



Integrating Co – Working Spaces in Design of Commercial Office Building in Abuja, Nigeria

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Abstract

The global landscape is undergoing a structural transformation from rigid, compartmentalised corporate offices toward fluid and decentralized work environments. In Abuja, Nigeria's administrative capital, a significant misalignment persists between inherited colonial-era architectural typologies with the operational needs of a rapidly expanding gig economy and technology-driven entrepreneurial sector. The integration of coworking principles into commercial office architecture as a strategy for addressing this typological obsolescence. A mixed-methods approach was employed, combining quantitative survey analysis with qualitative spatial assessment. Data were collected from $N = 195$ professionals operating within Abuja's Central Business District and analysed using the Relative Importance Index (*RII*). Results indicate that interaction and networking ($RII = 0.898$) and relaxed ambience ($RII = 0.891$) constitute the strongest drivers of coworking adoption, while economic efficiency ($RII = 0.865$) remains a significant motivator in a high-cost urban property market. However, the study identifies a critical thermal comfort which respondents ranked comparatively lower ($RII = 0.818$), suggesting users perceive environmental regulation as a baseline infrastructural requirement rather than a primary design attribute. The Biomimetic Efficient Envelope (BEE) model - a hexagonal framework derived from honeycomb geometry - optimises structural stability, reduces material requirements by 30%, and minimizes solar heat gain through improved perimeter-to-area ratio. By integrating Activity-Based Working principles with biomimetic environmental strategies, the BEE framework presents a climate-responsive spatial typology capable of supporting resilient and adaptive office development in Sub-Saharan Africa.

Keywords: Co-working, Co-work spaces, Biomimetic Architecture, Activity-Based Working.

1.0 Introduction

The spatial organization of professional activity is undergoing a profound transformation (Orel & Dvouléty, 2020). The emergence of platform economies, digital infrastructure, and knowledge-intensive labour has detached productive work from fixed institutional environments (Sisson, 2022). Consequently, conventional office towers—historically designed to facilitate hierarchical supervision and centralized control—are increasingly incompatible with contemporary professional practice (Appel-Meulenbroek *et al*, 2020). This transformation reflects a broader post-Fordist shift in economic organization, where productivity is driven by information exchange, creativity, and decentralized collaboration rather than standardized industrial processes (McRobbie, 2016). Within this context, workspace design must prioritize adaptability, connectivity, and community formation (Gandini & Cossu, 2021). In Abuja, however, commercial architecture remains largely anchored in colonial-era administrative typologies characterized by rigid spatial hierarchies and inflexible floor plans (Nwanne & Awodipe, 2017). These structures were originally conceived for bureaucratic governance rather

than entrepreneurial innovation. The result is a growing typological mismatch between the physical office environment and the needs of the emerging Nigerian knowledge economy (Radman *et al.*, 2022).

Coworking spaces have emerged globally as a spatial response to this transition (de Peuter *et al.*, 2017). Rather than functioning solely as shared office facilities, they operate as social infrastructures that facilitate lateral networking, collaborative learning, and professional identity formation (Johnson, 2014). These environments embody the concept of “working alone together,” in which independent professionals coexist within a shared spatial ecosystem (Radman *et al.*, 2022). In Abuja, however, most coworking initiatives remain retrofitted within aging office buildings, rather than integrated into purpose-designed architectural frameworks (Nwanne & Awodipe, 2017). This study therefore seeks to reconceptualize the office building itself, transforming it from a static container of labour into a dynamic platform for professional interaction. The central objective is to develop a design framework capable of embedding coworking principles into the architectural logic of commercial office buildings, thereby contributing to a spatial typology suitable for resilient urban development in Sub-Saharan Africa.

2.0 Literature Review

2.1 The Evolution of Professional Work Environments

The physical form of the workplace has historically evolved alongside technological and economic transformations (Hoffower, 2021). Early administrative environments, such as monastic scriptoria and mercantile counting houses, emphasized order and hierarchical oversight (Leadon, 2015). The industrial era later produced standardized office arrangements organized around centralized managerial control (Nikil, 2014). During the twentieth century, workplace experimentation introduced more fluid organizational concepts (Hoffower, 2021). The *Burolandschaft* (office landscape) movement attempted to dissolve rigid desk hierarchies, promoting spatial openness to enhance communication and workflow efficiency (Saval & Nikil, 2014). More recently, coworking spaces have emerged as a spatial manifestation of the sharing economy and entrepreneurial ecosystems (Hoffower, 2021). These environments foster knowledge exchange and community formation among independent professionals.

2.2 Coworking versus Traditional Serviced Offices

A key distinction exists between coworking environments and conventional serviced offices.

Table 1: *Coworking versus Traditional Serviced Offices*

Feature	Traditional Serviced Offices	Coworking Communities
Spatial Aesthetic	Corporate uniformity	Informal and creative environments
Social Structure	Organizational hierarchy	Lateral networking
Leasing Model	Space-as-a-Service	Membership-based ecosystem
Primary Value	Logistical convenience	Social capital and collaboration

Source: (Kojo & Nenonen 2014)

Table 1 identifies the fundamental divergent characteristics between traditional serviced offices and coworking communities, categorized by aesthetics, social structure, leasing models, and primary value propositions.

A critical distinction in modern workplace architecture exists between the rigid operational efficiency of traditional serviced offices and the community-oriented, membership-based framework of coworking spaces (Kojo & Nenonen, 2014). Traditional serviced offices typically prioritize corporate uniformity and logistical convenience, whereas coworking environments are designed as third spaces that facilitate informal, creative settings and lateral networking. Within the Nigerian urban context, specifically in Abuja, traditional commercial developments have historically mirrored colonial-era administrative structures that are static and monolithic, often failing to accommodate the fluid needs of the modern "gig" economy. In contrast, the coworking model is defined by the phenomenon of "working alone together," where independent professionals seek a shared social framework to mitigate the professional seclusion typical of remote labour (Spinuzzi, 2012).

Empirically, research conducted in Abuja indicates that the primary driver for choosing coworking over traditional setups is the high-value users place on interaction, networking, and collaboration, which achieved a Relative Importance Index (RII) score of 0.898. Architecturally, while serviced offices rely on hierarchical organizational structures, coworking spaces demand a "landscape of choice" that offers a mixture of open-plan and private, closed offices to balance social synergy with individual acoustic comfort. Furthermore, the visual identity of coworking hubs diverges from the "Fordist" efficiency of traditional offices by prioritizing a post-Fordist sensibility characterized by bespoke interiors that blur the boundaries between professional labour and recreational leisure (Parrino, 2015). This evolution suggests that the value of contemporary workspace is increasingly measured by its atmospheric quality and its ability to foster a sense of collective identity rather than mere square footage or physical utility (Oldenburg, 1989). Ultimately, integrating these flexible principles into commercial design represents a challenge to legacy office typologies, advocating for user-centred environments that are responsive to the specific cultural and environmental nuances of the local context.

2.3 Literature Gap

Despite the growing prominence of coworking spaces globally, existing scholarship remains heavily concentrated within North American and European contexts (Spinuzzi, 2012; Gandini, 2015; Capdevila, 2015). Research addressing the architectural and climatic realities of Sub-Saharan urban environments remains limited layouts (Merkel, 2015). Particularly underexplored are the interactions between coworking spatial models and tropical climatic conditions, where passive cooling, solar exposure, and energy instability significantly influence building performance (Brown, 2021). This study addresses this gap by examining coworking integration within Abuja's savanna climate and evolving professional ecosystem.

2.4 Theoretical Review and Framework

2.4.1 Activity-Based Working and Biomimetic Design

The conceptual foundation of this study combines Activity-Based Working (ABW) with biomimetic architectural theory. ABW proposes that productivity is enhanced when workers

can select environments tailored to specific tasks (McRobbie, 2016). These settings range from quiet focus pods to collaborative open areas and informal social lounges (Nikil, 2014). Rather than assigning fixed desks, the office becomes a landscape of spatial choices (Wohlers & Hertel, 2017). While ABW addresses behavioural flexibility, environmental performance remains equally critical in tropical climates. To address this challenge, the study introduces the Biomimetic Efficient Envelope (BEE) model.

2.4.2 The BEE Model

The BEE model draws inspiration from the honeycomb structure found in beehives, one of the most efficient geometrical forms in nature (Brown, 2021). Three core principles define the model:

- i. Structural Efficiency**
Hexagonal geometry distributes loads evenly, enabling large open spans with reduced structural material requirements (Capdevila, 2015).
- ii. Thermal Optimization**
The hexagon provides an optimal perimeter-to-area ratio, minimizing solar exposure while maximizing usable interior floor space (Brown, 2021).
- iii. Modular Adaptability**
Hexagonal units can expand organically, allowing buildings to scale in response to evolving occupancy needs. Through these mechanisms, the BEE model integrates environmental performance with spatial adaptability.

3.0 Methodology

A mixed-methods research design was employed to ensure a robust understanding of both spatial and experiential dynamics. This involved quantitative analysis (a survey of 200 respondents [91% return rate] analysed via SPSS and the Relative Importance Index (RII) to prioritize design factors). The qualitative analysis involved case studies of four major office developments, including Tower 2, World Trade Centre (Abuja) and Angel Square (Manchester), utilizing physical observations, checklists, and architectural appraisals.

3.1 Study Area

The Abuja Central Business District (CBD), located at the core of Nigeria's Federal Capital Territory, is a planned urban centre developed in the 1980s under the International Planning Associates (IPA) consortium and designed by Kenzo Tange (FCDA, 2015). Characterised by modern infrastructure, political significance, and rapid urbanisation, it provides an appropriate context for examining contemporary workplace models such as coworking (Watson, 2014).

The district accommodates a dense mix of government institutions, startups, freelancers, and digital enterprises, supported by strong accessibility to major transport routes and the Nnamdi Azikiwe International Airport. Its strictly regulated land-use system, managed through Abuja Geographic Information Systems (AGIS) and FCT Development Control, alongside high occupancy rates and rental yields, reflects a robust commercial environment dominated by mid-income professionals aged 25–40 (FCDA, 2018; AGIS, 2020).

Climatically, the CBD lies within a tropical savanna zone with temperatures reaching approximately 35°C, requiring climate-responsive design strategies. Its north-west to south-east orientation has important implications for building performance, particularly in managing solar gain and enhancing natural ventilation (NiMet, 2021; Olgyay, 2015).

3.2 Sample Population

A total of 200 professionals were surveyed, including coworking users, architects, developers, and space operators. 195 valid responses were analysed.

3.3 Analytical Tool

The Relative Importance Index (RII) was used to rank coworking drivers and spatial design preferences.

$$RII = \frac{\sum WA}{N \sum W} \times 100$$

Where:

W = weighting assigned by respondents

A = highest possible weighting

N = number of respondents.

4.0 Results and Discussion

Table 2: Table Drivers of Coworking Adoption

Factor	RII	Rank
Interaction and Networking	0.898	1
Relaxed Ambience	0.891	2
Economic Efficiency	0.865	3
Work–Home Separation	0.757	10

Source: Present Study

As shown in Table 2, all ten identified drivers of coworking demand in Abuja recorded high significance (RII > 0.70), indicating a broadly strong and multidimensional motivation structure. The most influential factor is interaction, networking, and collaboration (RII = 0.897), reinforcing the coworking principle of “working alone together” (Spinuzzi, 2012). A preference for a relaxed ambience ranks second (RII = 0.891), highlighting the importance of comfort and aesthetics (Merkel, 2015), while economic efficiency through shared resources ranks third (RII = 0.865), reflecting cost constraints among startups and SMEs (Hoffower, 2021). Technological advancement and evolving work styles emerge as secondary drivers (Gandini, 2016), whereas the need to separate home and work (RII = 0.757) ranks lowest.

Overall, the narrow spread of RII values in Table 2 indicates that coworking demand is shaped by a convergence of economic, social, and psychological factors.

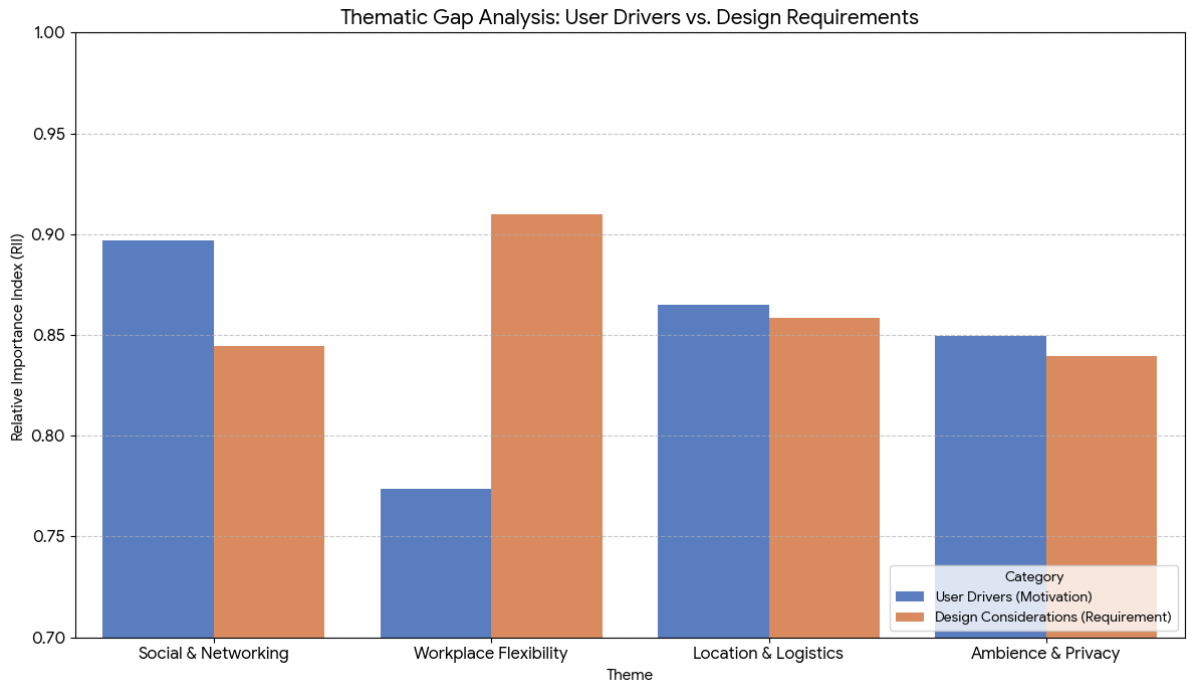


Figure 1: Thematic Gap Analysis: User Drivers vs. Design Requirements

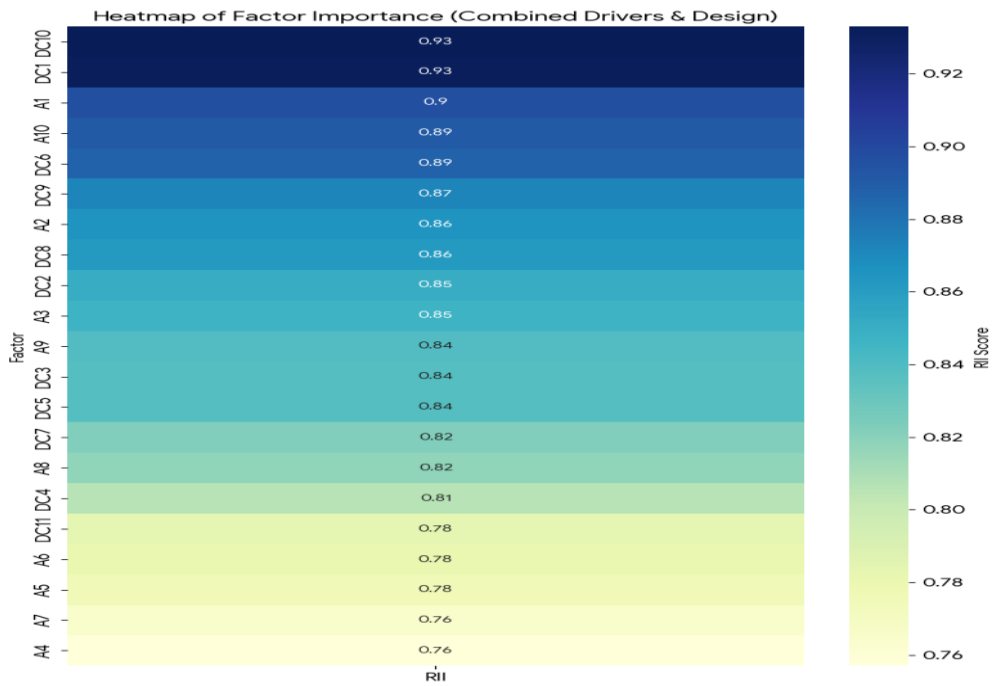


Figure 2: Heatmap of Factor Importance (present study)

Table 3: *Summary of Key Findings from RII Analysis*

Theme	Top-Ranked Factor	RII Score	Lowest-Ranked Factor	RII Score
Drivers of CWS Usage (Table 4.2a/b)	The need to interact, network and collaborate with like-minded people (A1)	0.898	The need to separate home from work activities (A4)	0.756
	Relaxed ambience that attracts users (A10)	0.891	Ease to change work location at will (A7)	0.764
Design Considerations (Table 4.3a/b)	A mixture of open and closed office options (DC10)	0.935	Thermal comfort (DC11)	0.76
	Accessibility via public transport (DC1)	0.931	Location in commercial/industrial areas (DC4)	0.801

Source: *Present Study*

Table 3 presents a distilled comparison of the most and least influential factors shaping coworking space usage and design preferences in Abuja, revealing a clear hierarchy of user priorities.

In terms of usage drivers, the need for interaction, networking, and collaboration (RII = 0.898) emerges as the dominant factor, confirming that coworking spaces are fundamentally valued as social and professional ecosystems rather than mere workstations. The strong ranking of relaxed ambience (RII = 0.891) further indicates that users place significant emphasis on psychological comfort and the experiential quality of the workspace. By contrast, factors such as separating home from work (RII = 0.756) and ease of changing locations (RII = 0.764) are comparatively less influential, suggesting that flexibility alone does not drive adoption unless coupled with meaningful social engagement.

Regarding design considerations, the highest-ranked factor is the provision of a mix of open and enclosed office spaces (RII = 0.935), reflecting a clear preference for spatial adaptability that accommodates both collaboration and focused work. Accessibility via public transport (RII = 0.931) is also highly prioritised, underscoring the practical importance of ease of movement within the urban context. In contrast, thermal comfort (RII = 0.760) and location within commercial or industrial zones (RII = 0.801) rank lower, implying that such factors are perceived as basic functional expectations rather than key determinants of user choice.

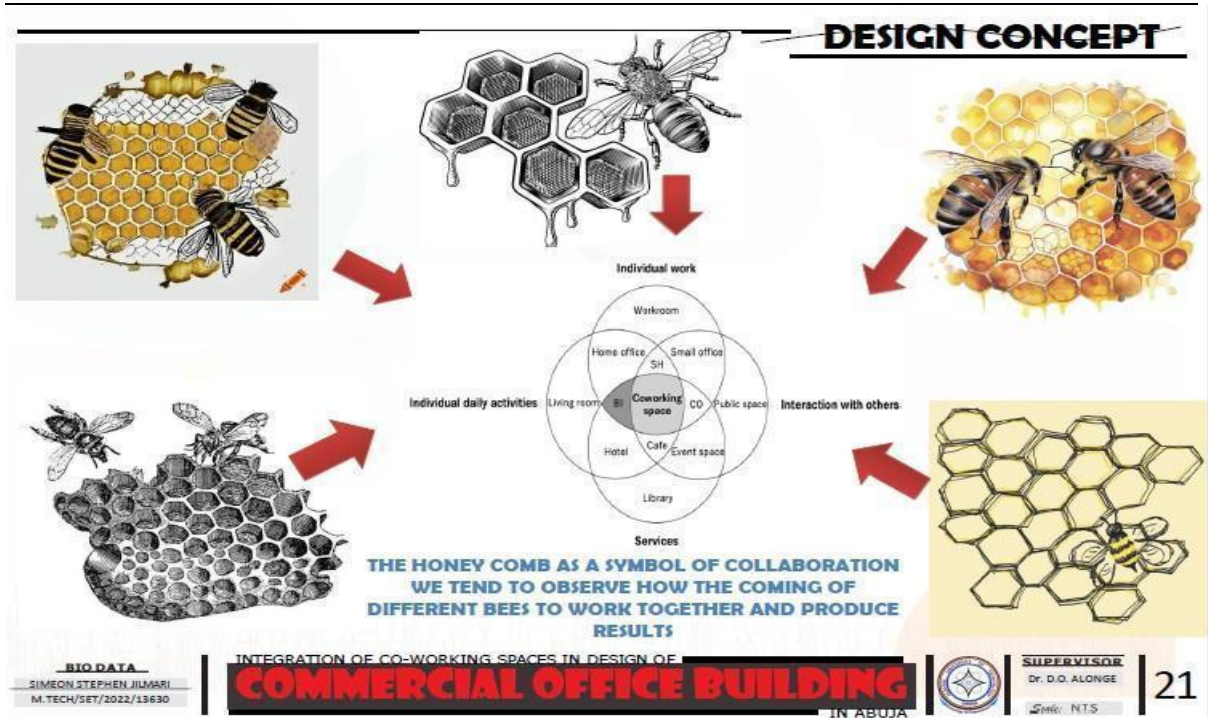


Figure 3: Conceptual analysis of proposed integration of coworking spaces in the design of commercial office building

Figure 3 illustrates the conceptual basis for the proposed integration of coworking spaces into commercial office design, drawing on a biomimetic analogy derived from the honeycomb structure. The figure systematically translates the organisational logic of bee colonies into an architectural framework that emphasises collective productivity, spatial efficiency, and adaptive interaction.

At a conceptual level, the honeycomb serves as a representation of decentralised yet coordinated activity, where individual units operate autonomously within a cohesive system. The visual progression from natural imagery to diagrammatic abstraction reinforces this analogy, demonstrating how biological systems can inform spatial organisation. From a design perspective, the hexagonal geometry implies modularity, scalability, and efficient space utilisation. The tessellated structure allows for flexible aggregation of units, supporting a range of work modes without spatial fragmentation. The directional flow within the figure suggests a deliberate abstraction process, from natural form to architectural application, indicating that the biomimetic approach is not merely aesthetic but operational. It informs spatial configuration, interaction patterns, and functional relationships within the proposed design.

4.1 The Thermal Paradox

Although Abuja experiences average daytime temperatures approaching 35°C , thermal comfort ranked comparatively lower ($RII = 0.818$). This reflects what the study terms the Thermal Paradox: users perceive climate control as a baseline infrastructural expectation rather than a premium design feature. Consequently, environmental performance must be embedded within the architectural envelope itself, rather than relying exclusively on mechanical cooling systems.

4.2 Case Study Synthesis

Several built precedents provide insight into effective design strategies as follows:

i. Atrium Integration

Buildings such as the Bank of Industry headquarters utilize central atria to introduce daylight and facilitate informal social interaction.

ii. Thermal Massing

Structures like Angel Square in Manchester demonstrate the value of exposed concrete ceilings in regulating internal temperature fluctuations.

iii. Building Orientation

The Bank of Industry building in Kaduna illustrates the effectiveness of North–South orientation and double-banking layouts, which reduce solar exposure while enabling cross ventilation.

4.3 The Bee Model: A Biomimetic Design Synthesis

The Biomimetic Efficient Envelope (BEE) represents a holistic architectural framework for coworking integration.

Key components includes:

a. Hexagonal Modular Planning

2 × 2-metre hexagonal modules create flexible spatial clusters capable of expanding or contracting according to occupancy requirements.

b. Stack-Effect Ventilation

Central atria and vertical ventilation shafts promote passive airflow, reducing reliance on mechanical cooling systems.

c. Social Collision Nodes

Shared atria and circulation hubs serve as high-frequency interaction zones, encouraging networking and knowledge exchange.

d. Material Strategy

High thermal-mass materials and solar shading systems stabilize internal temperatures while reducing cooling demand. Collectively, these strategies create a building envelope that responds dynamically to both environmental and social conditions.

5.0 Conclusion and Recommendations

The integration of coworking principles into commercial office architecture offers a viable pathway toward addressing Abuja’s evolving professional landscape. Conventional office typologies are increasingly incompatible with decentralized work patterns, entrepreneurial ecosystems, and infrastructural instability. The BEE model demonstrates that biomimetic

design can provide a climate-responsive architectural solution, aligning environmental performance with the spatial needs of contemporary professionals.

5.1 Strategic Recommendations

- i. Incorporate hybrid spatial layouts supporting both collaboration and focused work.
- ii. Implement passive cooling strategies including shading devices and cross ventilation.
- iii. Encourage mixed-use urban zoning to reduce commuting pressures.
- iv. Prioritize digital infrastructure as a foundational building service.
- v. Orient buildings along a north–south axis to minimize solar gain.
- vi. By embedding coworking principles within architectural design, Abuja’s commercial office developments can evolve toward adaptive, resilient, and socially productive urban infrastructure.

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