



Assessment of Flexible Features in the Architecture of Convention Centres: A Review of Convention Centres in African Countries

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Abstract

Flexibility has been shown to increase the uniqueness of a place through time, making rooms adaptable to multifunctional usage without changing the practical needs. The focus of this study is on the design characteristics and strategies that allow for changing scenarios in the usage and operation of places. Walls, floors, and roofs are design elements that influence space in any building. Because convention centers are hubs for cultural and social activities, they draw a volatile population, necessitating the need for adaptable venues for convention centers, which are quickly becoming stable and developing aspects of any city. The study examines the adaptation to inadequacies of event spaces in chosen convention centers, as well as the architectural characteristics employed to accomplish flexibility. According to the study, the convention centers in Africa had adaptability as their flexible design approach, which was due to the usage of vast open spaces, while. Curtains and partition walls were employed as flexible design elements in the 20% of centers that had few of these components. To create a successful adaptable design, the study advised that design features for flexibility such as sliding walls, retractable roofs, and seating be employed in event center designs.

Keywords: *flexibility, adaptable, open spaces, multi-functional*

1. Introduction

A convention centre is a huge structure built to host a conference where individuals and groups come together to promote and discuss mutual interests. Convention venues often have enough floor space to accommodate thousands of guests. Exhibition halls are very big venues that are appropriate for massive trade events. Convention centres often have at least one auditorium, as well as performance halls, lecture halls, meeting rooms, and conference rooms. A conference centre is available in certain big resort area hotels. Convention centres often have at least one auditorium as well as concert halls, lecture halls, meeting rooms, and conference rooms. A conference centre is available in certain big resort area hotels. (From the Cambridge Dictionaries, 2015) Convention is the gathering of representatives of sovereign nations or delegates from other groups and societies for the purpose of debate and occasionally decision (Lawson, 1981). Political or negotiating and non-political conventions; legislative, diplomatic,

and technical conventions; and periodic and ad hoc conventions. Non-political conventions are classified as administrative, economic, humanitarian, social, communications, scientific, educational, and cultural if they result in the formulation of law, and diplomatic/technical if they are attended by diplomats/technical specialists.

Architecture is concerned with the concepts and design decisions that must be made in order to effectively satisfy the quality criteria of a software system. The degree to which a system accommodates potential or future modifications to its needs is referred to as flexibility. Flexible spaces can be identified and limited by design elements such as floors, ceilings, and walls, which should be designed to change flexibly. To produce a flexible space, a space may need to be decreased or enlarged, and because these design aspects define and constrain the space, they should be built for dissociation or separation. An event centre is a multifunctional location where large crowd events, such as exhibition halls, conference centres, exposition centres, and convention centres, take place. Flexibility and adaptability are essential in these areas in order for them to be partitioned into various sized sections as needed. These sizes broaden the design options for demountable buildings built with modular components. Each module is readily attachable, detachable, modifiable, moved, and replaceable for upgrading, repair, recycling, and reuse.

1.1 Aims and objectives of the study

The purpose of this research is to investigate the impact of flexible spaces in the design of convention centres, specifically the use of sustainable materials that are energy efficient to create a comfortable and conducive atmosphere, thereby positioning Port Harcourt favourably to benefit from tourism by improving its capacity to hold medium to large-scale international meetings, conferences, and exhibitions. This would eventually entail building a landmark through unique architectural design that will draw visitors from many cities and nations to attend meetings, conferences, exhibits, and events. The following are the project's specific objectives to achieve the aforementioned goal:

- To establish a venue for social and cultural gatherings.
- Establishing a space for presentation and engagement.
- To promote public interest, interactive spaces and landscaping will be created.
- To establish a landmark by using current architectural elements.
- To investigate how it contributes to urban expansion.

2. Literature Review

2.1 Overview of flexibility

Humans are adaptable and moveable beings, and their existence as a species is owing to their adaptability and movability. Man's desire to explore and achieve new goals demonstrated that people are dynamic and have dynamic behaviours. A basic cave might be extended, reshaped, and have another room built behind, to one side, above or below, linked by a ramp, stair, or doorway, and then another chamber beyond that, possibly in a different direction, or branching out from one of the new chambers, therefore adjusting to existing demands. Domino House was created in 1914 utilizing the "Plan Libre" principle, as seen in Figure 1, which was one of the quintuple principles presented by Le Corbusier contemporary architecture in the early twentieth

century. The layout was open, with no internal barriers save for space partitioning, column supports, and stairs connecting levels. Internal barriers could be put wherever needed so that areas could be downsized or enlarged, and this approach gave flexibility in creating spaces. Because of its exceptional adaptability, movement, and transformability, flexibility has inspired creativity all across the world. It is a significant concept that has entered the present architectural world because it opens up the possibility of portable, prefabricated, demountable, dynamic, adaptable, movable buildings, which are quickly becoming a trend in modern design. Buildings no longer symbolize a static classified order; rather, they have evolved into adaptable containers for use by a continuously evolving civilization. Flexible structures are designed to adapt to changing circumstances in their usage, function, and placement. They may transition from one reality to another, accommodating new goals and demands, and the possibilities are immense and unlimited. It is not static; rather, it is moveable, adapts to change, and transforms. Building flexibility refers to adopting a concept in which buildings may adapt to present and future demands ranging from economic considerations to sustainability and the potential of change, as well as allowing the partition of space according to the needs of the user. Building flexibility refers to the ability to adapt to changing needs and configurations. The following factors must be addressed in order for a building design to be flexible: adaptability, mobility, and transformability.

2.2 Flexibility of design features

The essential aspect that defines how flexible a structure may be is the flexibility of the design components that comprise it. These design elements are easily identified and assembled, allowing one to realize, create, or modify the change requirement. Modules are made up of various components that can be dismantled non-destructively from the product as a whole, and each module can be readily attached, disconnected, modified, relocated, and replaced for upgrading, repair, recycling, or reuse. Demountable structures have a modular architecture that serves as the foundation for flexible, movable, and transformable structures as well as event rooms, exposition halls, banks, and restaurants. The adaptable system may be swiftly and simply controlled to enable room space division for meetings, events, or activities, allowing different areas to be used without interfering with one other or opening up to one enormous room as needed, as seen below.

2.3 Basic elements of design features

There are two methods for generating flexible multifunctional spaces: the first is via the use of furniture, and the second is through the use of building components such as walls and floors. In addition to flexible walls, modular design leads to flexible areas and may be accomplished by construction features such as walls, furniture, ceilings, doors, or windows.

2.3.1 Moveable and Retractable Seating

Alterations in the function of a space are one of the most common changes that may occur in a space. When static seats are used, the type of function that the area may be utilized for is limited, making it less flexible; however, when flexible seats are added, the space can be changed to accommodate a variety of uses. Retractable chairs are the most versatile seats in performance venues such as event centres, since they provide multi-functional areas. Seating platforms that move and retract are utilized in a variety of institutions, including performing arts centres and theatres, where seating spaces and floor space must be racked. Large rooms can have several

floor levels for multi-purpose usage because of their flexibility and economic effectiveness. This has the advantage of maximizing venue space, allowing numerous applications inside a facility, and providing optimal audience viewing. Fixed, recessed, movable, and travelling seats are among the options.

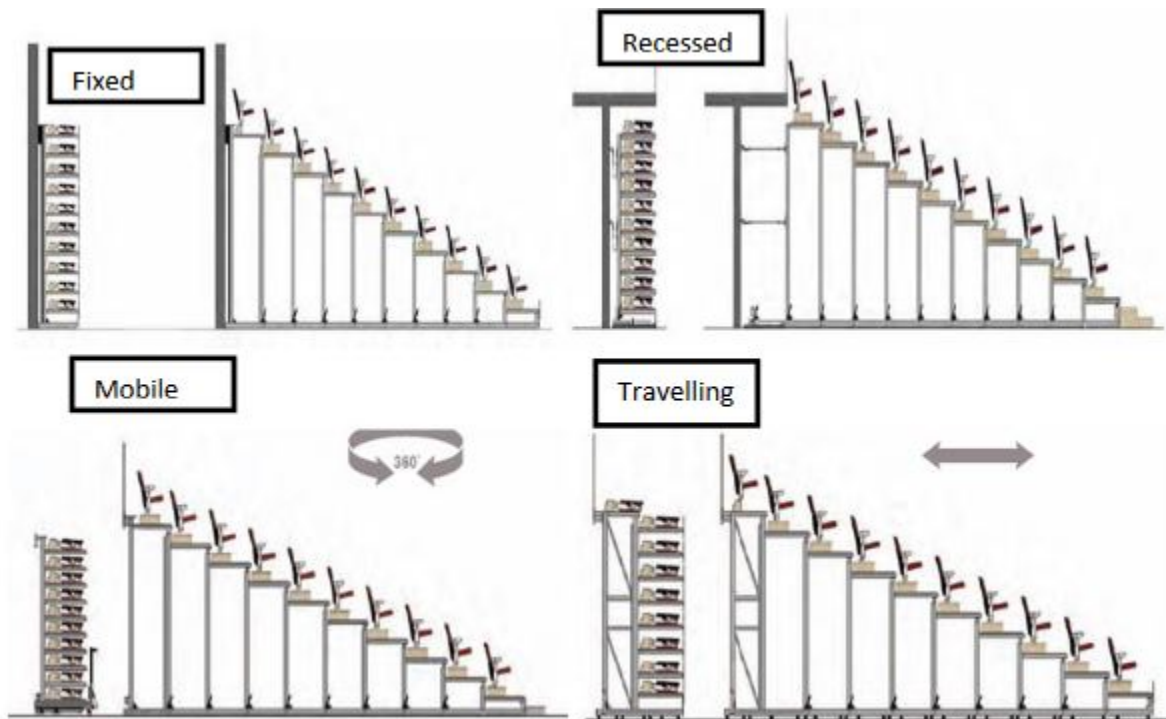


Fig 1: Types of retractable seating (Source: Architects Handbook)

2.3.2 Moveable and folding walls

It goes without saying that walls are required to create flexible interior spaces. Flexible walling systems are constructed of lightweight materials for ease of use. Where functional space delineation is a critical component of the partition project, movable barriers are provided. In places where future partition rearrangement is likely, demountable and moveable partitions should be employed. Large rooms may be easily subdivided to maximize space use due to their flexibility and cost effectiveness. These partitions are faster to install than traditional wall construction and reduce the cost and bother of cutting and installing rugs and ceilings around fixed walls. They provide optimum flexibility and reusability to support frequent and rapid work movement without causing material loss, damage, or alteration to panels or adjacent structures such as ceilings, fixed walls, or floors. Non-progressive movable and demountable walls allow individual panels to be removed from any position without disrupting surrounding units. To maximize reusability, partition layout should be dependent on module configuration. Office interiors, meeting rooms, sports and leisure facilities, schools, universities, churches, and conference centres are all common uses of folding walls also including banquet halls, exhibition halls, banks, and restaurants. The adaptable system may quickly and simply divide room space for meetings, parties, or activities, allowing distinct portions to be used without interfering with one another or opening up to one enormous room as needed.



Fig 2: Folding and moveable doors used as partitions
Source (Source: global sources)

2.3.3 Moveable and Retractable Roofs

This is a roofing system that rolls back on tracks, allowing the facility's interior to be exposed to the elements. These roof constructions date back to ancient Rome, when movable awnings were used to cover buildings used for large events (amphitheatres, theatres, and circuses). They employed basic retractable mechanisms (wooden beams, ropes, and canvas) to extend the roof over the stands, sheltering consumers from various weather conditions. Retractable roof structures are a sort of roof structure that can be moved or folded totally or partially in a short amount of time, allowing the building to be operated with an open or closed roof. Residences, restaurants and bars, swim centres, and other facilities that want to give an open-air experience at the touch of a button employ retractable roofs.

2.4 Overview of Convention Centres

Convention centres are large public gathering places that draw individuals of diverse ages, socioeconomic backgrounds, and hobbies. It can be used for hosting community and cultural events, religious and motivational gatherings; the contrast and diversity of events is endless. Because convention centres are hubs for cultural and social events, they draw an unpredictable crowd, thus they must be structured to allow participants and audiences to interact in different ways.

2.4.1 Types of Convention Centre

3. Research Methodology

The observational and case study research approach was used. The observation technique of research entails actually observing and researching a building sample. The study was carried out by noting the number of spaces supplied in the convention centres, as well as the types of buildings and event spaces given, as well as the flexible design characteristics and approach employed in the selected convention centres. The observation schedule was created to expose the many types of event centre buildings and event space available, the availability of flexible design components, the various types of flexible design features, and the technique adopted. Simple descriptive statistics were used for data analysis and were used for content analysis. The data was manually generated and tabulated in a Spread Sheet.

3.1 Eko Convention Centre, Lagos, Nigeria



Fig 3: Source: (ekohotels.com, 2005)

The Eko Convention Venue is the biggest multifunctional conference; banquet and exhibition centre in Nigeria, having a maximum floor size of 5,151 square metres .This facility has adequate room to house 270 exposition booths; it also has the potential to cater to dinner and conference events for up to 3,000. It is the most prominent musical venue in Nigeria, and can hold up to 6000 in concert. The Hall can be split into five distinct parts for smaller conferences and exhibits and comes with built in sound systems, professional lighting and roll away stage with carpeting to enhance sound effects. All of these fantastic amenities are in addition to the freshly created “Grand Ballroom” which accommodates 350 guests for supper. There are 13 purpose-built conference rooms that come equipped with state-of-the-art visual and audio technology.

Project Program

- Main conference hall
- Committee rooms
- Office accommodation
- Foyer
- Executive session hall
- Mezzanine floor
- Banquet Hall/Kitchen

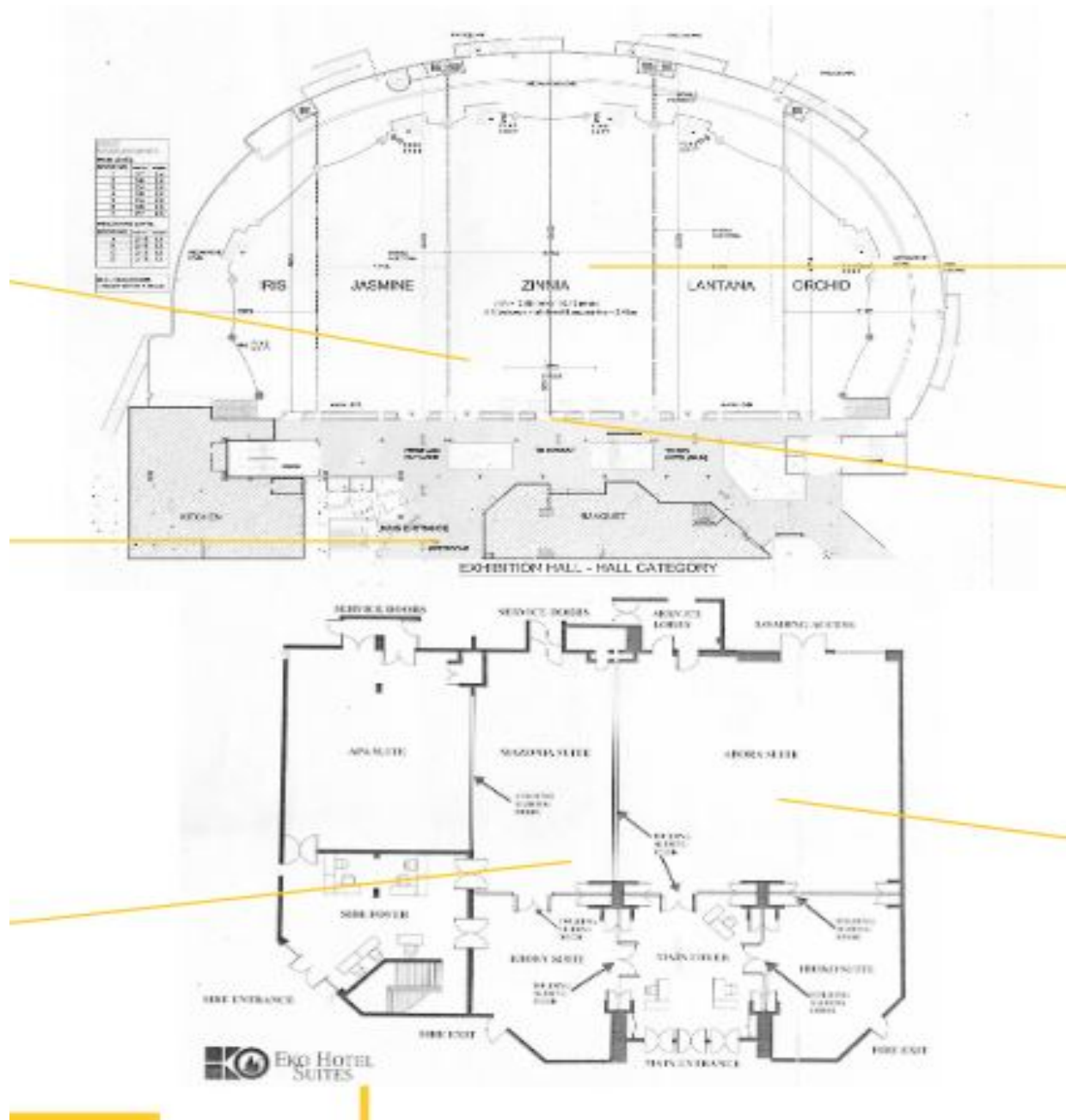


Fig 4: Floor plan of Eko Convention Centre (Source: Ekohotels.com)

Flexible design features of Eko Convention Centre

- The centre provides for a large number of people and the halls and seminar rooms provide for smaller meetings and gatherings of people.
- The centre provides ample parking lots for the users of the facility.
- There 'is easy access and circulation to the different spaces provided for in the building.
- The centre is housed in the Eko hotel and suites, which makes it possible for accommodation of individuals, using the facility.
- The provision of a good number of exits allows for easy escape in cases of danger.

- The centre has a good network of roads connecting the car park and the convention centre.
- There is provision of support facilities such as shops and business centres.

3.2: Durban International Convention Centre

The first of its kind in South Africa, it is located within the central business district (CBD) area of Durban's city centre. The Shaka International Airport is a 30-minute drive away, while there are over 3000 Hotel rooms within a 10-minute walk. It is part of a complex containing a convention centre, exhibition centre, a hotel and an arena. The Convention Centre consists of a main hall that can be divided into 22 individual halls, an auditorium with a capacity of over 1500 guests and an outdoor event space for parties and wedding events. It includes 21,820 Sqm of exhibition space, 1,605 Sqm of meeting spaces and parking for 1,340 vehicles. The building was extended in 2006 when a multi-use arena was added to the south of the building.



Fig 5: Durban International Convention Center, Source: (SVA International (Pty) Ltd, 2017)

Flexibility of Design

The Durban International Convention Centre can accommodate a wide variety of activities. These include international conventions, exhibitions, sporting events, and special occasions. Flexibility and Versatility are key factors in this design. Clients can choose from an almost unlimited number of standard floor plans with different seating arrangements and capacities for different venues. The spaces are all multi-purpose spaces that could easily be configured to fit any event. The main convention area, for example, with an area of 11,600sq.m can either be a very big venue for a mega convention or can be subdivided into 22 different convention halls using operable walls. Also, Hall 1 can either be a mega auditorium with 1,680 delegates or can be configured for a tribunal meeting with the seating raked to the ceiling with floor area of

1,448sq.m. These spaces can be used for conferences and meetings or for exhibitions and banquets. The entire venue can either be used for a plenary session of 12,000 delegates or a banquet of about 5,000 guests. This facility also has loading docks on the same level as the convention halls that allows for easy erecting and pull down of exhibition stands. The flexibility of this design is also seen in the Convention Arena that can either be booked as a meeting hall or as an indoor entertainment and sporting arena. This arena can accommodate between 3,000 and 10,000 fans for a concert and can perfectly carry out live broadcast and house lighting for movie filming.

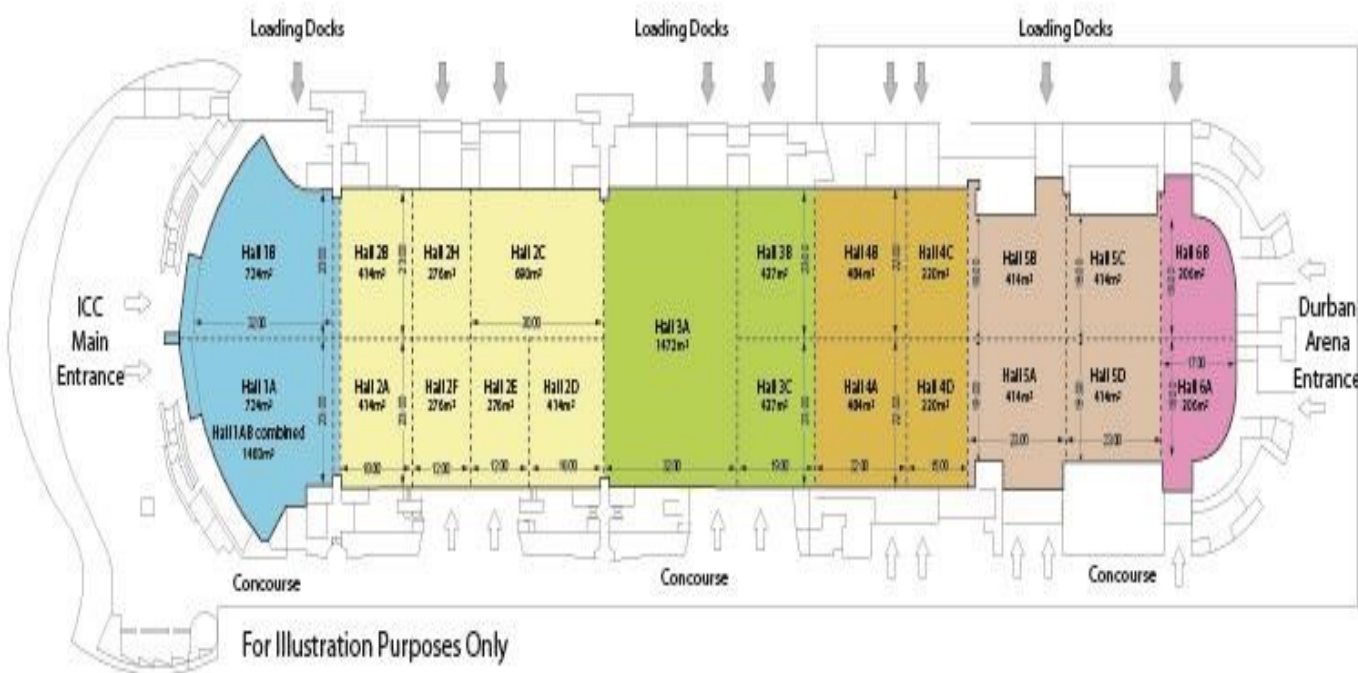


Figure 6: Possible Convention Hall Combinations, Source: (Durban ICC, 2017)

In addition to these meeting halls, The Durban ICC has four meeting rooms for smaller meetings or conferences that could also serve as breakaway rooms for larger events, and three executive conference suites that can serve as private board rooms or VIP rooms on the upper floor, overlooking the convention halls. The meeting rooms also offer the flexibility of the main halls and can be configured into venues ranging from 45 Sq.m. to 370 Sq.m. Both meeting rooms on the ground floor open to adjacent outdoor courtyards.

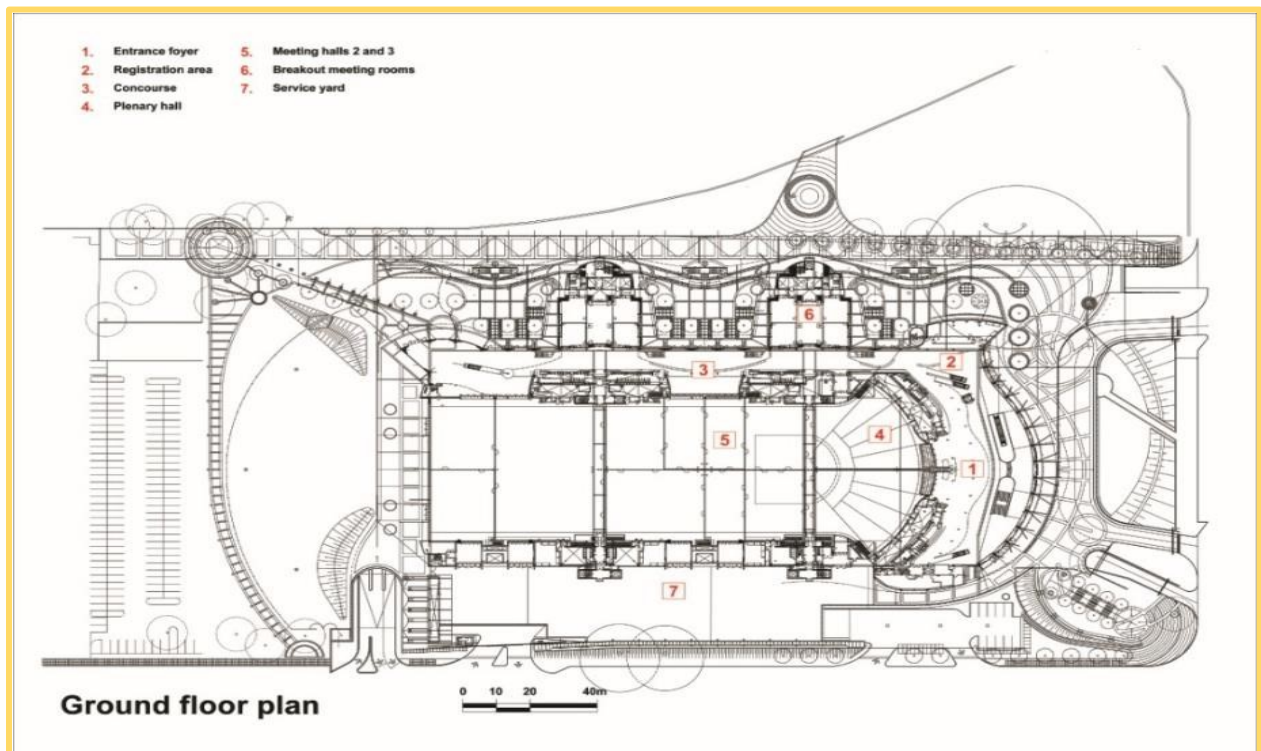


Figure 6: Ground Floor Plan of the DICC, Source: (SVA International (Pty) Ltd, 2017)

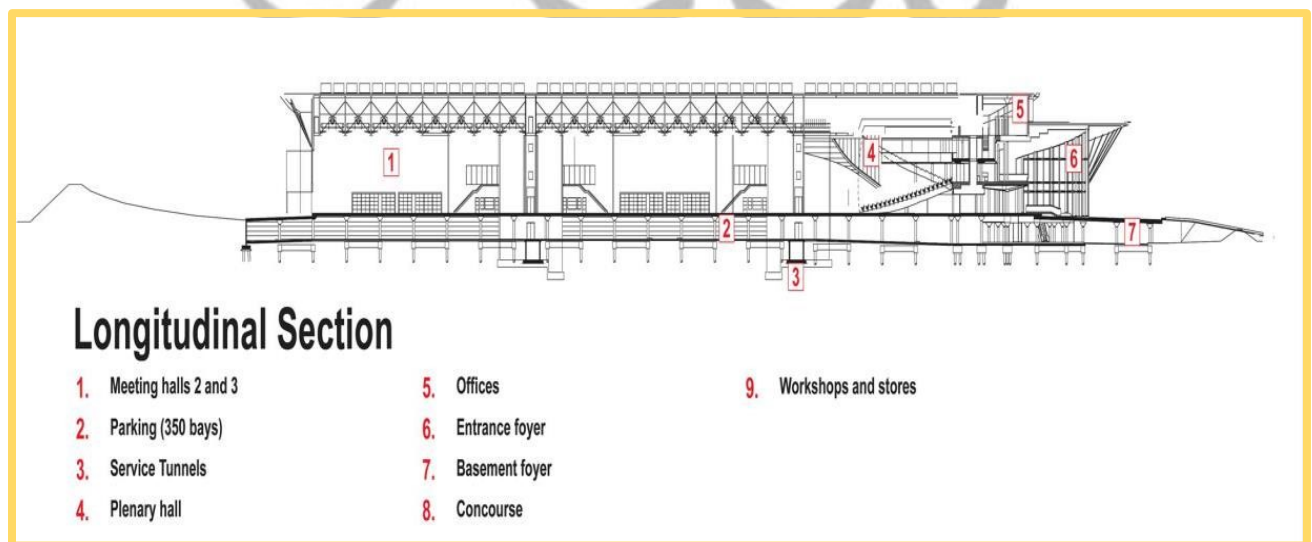


Figure 7: Longitudinal Section through the DICC, Source: (SVA International (Pty) Ltd, 2017)

4. Results and discussion

4.1 Assessment of Design features for flexibility

As shown in Table 1, the use of large open spaces resulted in 100 percent of the population studied having adaptability as their flexible design approach. However, 40 percent of the

population is mobile, as evidenced by the usage of temporary structures for convention centres, which may be disassembled and reassembled at a different place. Transformability as a flexible design approach was not found in any of the study population. Their shape, space, and look remained unchanged; essential design elements such as roofs, floors, and walls were not adaptable.



Fig 6: Ground Floor of Proposed Convention Center featuring flexible retractable seating arrangements: Source: Authors work

5. Conclusion

The study shows that convention centres are facilities that bring together many types of people and should be flexible enough to meet the demands of diverse users. The study found that most convention centres in lack flexible design characteristics that allow them to build or alter space to meet changing needs. The convention centres evaluated featured only main one hall for events, with few adaptable design elements such as moveable partitions, retractable roofs, or seats to make the single hall versatile. Despite the fact that all convention centres analyzed had an open space design that allows for flexibility, 80 percent of convention centres in Nigeria and other African countries lacked adaptable design characteristics. The 20% that offered few of these elements employed materials that only partially achieved this goal, rendering the spaces useless. The majority of these flexible venues used racked concrete platforms for level change and fixed seating, rendering the space impossible to adapt to changing event activity. The study of related literatures yielded answers to the flexibility of design aspects.

Recommendations

Designers of convention centres must recognize that convention spaces are multifunctional spaces, therefore elements like moveable walls, retractable roofs, and seating should be included in event centre designs to produce an effective adaptable design. Because convention centres draw an unexpected crowd, space flexibility should be addressed at all times, as should a flexible design strategy that allows the facility to adjust to meet the demands of the users.

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