



Exploring the Identity of Modern Chadian Architecture Amidst Evolving Living Environments and the Promotion of Sustainable Development, Focusing on the Example of N'Djamena

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Abstract

An architectural tour of our rural areas around the world showcases unique expressions of cultural identity through our buildings, spatial layouts, and decorations, often overshadowed in urban environments; Chad is no exception. Authors present their strategies for promoting local identities. In Chad, the architect-urban planner Senoussi Ahmat Senoussi oversees the women of Gaoui as they enhance their techniques in earthen decoration. Also, the architect ROGER Boriata studied the variation of traditional buildings. However, no study through for the development of theories, doctrines and the innovation of styles for the identity of contemporary Chadian architecture. Investigations have been made. This article studies the identity of contemporary Chadian architecture in front of changes in buildings and sustainable development: the illustration of N'Djamena. The modern architectural style is one that has a colonial form and uses only sheet metal for the roof and cement for the walls and floor. Moreover, the modern style is a combination of colonial and traditional architecture. The wall can be made of earth and the roof of sheet metal. Our study shows a variety of architecture and influence of individual housing: the very important proportion of houses called other style or without style is estimated (40% - 50%). A disappearance of traditional architectural identity in administrative, cultural and commercial center is noticed. The architectural styles of the N'Djamena administrations are of the colonial kind (40%). The commercial equipment are mostly in the Arab-Moorish style (40%). 20% of the buildings are a mixture

of Chadian styles. This study amounts to the matrix of documentation of the traditional Chadian habitat with a view to its theorization for the identical contemporary urban Chadian architecture considering societal biodiversity.

Subject Areas

Architecture

Keywords

Identity, Contemporary Chadian Architecture, Sustainable Development, Societal Biodiversity

1. Introduction

Climate change, with its impact on the biosphere, is prompting reflection across all disciplines. It is a question of minimizing the impact of our actions on our planet, and turning to sustainable development: the balance between society, the environment and the economy [1]. In architecture, for example, we express about sustainable architecture and integrated design. Sustainable architecture is an architecture that balances societal cultures through compositional styles, the environment through the optimization of energy consumption in structures, the use of sustainable materials and the saving of resources for future generations [2].

This situation in architecture has led authors [1]-[3] to reflect on modern architecture, which is far from achieving the objectives of sustainable architecture. The use of traditional architecture is undeniable and unavoidable [3]. Reactions against modern architecture created a post-modernist spirit, leading to the rediscovery of construction and ornament as instruments of a new architectural composition that refers to both older (historical) and more recent (modern) traditions [4]. Several architects have spoken out on the subject, claiming to be architects who combine culture, modernity and tradition [5]. Indeed, modern architect Kenzo Tange [6] uses traditional Japanese materials, lexicons and relationships in his contemporary work. In his work, Kenzo Tange is profoundly Japanese.

This characteristic has largely contributed to its international reputation, and is thought of as regionalism over the rest of the world. One of the most important contradictions in the world is the opposition between regionalism and internationalism. Kenzo Tange overcomes this problem by addressing both the past and the future [6]. Tange's architecture is very old (rooted in Japan's age-old tradition) and is very new (constantly innovating with technology and international aesthetic concepts). For his part, Egyptian architect Hassan Fathy [7] published a book about his experience as an architect and urban planner in Upper Egypt, where he built the village of Gournah, near Luxor, in the 1940s. He thus contributed to the rehabilitation of the value of tradition. An architectural stroll through the rural regions of the world brings to light the singular expressions of cultural identity [4] [5] [7] through our buildings, our spatial arrangements and our dec-

orations, which find it hard to impose themselves in urban areas, Chad being no exception. A number of authors have put forward their approach to valorizing local identities [8]. In Chad, architect/urbanite Senoussi Ahmat Senoussi is helping the women of Gaoui to improve their earthen decoration techniques. Architect ROGER Boriata has also carried out some work to enhance traditional habitats. However, no studies have been carried out to elaborate theories, doctrines and the creation of a style for the identity of contemporary Chadian architecture [9] [10].

Chad, the cradle of humanity with its wonders and history, is being stripped of its soul, its constructive culture. Authentic Chadian traditional architecture [7]-[10] is undergoing metamorphosis, not to say disappearance, as the population looks on helplessly. Buildings of N'Djamena are perfect illustrations of this sad reality of the deprivation of the identity of Chadian architecture [11].

2. Materials and Methods

2.1. Methodology

This concern:

- An assessment of architectural frameworks;
- Specifying architectural styles;
- Understanding the built environment, lifestyles, and comparing types of housing;
- Gathering opinions from professionals;
- Proposing solutions for contemporary urban architectural identity in Africa, particularly in Chad.

2.2. Typology of Habitat in N'Djamena

2.2.1. Traditional Case

When one travels through the plains of Chad, one quickly realizes that, for identical geographical conditions, housing present's varieties and this diversity cannot be explained by differences in needs. The idea of style eventually took hold. If, moreover, one has the opportunity to visit the banks of the Lower Logone, one is obliged to see there one of those regions, which throughout the world, constitute architectural centers, bringing this expression back to the measure imposed on it by the country.

The way of life that people follow naturally leads to a distinction between nomads, semi-nomads, and sedentary people. This classification must be maintained in the study of habitat.

➤ Nomads styles

Habitat seems to be beyond their concerns. Constantly moving in search of pastures for their livestock, they rarely stay in the same place for several days. To protect themselves from the burning sun, they simply make do with the sparse foliage of the trees or niches built in the thickets (**Figure 1**). When the rains come, they head north and thus avoid the severe weather. Over time, however, some

begin to settle and some have even founded small villages in the southern regions.



Figure 1. Nomads style: a) Bororo styles; b) Arab styles.

➤Semi-nomads style

They are located on the edge of the Sahelian steppe or in savannah areas transformed into steppe. Their lifestyle requires them to have both permanent and temporary housing. The temporary dwelling is only used during transhumance, that is, during the dry season. It is a simple shelter, but despite its precariousness, its construction obeys certain laws, and three types are recognized:

- The light tent made of mats or skins, a remnant of nomadism; it is sometimes reduced to a single mat, where a squatting man has difficulty finding shade;
- A small round hut made from thin sticks covered with straw;
- An ovoid hut with a frame made from sticks or millet stalks and covered with straw.

It is a more evolved model than the two previous ones and better adapted to its purpose; it allows, in fact, by juxtaposing the huts one after the other, to describe a vast circumference inside which the animals are penned during the night.

➤Sedentary styles

It is among the sedentary populations that we find the greatest variety of architectural types. Despite the presence of rocks in several parts of the territory, stone is only used in a very exceptional way as a building material; only a few rare natives of the subdivisions of Melfi and Mongo build walls using rubble bound with clay.

The roof, made up of several large seccos placed one on top of the other, is supported by a central mast and stakes placed around the perimeter; the wall is made of woven straw. This hut gives the impression of a tastefully directed constructive effort; it can last from 5 to 6 years.

Traditional styles are generally environmentally friendly and provide ecological well-being. However, they are less sustainable due to the materials used, such as straw for the roof and earth for the walls, which are weak against water.

2.2.2. Administrative Equipment

The contemporary administrative buildings in N'Djamena are generally the result of foreign design (**Figure 2**). The prevailing style is that of Western modernism, reflecting the level of architectural uprooting in N'Djamena, and the choices made by the state, which in practice do not prioritise the promotion of Chadian archi-

tectural identity [12] [13]. The materials used include cement, iron, glass, etc. The dominant colours of the buildings are beige and cream yellow; the buildings are often on average six storeys high with elongated windows; the façades are generally symmetrical [14]-[16]. Contemporary buildings are thus far from being integrated into the Chadian context and environment [17].



Figure 2. National social security fund of N'Djamena.

2.2.3. Cultural Equipment



Figure 3. National museum.



Figure 4. National Library (on the right) and House of Culture (on the left) source: personal.

The contemporary cultural facilities in N'Djamena are generally the result of foreign design (**Figures 3-4**). The prevailing style is that of Western modernism,

reflecting the level of architectural uprooting in N'Djamena, and the choices made by the State, which, in practice, do not prioritise the promotion of Chadian architectural identity [1] [18]-[21]. The materials used include cement, iron, glass, etc. The dominant colours of the buildings are beige and cream yellow; the buildings are often around six storeys high with elongated windows; the façades are generally symmetrical [22]-[24].

Contemporary buildings are thus far from integrating into the context of the Chadian environment.

2.2.4. Commercial Equipment

The contemporary administrative buildings in N'Djamena are generally the result of foreign design (Figure 5). The prevailing style is that of Western modernism, reflecting the level of architectural dislocation in N'Djamena, and the choices made by the State, which, in practice, do not prioritise the promotion of Chadian architectural identity [25] [26]. The materials used include cement, iron, glass, etc. The dominant colours of the buildings are beige and cream yellow; the buildings are typically around six storeys high with elongated windows; the facades are generally symmetrical [27]-[30]. Contemporary buildings are thus far from being integrated into the Chadian context and environment.



Figure 5. Toumaï Hotel (on the left) and Banks (on the left) Source: personal.

2.2.5. Housing



Figure 6. Housing made of raw earth and sustainable materials. Source: personal.

Individual Housings in Ndjamen have a high proportion of houses without a specific style (Figure 6). The materials used include earth, cement, iron and glass

[31]. The dominant colours of the buildings are ochre, beige, and cream yellow; the houses are often single-storey or two-storey on average, with irregular and unbalanced asymmetry of the façades in general [31]-[33].

2.2.6. Modern Buildings

Contemporary administrative facilities in N'Djamena are generally of foreign design. The style in vogue is that of Western modernism, reflecting N'Djamena's level of architectural rootlessness and the choices made by the State (Figure 7), which in fact does not make the promotion of Chadian architectural identity a priority [34]-[36]. The materials used are cement, iron and glass. The dominant building colours are beige and creamed yellow; buildings are often on average six storeys high, with long windows; facades are generally symmetrical. N'Djamena's contemporary buildings are thus far removed from the Chadian context and environment [37].



Figure 7. Modern architecture. Source: personal.

2.3. Architectural Changes in N'Djamena

✓Cause of change

✓Socio-cultural appropriation of espace

N'Djamena is a multicultural city, with a mix of natives and foreigners. The social standard of living is reflected in the inhabited areas: the rich live in the city center, the middle class in the suburbs and the poor in the shantytowns. Spatial organization is thus influenced by cultural and religious attitudes [38] [39]. Northern neighbourhoods are predominantly Muslim and northern. The South-West is predominantly Southern and Christian in origin; the West is mixed, with strong spatial segregation; the East has a mixed situation; largely the Northern middle class populate the Northeast; and the Southeast is mixed, with a majority of Southerners. These different social strata and cultural groupings have different tastes in architectural styles: Arab-Moorish, colonial, modern, traditional or vernacular, mixed [38]-[41].



Influence of Arabo-Moorish architecture

The architecture of northern districts is influenced by the Arab-Moorish style [42]-[44] and is characterised by:

- ✓Massive use of simple and complex columns (orders);
- ✓Use of simple and complex arcades;

- ✓Spatial segregation;
- ✓Use of terraces for commercial buildings.

Influence of colonial architecture

The city centre districts, which are mainly made up of administrative buildings, are still influenced by the legacy of colonial-style architecture [42] [44]:

- ✓Use of solid walls;
- ✓Use of stone;
- ✓Use of simple arcades;
- ✓Use of linear forms;
- ✓Use of sheet metal roofs;
- ✓Use of earth floors.

Influence of modern architecture

As well as being a prisoner of colonialism, the city centre has seen a strong emergence of modern architecture [44]:

- ✓Massive use of conventional materials;
- ✓Use of cubic shapes;
- ✓Use of symmetrical fronts;
- ✓Use of aluminium windows and doors.

It should be noted that colonial housing styles are made of sheet metal and cement, both of which are more durable than straw and earth. However, they are good heat conductors. Therefore, they are not suitable for the Sahelian context, which is hot almost all year round. Furthermore, cement releases greenhouse gases, and is therefore not environmentally friendly.

3. Results and Discussion

3.1. Identification of Habitat Styles in N'Djamena

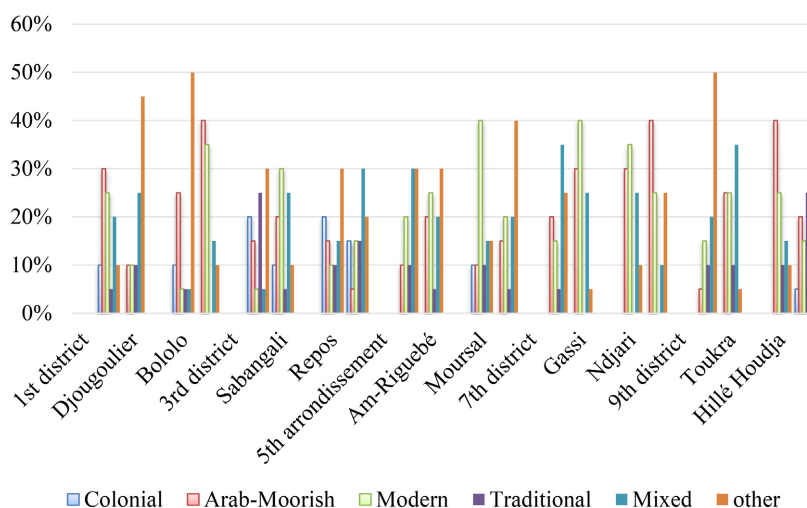


Figure 8. Diagram of typological studies of individual housing in N'djamena.

According to our surveys, we found the following in our study area (Figure 8) [45] [46]:

✓ A high proportion of houses in the Other or no style (40% - 50%): Bololo, Paris-congo, Walia and Djougoulier;

✓ Colonial style (10% - 20%) in the old districts: Farcha, Bololo, Gardolé Sabangali, Blabine, Repos, Moursal, Farcha, Goudji, Gassi, Ndjari, Diguel, Hillé Houdja;

✓ Modern Style (30% - 40%) in the new districts: Goudji Sabangali Moursal Gassi Ndjari;

✓ Traditional Style (15% - 25%) in the old districts: Gardolé, Gaoui and Blabine;

✓ Mixed style (25% - 35%) in the old and new districts: Toukra, Ndjari, Gassi, Dembé, Ridina, Blabine, Dembé Sabangali and Djougoulier.

These results (**Figure 8**) confirm that “natural resources, climate, vegetation, soils, economy and population density are just some of the many external influences that affect building design”. In other words, the poor have no choice in the style of their building, but it is a reflection of their lives [38] [42] [45]-[47].

3.2. Identifying Administrative Styles

The architectural styles of the administrations (**Figure 9**) in N'Djamena are colonial heritages (40%) with an immersion of modern style (30%) and a rejection of the traditional (0%).

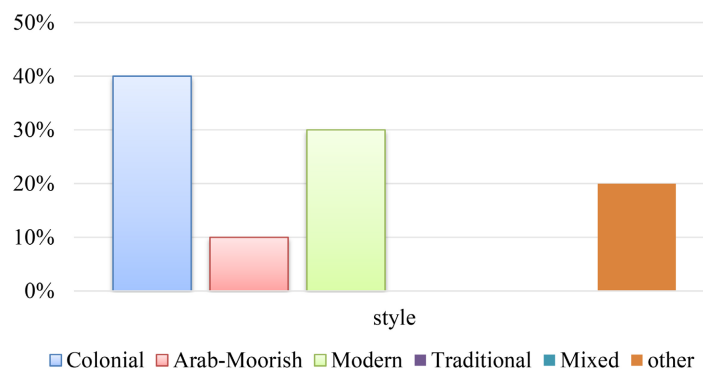


Figure 9. Diagram of typological studies of administrative style in N'Djamena.

The results show evidence of the devaluation of traditional architecture in public service facilities, with buildings in either colonial or modern style [48] [49].

However, the latter constitute a secondary heritage that should be protected.

“This paradoxical observation is part of a current political climate in which the issue of stereotypes is at the heart of debate. The ‘Other’ is now an active player in the deconstruction of stereotypes, marking a major break with previous generations. Stereotypes raise questions about living together, intercultural issues and the notion of ‘diversity’ in our mixed-race, globalised societies at a time of rising populism and rejection of immigration. These questions are intimately political, because stereotypes are also a weapon for those who wield power, who define themselves as the ‘norm’, who create or maintain clichés”.

¹Stereotypes and colonial legacies: historical, museographic and political issues|Cairn.info.

3.3. Identification of Shops Styles

The majority of commercial equipment (**Figure 10**) are in colonial style (40%), with some in modern style (40%).

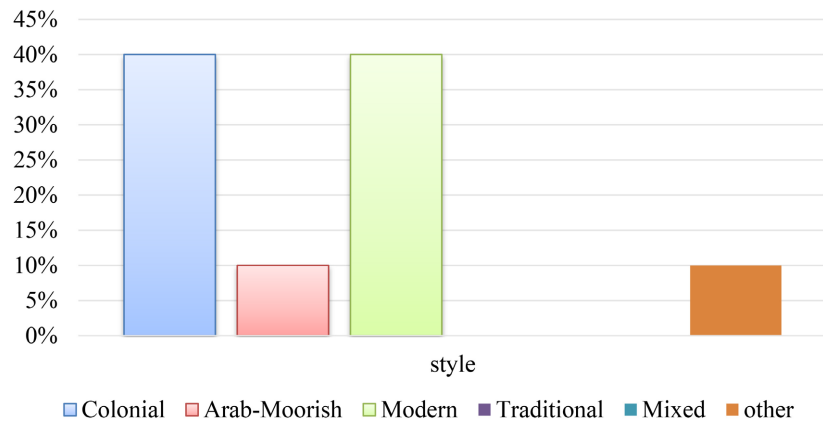


Figure 10. Diagram: typological studies of commercial facilities in N'Djamena.

The results show the dominance of colonial (40%) and modern (40%) styles in commercial buildings to the detriment of traditional styles since the time of colonisation and the years of independence of African countries [48] [49].

We owe this reality to the example of Kenzo Tange, who believed that “the Japanese people were looking for a freedom of expression that would symbolise a new post-war Japanese society free from the technocratic regimes of the past. Kenzo Tange’s work marked a re-established awareness of Japanese architectural traditions expressed through a contemporary interpretation’ that the African people are thirsting for their own expression of architectural identity”.

3.4. Identification of the Styles of Cultural Equipment

The majority of cultural equipment (**Figure 11**) in N'Djamena have no traditional style (0%) and the fashionable style is modernism (50%).

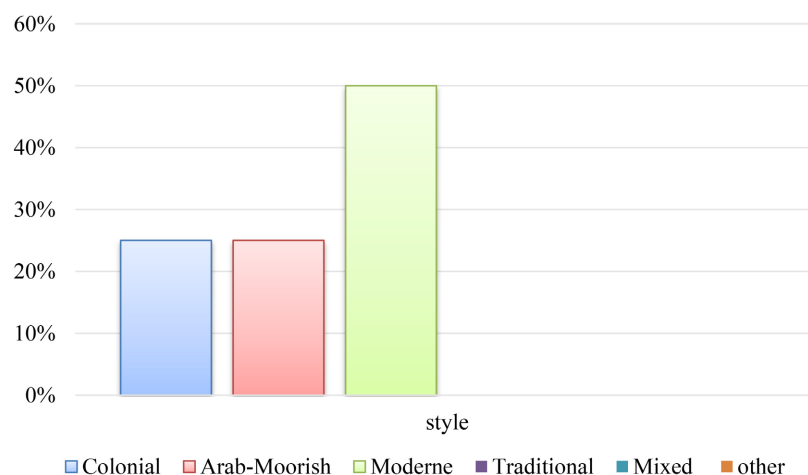


Figure 11. Diagram of typological studies of cultural equipment in N'Djamena.

As Ahmat Dallah says, “N’Djaména seems to be throwing away its past. It is putting on a new skin, not hesitating to erase anything that might stain the city centre, sacrificing places, monuments and even entire districts, replacing them with new architecture and public spaces” [6]. The traditional seems to be fading away to make way for modernity and the conservation of colonial and Arab-Moorish architecture.

This advance of “Western” modernity poses quite a few anthropological problems for our society, as Tania Doumbe Fines says: “The use of Western designs and materials has proved inappropriate for African urban environments. European modernism is inherently anti-local. It is contradictory to draw inspiration from it when it was used to colonise Africa in the first place. One example of this dichotomy is the Kenyatta International Conference Centre (Nairobi, Kenya). Designed by Norwegian architect Karl Henrik Nøstvik, this 32-storey glass skyscraper, the tallest structure in East Africa until the 1990s, is not built to withstand the equatorial sun⁶. Heat islands are created, resulting in spaces that are dependent on air conditioning” [38] [42]-[46] [48] [49].

3.5. Anthropology of Housing Space [8]

✓-Socio-cultural representations of space

Table 1 shows that the socio-cultural representations of the different groups are clearly similar.

Table 1. Socio-cultural representations of space.

	Nordist Group	Southern Group
Housing	Rest period	Rest period
Natural	Power supply	Food and belief
Cemetery	sacred	sacred

✓Symbolic dimension

Table 2 shows that the inhabitants of N’Djaména attach great importance to spirituality in their daily lives. Churches and mosques are sacred spaces that are an integral part of the lives of different social groups [48].

Table 2. Symbolic dimension.

	Nordist Group	Southern Group
Sacred Space	Mosque, Church	Mosque, Church
Secular space	Sports ground	Festival ground

3.6. Architecture and Sustainable Development [48]

Taking into account only the opinions of architects on the question of which architectural style best responds to the concept of sustainable development, traditional architecture (**Figure 12**) and mixed use appear to be the most appropriate.

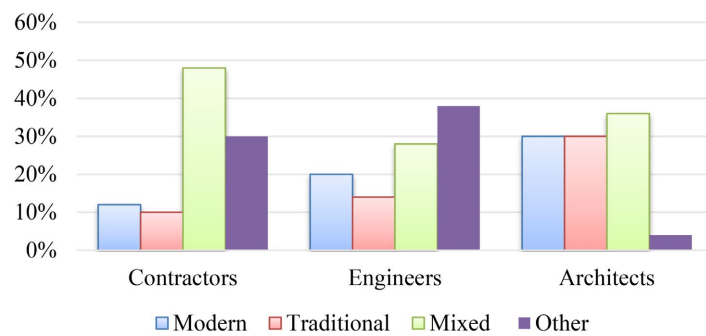


Figure 12. Diagram Professional opinion on architecture and sustainable development.

The traditional habitat must forever be the basis of our building projects: “In Africa, huts are still built today from cob, a simple, durable structure made from clay and straw, which not only provides passive cooling, but is also quick to build, cheap and recyclable. The same is true of the traditional reed house of the Maadan (Marsh Arabs) in the marshes of southern Iraq, whose original design and structure also provide protection and better air circulation” [49].

4. Conclusions

The aim was to study the identity of contemporary Chadian architecture in the face of changes in habitats and sustainable development: the case of N’Djamena. This study is necessary and constitutes the documentation matrix of the traditional Chadian Habitat with a view to its theorisation for the identical contemporary Chadian urban architecture taking into account societal biodiversity.

Our study shows a variety of architecture and influences on individual housing in N’Djamena: A high proportion of houses in the Other or no style (Bololo, Paris-Congo, Walia and Djougoulier); A low rate of Colonial Style in the old districts (Farcha Bololo Repos Gardolé Sabangali Blabine et Repos; Moursal Arabo-Moorish Farcha Goudji Gassi Ndjari Diguel Hillé Houdja); Emergence of the Modern Style in the new districts (Goudji Sabangali Moursal Gassi Ndjari); Resilience of the Traditional Style in the old districts (Gardolé, Gaoui and Blabine); Appearance of the Mixed Style in the old and new districts (Toukra, Ndjari, Gassi, Dembé, Ridina, Blabine, Dembé Sabangali and Djougoulier).

Thus, through our research we have been able to confirm the trend towards the retreat of manifestations of traditional architectural identity in urban areas: a rejection of the traditional in administrative, commercial and cultural facilities. In fact, the architectural styles of the administrative buildings in N’Djamena are colonial legacies with an immersion of modern style; the majority of commercial facilities are in Arab-Moorish style and some in colonial style; the majority of cultural facilities in N’Djamena have no traditional style and the fashionable style is modernism. Taking into account only the opinions of architects on the question of which architectural style best responds to the concept of sustainable development, traditional and mixed architecture appear to be the most appropriate.

As a result, traditional and mixed architectures appear to be the most appropri-

ate for creating an identity for contemporary African urban architecture, particularly in Chad. There is therefore an urgent need to document and theorise them.

Conflicts of Interest

The authors declare no conflicts of interest.

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