70	49	100
14	6	5	30	36	25
15	3	4	12	9	16
16	2	1	2	4	1
	$\Sigma X=66$	$\Sigma X=$ **86**	**$\Sigma XY=489$**	**$\Sigma X^2=388$**	**$\Sigma Y^2=658$**

Source: Survey 2024.

$$n\Sigma xy - \Sigma x\Sigma y \qquad 16X489- 66X86$$

$$\gamma = \sqrt{[n\Sigma X^2-(\Sigma X)^2]\,[n\Sigma Y^2-(\Sigma Y)^2]} = \sqrt{((16x388x66^2)(16x65886^2)}$$

$$\gamma = \frac{7824-5676}{\sqrt{(6208-4356)(10528-7396)}} = \frac{2148}{\sqrt{(1852)\,(3132)}}$$

$$= \frac{2148}{\sqrt{5800464}} = \frac{2148}{\sqrt{2408.4152}} = 0.8919$$

$\therefore \gamma = 0.892$ (approx)

Table 3 shows that the calculated r value is 0.892. Since the calculated r value 0.892 is greater than the critical r value 0.05, the null hypothesis (H03) which states that there is no significant relationship between ergonomic design and new technology of road construction companies in Rivers State was rejected and the alternate was accepted. This implies that there is a significant positive relationship between ergonomic design and new technology of road construction companies in Rivers State.

Summary of Findings

Based on the analysis of data carried out, the following findings were made:

1. There is a significant positive relationship between cubicles and strategic planning of road construction companies in Rivers State.
2. There is a significant positive relationship between open workspace and experienced workforce of road construction companies in Rivers State.
3. There is a significant positive relationship between ergonomic design and new technology of road construction companies in Rivers State.

CONCLUSION

Base on the findings, the study concluded that there is a significant positive relationship between workplace design (cubicles, open workspace and ergonomic design) and competitiveness (strategic planning, experienced workforce and new technology) of road construction companies in Rivers State. Road construction companies that fall short of designing their workplace properly in terms of cubicles, open workspace and ergonomic design will find it difficult to compete favourably in the global market.

RECOMMENDATIONS

Based on the findings, the following recommendations were made:

1. Management of road construction company should ensure office workers are isolated to plan strategically through adoption of cubicle designs.
2. Management of road construction company should endeavor to retain employees who could work in a tensed work environment.
3. Management of road construction company should ensure adequate provision of good office furniture that relaxes employees to be innovative.

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