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Impacts of dynamics in Architecture in Bamenda, Northwest Region, Cameroon

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Abstract: This paper presents the impacts of dynamics in architecture in Bamenda, Northwest Region, Cameroon. Before Bamenda was a peasant society, houses were constructed with local building materials. With the arrival of the colonial masters, these buildings changed. This study aims to investigate the setbacks resulting from architectural dynamics in Bamenda from the pre-colonial era to the present day. In this paper, we employed a qualitative method to collect data. This method was employed through techniques such as direct observation, in-depth interviews, Focus Group Discussions (FGDs), and photography. The data was interpreted using theories, including the dynamics of anthropology, take-off, and Modernization theories. Our findings are presented in five main themes that describe the impacts that have taken place in Bamenda due to the transition in architecture. Our findings reveal that the dynamics in architecture have brought the following impacts (social, economic, cultural, and environmental impacts). Numerous schools, roads, markets, health facilities, and travel agencies have been established in Bamenda, enhancing mobility and social cohesion. Landlords have constructed houses and are earning income from them through rent. The culture of the Bamenda people is rapidly disappearing as the ritual site is transformed into a waste disposal area. The felling of trees for construction has also resulted in flooding and landslides. Consequently, the dynamics in architecture in Bamenda have resulted in both negative and positive impacts. Another area of research could be conducted on measures to overcome the impacts of dynamics in architecture in the Bamenda Northwest Region, Cameroon.

Keywords: Impacts, dynamics, architecture, Bamenda

1. Introduction

In the Northwest Region of Cameroon, traditional architecture has historically been characterized by its static nature, employing durably locally sourced material and established typology that respond to specific climatic conditions and cultural practices [1, 2]. This vernacular form, while robust and culturally significant, witnessed a change from the arrival of the colonial masters in Cameroon. Therefore, architecture has increasingly embraced the concept of dynamic architecture. A paradigm that moved from beyond static form to incorporate flexibility, adaptability, and responsiveness into building design and construction [2, 3]. This dynamic has had a profound impact on Bamenda in numerous ways. The expansion of human populations away from city centers into low-density, mono-functional, and typically car-dependent communities is a process that has been occurring in most towns worldwide. In recent years, it has been remarkably rapid. Land use dynamics and variations in sprawl are interwoven phenomena that are inevitable if humanity continues to inhabit the Earth's surface [4]. Living in sprawl means driving to work, driving to get dinner, and driving to meet friends. It means congestion, as its inhabitants travel ludicrous distances for work or basic services, and isolation due to the lack of the benefit of compact city life. Sprawl consumes vast areas in highly inefficient ways, destroying arable land and creating monocultures. Furthermore, a sprawling metropolis generates vastly greater amounts of pollution and CO2 than a more compact one. Urban sprawl is a multifaceted concept that directly affects traffic congestion,

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high oil consumption, and many other transportation issues [4, 5]. This study will focus on the impact of architectural dynamics in Bamenda, Northwest Region.

2. Socio-Economic and Environmental Impact of Architecture: Literature

The British Urban Regeneration Association (BURA) reviewed best practices in urban regeneration. It concluded that historic buildings can act as focal points around which communities rally, thereby reviving their sense of civic pride. It further emphasized that care should be taken not to demolish old buildings before their full potential is realized. The restoration of the early nineteenth-century St. John's Church in the London Borough of Hackney, UK, is a good example of how restoring a local landmark can inspire the regeneration of an area. Cooper (1982) found a negative correlation between the appearance of a house and feelings of inferiority. These findings were drawn from an analysis of 100 post-occupancy evaluation studies examining resident reactions to multi-family housing design across the English-speaking world. The study revealed that residents valued the attractiveness of their homes and surrounding environments. Well-designed site layouts and landscaping contributed to this attractiveness, including varied and interesting views from windows, provision of private open spaces, a degree of aesthetic complexity, and uniqueness in the scheme's subunits, as cited by [5].

The Popular Housing Forum (1998) conducted 819 interviews with members of the public, divided between potential new-build buyers and other respondents. The study found that newly built homes were generally perceived negatively and were often associated with the lower end of the housing market. There was a strong preference for traditional housing that aligns with the character of the surrounding neighborhood. However, respondents considered the appearance and safety of the neighborhood to be more important than the individual dwelling itself, as cited by [5].

Cozens et al. (2025) found that visible signs of decay increased criminogenic activity and reduced defensibility, highlighting the importance of maintaining properties and their surrounding environments correctly. The study also found that different dwelling types were perceived as having varying levels of vulnerability to crime. Terraced housing was identified as the most defensible form of high-density development, while high-rise flats were considered the most susceptible to crime, as cited by [6].

According to Kim and Rigdon (1998), the three principles of sustainable design—economy of resources, life-cycle design, and humane design—provide a broad framework for understanding the environmental issues associated with architecture. Building and window designs that utilize natural light have been shown to enhance occupants' psychological well-being and productivity. However, stripped wooden flooring can amplify everyday household noise and may lead to dissatisfaction, as sound often travels between neighboring homes rather than from street-level sources (Edge et al., 2003). The concept of roof gardens has been particularly successful in Germany. German architect Rudolf Doernach proposed more radical ideas, suggesting that plants should be incorporated into building façades as an active building material capable of self-reproduction. Several of his designs, including a chapel in Bonn, Germany, demonstrate this approach (Johnston & Newton, 2004), as cited by [7].

Vanson and Bourne (2005) found that the aesthetic quality of the workplace can create an environment that is both inspiring and stimulating. This is achieved by combining familiar and unfamiliar elements, natural and high-tech features, tactile surfaces, mood-enhancing lighting and sound, as well as both standard and unconventional furnishings. Such environments contribute to a fun workplace atmosphere, generating energy and enthusiasm (Gensler, 2005). The Vanson Bourne case study was based on 200 reviews from middle and senior managers in the UK, randomly selected from the legal, media, and financial services sectors, as cited in [8].

Macmillan (2003) argued that the buildability of a building can be significantly improved by adopting a "loose-fit" approach. This approach seeks to strike a balance between building materials and services, aiming to achieve ease of installation, faster construction, simplified maintenance, and greater flexibility for future adaptations. It may also shorten the construction period, thereby reducing accumulated interest costs incurred during this phase. On large projects, such costs can account for approximately 25–30 percent of the overall construction cost, as cited by [9].

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Research by Vanson and Bourne (2005) also demonstrated that workplace design can stimulate creativity, attract and retain talented employees, and improve organizational agility (Gensler, 2005). However, other studies indicate that a careful balance must be achieved in spatial organization. The key challenge lies in balancing communication and concentration while addressing the needs of both organizations and individuals, as cited by [10].

Vandell and Lane (1989) examined over 100 office buildings and identified a positive correlation between design quality and market rents. They also made preliminary attempts to establish a grading system for design dividends that could be measured, to a limited extent, in financial terms. In 2003, the Commission for Architecture and the Built Environment (CABE) published a step-by-step manual outlining the client's role across four procurement stages: preparation, design, construction, and use. The Lewisham Children's and Young People's Centre in London, UK, serves as a case study demonstrating how a design competition can result in a high-quality building. The designs incorporated generous amounts of natural light and ventilation to enhance energy efficiency while providing a comfortable and therapeutic environment. This approach improved the building's external appearance, enhanced internal wayfinding, and offered outward views, as cited by [11].

3. Methodology

Anthropologists have developed methodologies for gathering data, testing hypotheses, and formulating theories to understand human diversity. These methodologies are applied within naturally occurring human societies and cultures [12]. Data for this article were collected from both primary and secondary sources. Qualitative research methods were employed to gain in-depth insights into the cultural, social, economic, and environmental contexts that shape and influence architectural dynamics in Bamenda.

In addition, an interview schedule was prepared, and locations for the interview exercises were identified. These venues were selected based on the convenience of the informants. Informants were pre-informed about the purpose of the research, and their voluntary participation was solicited. In some cases, informants were interviewed on the spot without prior notification. Interviews were conducted in various settings, including homes, offices, health centers, palaces, and other locations, depending on the preferences of the informants. The informed consent form, ethical clearance, and research authorization were read and presented to all informants. Upon agreeing to participate in the study, informants signed the informed consent form before the interviews commenced.

To ensure the credibility of the study, extensive fieldwork was conducted. Primary data were collected from 94 participants using a snowball sampling technique. These participants included notable individuals, administrative authorities, businesspeople, engineers, technicians, teachers, and other relevant stakeholders. Data was obtained through in-depth interviews. Focus Group Discussions (FGDs) were also organized to capture diverse perspectives on the impacts of architectural dynamics in Bamenda. These discussions involved administrative and traditional authorities, engineers, property owners, technicians, and participants from diverse professional backgrounds.

A digital camera was used to document architectural features in Bamenda. The photographs taken enhanced the credibility and reliability of the field data. Several research tools facilitated data collection for this study, including interview guides, FGD guides, and observation guides. Additionally, a comprehensive literature review was conducted to gather relevant historical information on the dynamics of architecture. Data analysis was conducted immediately after the completion of fieldwork, utilizing content analysis, while photographs were interpreted through an iconographic approach.

4. Presentation of Research Area

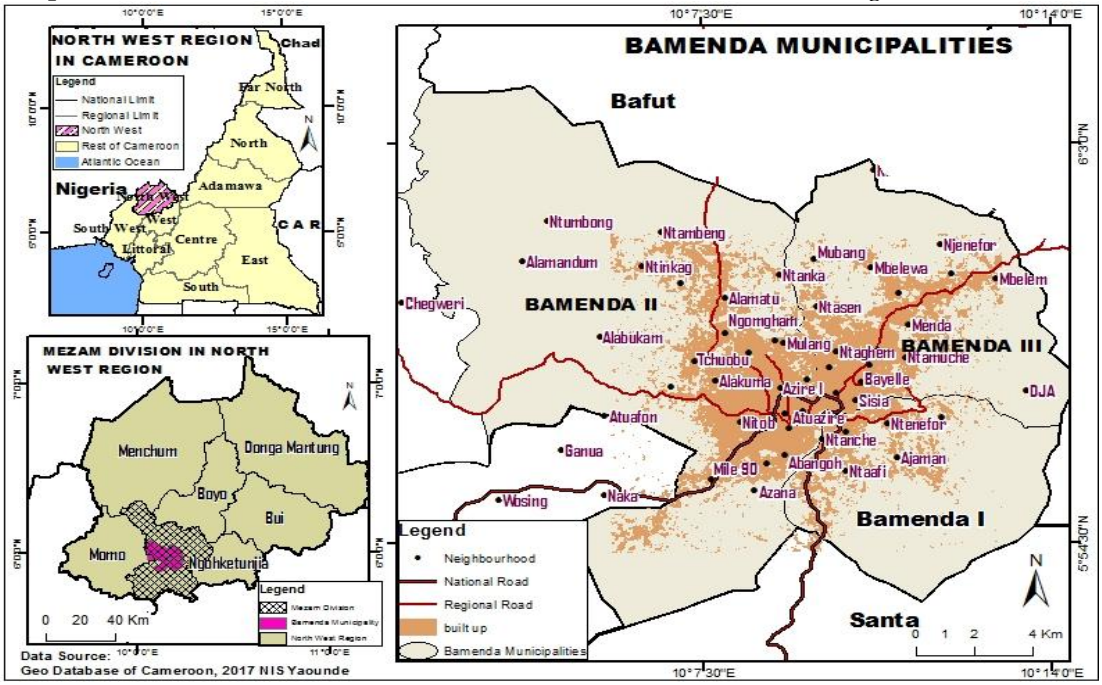
Bamenda is the headquarters and capital of the Northwest Region of Cameroon, located on the Northwest Plateau of the country. It lies between latitude 5°57′34″ N and longitude 10°08′45″ E, at an elevation of

approximately 1,413 meters above sea level. Bamenda is the administrative seat of Mezam Division and the largest city in the Northwest Region.

The city covers an area of approximately 71.23 square kilometers. It serves as the commercial, political, and socio-economic hub of the region, while also providing links to surrounding suburban areas. According to the 2005 projected population census, Bamenda has an estimated population of approximately 74,127 inhabitants. Administratively, Bamenda operates as a City Council composed of three sub-divisional councils: Nkwen, Mankon, and Bamendakwe, which collectively cover the area occupied by the city. As a result, Bamenda is surrounded by several villages and suburban settlements.

Bamenda shares boundaries with Bali and Mbengwi to the west, Santa Subdivision to the south, Bafut to the north, and Tubah to the east (Tening, 2013). Due to rapid population growth and patterns of urban expansion, these surrounding areas are increasingly regarded as part of the broader urban agglomeration.

Map 1: Location of Bamenda in the Mezam Division of the Northwest Region of Cameroon.



Source: Ntumngia & Fombe (2022). In the Cameroon database, 2017 NIS Yaounde.

5. Results

5.1 Social Impacts of Dynamics in Architecture in Bamenda

Regarding this work, we are interested in the effects that architectural mutation has had on Bamenda. It has either improved living conditions by adding value to the way people lived in the past or increased their standard of living. In this section, the impacts will be divided into two categories: the negative and positive effects of architectural dynamics in Bamenda. No matter how beneficial a developmental project may be to a community or area, it is certain that the same project will also have some consequences. If we limit ourselves to only one side of these impacts, the work will be incomplete. In addressing both the negative and positive impacts in this work, we will strive to strike a balance between them.

5.2 Positive Social Impacts of Dynamics in Architecture in Bamenda

With the population increase in Bamenda, the area has undergone a dramatic transformation into a spontaneous urban center, thereby creating a voluntarily established social order. Another outcome of this urbanization is that such cities are largely unplanned and highly influenced by interactions among inhabitants with diverse mindsets. This transformation is driven by rapid population growth and migration, rising land values, mixed land uses, and significant infrastructural development [13]. Efforts put in place by theorists such as Jacobs (1961, 1969) and Alexander (1964, 1968), together with the socio-economic benefits derived by many inhabitants

(Webster & Lai, 2003), demonstrate that these spontaneous social orders encompass language, culture, and markets.

Almost everyone appreciates trends in dynamic architecture. These trends enhance aesthetic taste and foster a closer connection between people and social life through interaction. When someone builds a well-designed house, others often seek to copy and improve upon it, making it even more attractive. This creates a notion of competition, as people enjoy beautiful things and aspire to socialize with others of a certain standard. Everyone is striving to find a suitable structure for themselves [14].

The Bamenda population has widely appreciated the change in architecture. A significant number of informants reported that architectural mutation has had a profoundly positive impact on their lives. There has been an increase in socialization and exchange among inhabitants. The people of Bamenda have been striving to improve their living conditions by constructing suitable structures for themselves. Consequently, when an individual creates an impressive structure, it is admired by many, and some are compelled to replicate it. This situation has sparked a spirit of competition among the inhabitants.

This competition is driven by the desire to demonstrate wealth and the need for decent housing. The aspiration to build better structures has significantly transformed the landscape, making it more attractive. Bamenda is noted for attaching special importance to the construction of well-furnished homes, which is one of the motives for driving this competitive spirit. Over time, inhabitants have worked relentlessly to demolish old buildings and erect befitting structures that genuinely reflect their social status. The Bamenda man is proud, and this pride is reflected in the desire to live in a better environment with quality structures that he has built [15].

Building houses while respecting town planning laws will go a long way toward improving the well-being of the population. Proper ventilation systems ensure that buildings are healthy for habitation, as poor air quality can lead to various health issues. Residential houses must be inspected by town planning officials to ensure compliance with established standards. This prevents inhabitants from suffocating, unlike some older structures in Bamenda, which had minimal ventilation. Individuals with breathing problems are more likely to experience severe symptoms in congested houses than in well-ventilated ones [16].

In the past, due to the absence of town planning laws in Bamenda, inhabitants constructed unconventional structures under the guise of housing, as there were no regulations governing building practices. With the involvement of town planning agents, buildings are now monitored to ensure they can guarantee the well-being of occupants. Social infrastructure supports such forms of cohesion in healthy communities and enhances their ability to achieve higher levels of social well-being [17, 18, 19].

When structures are well constructed, particularly with adequate ventilation, they become favorable for human habitation and reduce the likelihood of illness among occupants. Building design can have a direct impact on the health and well-being of inhabitants [20, 21].

Architecture initially emerged as a means of protection and shelter from the surrounding environment. Over time, it evolved into an art form characterized by subjectivity, creativity, and beauty. Today, architecture is evolving once again—from an art form into a subject of psychological study and purposeful implementation focused on psychological well-being [22].

Furthermore, Vishnu & Amuthakumari added that research by Vanson & Bourne (2005) demonstrated how workplace design can stimulate creativity, attract and retain skilled staff, and improve organizational agility (Gensler, 2005). However, other research has shown that a balance must be achieved in the way space is arranged [23].

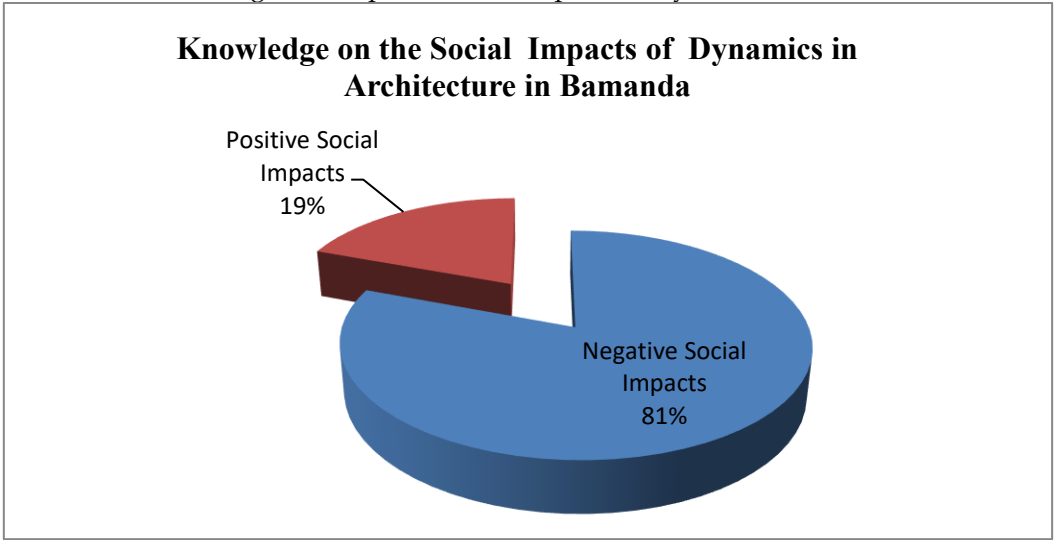
Modernity has made it possible for toilets to be designed internally, eliminating the need to go outside the house whenever a toilet is needed. Modern toilets function with water, which is why they are referred to as a water-closet system. These toilets are clean and comfortable for human habitation, and this has significantly

improved hygienic conditions. As one informant stated, "With modern architecture, we have improved toilets and also seen an improvement in our health and sanitation" [24].

5.3 Negative Social Impacts of Dynamics in Architecture in Bamenda

The human population worldwide has been expanding dramatically, including in towns and cities, and figures have been rising recently; if care is not taken, it will continue to skyrocket. The way land has been utilized, along with its variations, results in sprawling areas that are essentially unchangeable due to the presence of human beings on planet Earth [25]. For people to live in the sprawl, they must be driven out of work and move to meet friends. It will cause congestion as the inhabitants will have to cover long distances from work and will lack basic facilities. Sprawls consume extensive areas in a poor manner, which goes beyond reducing the available land and giving way to monoculture. High crime waves, armed robbery, prostitution, scammers, people now do things that they were not supposed to do just because they want to survive in urban areas (FGD, City Council Hall, September. According to "World War II Post-War Building Styles" (2016), Monochromatic colors, poorly placed windows, an absence of architectural detail, and repetitive styles produced a unique form of sensory deprivation. Not only did this trend result in a lack of intellectual stimulation, but it also effectively removed every aspect of human touch, creating a cold and unwelcoming environment that could not produce a positive physiological response or a sense of well-being [26].

Figure 1: Demonstrate Percentages of Respondents on Impacts of Dynamics in Architecture in Bamenda



Source: Ngala (19 September 2022)

According to the responses from our informants, 71 out of the 94 participants indicated that the transition in architecture is visible in Bamenda, representing 81%. The indicators that we used include high crime wave, armed robbery, banditry, kidnapping, scamming, drug abuse, delinquency, traffic, congestion, prostitution, deviant behaviors, population increase, high rents, promiscuity, and stealing. This means that the negative social impacts of architectural dynamics outweigh the positive social impacts. One can say with certainty that the negative social impacts are disadvantageous to the inhabitants. They mentioned that all the above indicators are visible in Bamenda. Meanwhile, 29 informants highlighted that the transition has brought positive impacts in Bamenda. They cited an increase in the construction of infrastructures, including schools, churches, health units, markets, travel agencies, parks, and drinking spots, among others, which represents 19%. The infrastructures and structures mentioned above have ameliorated the living conditions of inhabitants of Bamenda. Nothing can be entirely good without some setbacks or consequences.

A large proportion of migrants who cannot afford decent housing resort to low-quality housing in inner-city slum neighborhoods, such as Old Town, Ntamulung, Atua-Azire, and Ayaba, as well as squatter settlements in hazard-prone zones, including Sisia, Abangoh, and Mulang. These neighborhoods are characterized by inadequate toilet facilities, poor waste disposal, substandard housing structures, and an insufficient supply of electricity, water, and access roads [27].

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6. Economic Impacts of Dynamics in Architecture in Bamenda

The transition in architecture in Bamenda has brought economic impacts. The economic impacts of architectural dynamics are evident. The inhabitants of Bamenda are earning a living thanks to these architectural dynamics. The population has increased, and landlords have constructed additional housing units, resulting in higher rents. Thus, permitting them to earn income from house rent enables them to support themselves financially. Markets have been established to help businesses generate income. The inhabitants of Bamenda are generating substantial revenue and profits from thriving businesses. These businesses are in various types of buildings, including shops, stores, sheds, offices, establishments, enterprises, agencies, and hotels.

The evolution of architecture in an area typically results in the construction of Commercial Residential Buildings (CRBs) along the streets and around public spaces. The notion of CRB is closely associated with houses/shops [28]. It is evident in many different cultures that have emerged in various towns and communities, mainly due to the economic circumstances of the inhabitants living and working in those areas. (Devis, 2009) Thinks the CRB is due to the benefits of architectural transition that occur in a cultural milieu, which is a necessary component for adaptation.

Yes! Bamenda has experienced economic improvement with the advent of modernization. We can engage in tertiary activities that generate income. Modernization is an eye-opener. People have the privilege of opening small businesses, and you will discover that the distance we cover on foot was wasteful and time-consuming to reach the market. Meanwhile, if we have items nearby, we can easily retrieve them and integrate them into our daily activities. Some of those markets have helped us so much that it is easy to drop in on one of them and pick whatever you need within a short time. We are content, and that is why we concentrate in this urban area. Improved means of transportation have led to the establishment of stores, shops, retailing, and other business opportunities in the quarters [29].

The information suggests that modernization has improved the economic sector of Bamenda. It has enabled them to generate income through various activities, such as tertiary education and marketing. The markets are being designed in a sustainable manner that can be easily adapted. If it must be modified, the effects will be less. He reiterated that markets in those days were usually located far away from home, and to reach the market, one had to undertake a long, arduous trek on foot.

The introduction of modernization has encouraged the inhabitants of Bamenda to open business avenues where they sell their products. Recently, markets have been established almost everywhere to facilitate mobility and access to these markets. This transition in architecture has improved the economic conditions of the Bamenda men. For example, so many hotels have been constructed to welcome strangers and visitors. Additionally, it is a source of income for many landlords, as it is common to see story buildings that have been constructed and reserved for rent [30].

The economic sector is one area where this dynamic architecture has had a significant impact. In those days, there were few hotels, but recently we have noticed a drastic increase in the number of hotels that have opened their doors in Bamenda, which is on the rise. Many visitors, including strangers and foreigners, come to Bamenda and are accommodated in this hotel. It is worth noting that these hotels have employed numerous staff members to work in various roles, including cooks, drivers, servers, and cleaners. It should be emphasized that this transition has equally affected the transportation sector, as highlighted in the information below. It has led to the establishment of numerous businesses, such as travel agencies, that transport people from one place to another. These agencies have reduced unemployment by recruiting some of the population to work as drivers, bus conductors, and loaders. They are earning a living from these activities [31].

The CRB has been noted for revitalizing the center and street as a strategy to ameliorate urban cities, diversify, and ensure centers are friendly for their inhabitants. The buildings constructed in streets or centers are of great importance; they assist and render proximity service. (Devis, 2009; 2012) The merging of functions in the CRB initiates a socio-economic process that is highly influenced by the economic situation in an urban center, which will help shape the units. Socially, they are grounded. Globally, they create cultural forms within an urban

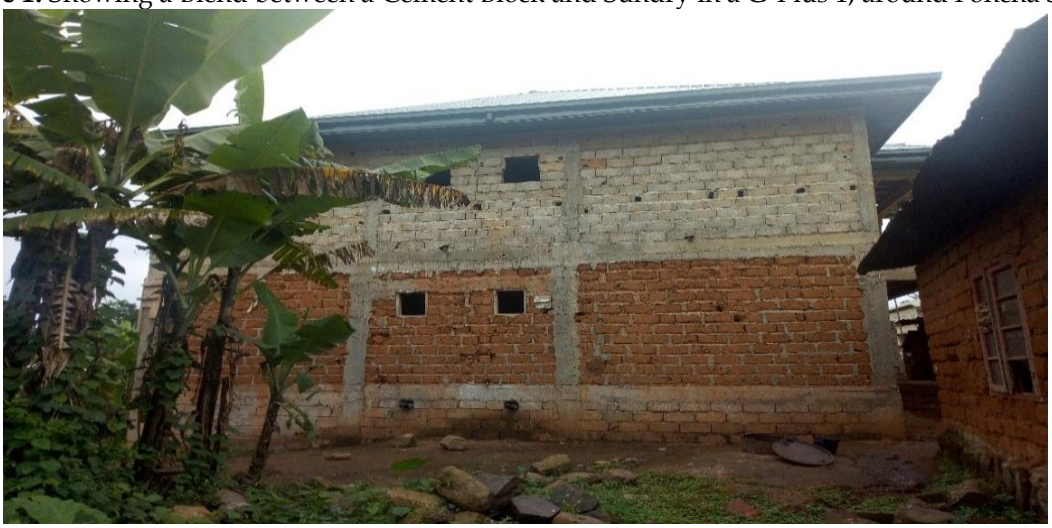
development process. Based on the concept of the CRB, it is typically designed to serve multiple functions, with shops located along the roads, and city dwellers occupying the upper floors of the building. That entails mutations regarding the residence or the shops in relation to where the buildings are situated, not forgetting the link it has to the street and extending to other streets [32].

Economically, housing is sustainable when it is accessible (to all age, sex, class, and income levels) and affordable (deals with government involvement in the housing sector through the provision of incentives, encourages housing finance, upgrading schemes, and the practical implementation of housing laws and regulations). Housing is environmentally sustainable when the technology and appliances used in construction are environmentally friendly [33].

7. Cultural Impacts of Dynamics in Architecture in Bamenda

The culture of the Bamenda people has been affected by the change in architecture. The way they used to construct their homes in the past is different from what is held today. The designs and building materials have also drifted towards modernity. There are some lifestyles that architecture imposes on the inhabitants of Bamenda. This study notes that the current broad agglomeration of cultural and creative sectors has been responsible for producing such homogeneity of urban architectural design forms and lifestyle concepts that it may one day no longer provide sufficient inventive ideas for blending innovation in architectural practices, requiring instead centralized nationalist intervention models to sustain the traditional built infrastructures of society and its culture. The transformation of stressed cities into resilient spaces requires various conditions, primarily social capital, technological capacities, sustainable natural resources, and effective governance mechanisms [34, 35].

Figure 1: Showing a Blend between a Cement Block and Sundry in a G-Plus 1, around Foncha Street



Source: (Ngala, 26 September 2021).

The building in Figure 1 is a single floor, and the ground floor is constructed with sundry blocks and filled with cement mortar. The upper floor is constructed with cement block and choked with cement mortar. The foundation of the building above is constructed with foundation blocks and choked with cement mortar, preventing water from penetrating the foundation and, above all, ensuring that it is solid. In those days before the introduction of modernity, the inhabitants of Bamenda used earth for building construction, but as time passed, they began to look for other ways to improve their homes. Whether by chance or not, they began using modern building materials, such as cement mortar and cement blocks, for construction. Modernization has prompted many people to adopt the trend of using cement blocks for construction. Later, they recognized the need to blend traditional and modern building materials, as shown above. Looking closely at Figure 1, the foundation is suspended above, indicating that this area is likely a swampy one. This house is being constructed in a valley around Foncha Street. The foundation was backfilled, which is a permanent solution that the inhabitants of Bamenda have adopted to mitigate flood especially during the rainy season.

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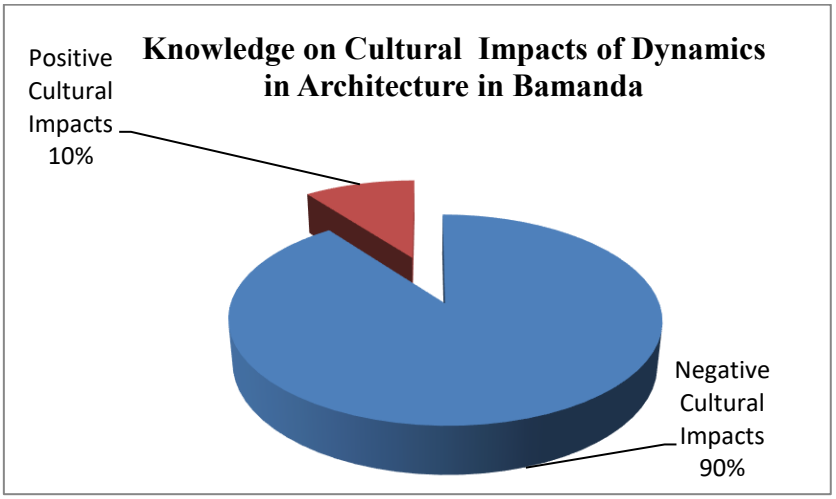
This building was constructed recently. The inhabitants of Bamenda have been reverting to the use of sundry blocks for construction after abandoning them for reasons best known to them. Until recently, the weaknesses of cement blocks were demonstrated by the ongoing Anglophone crisis. Bullets have penetrated buildings constructed with cement blocks and taken away so many lives [36]. The structure shown above is an accurate representation of a blend of traditional and modern building materials in architecture in Bamenda, utilizing both in a single building. I believe that the culture of the Bamenda people has undergone significant changes. We transitioned from building with bamboo, grass, sticks, and stones from one phase to another. Culturally, many people from Bamenda have migrated to other cities and around the world, adopting Western cultures. When they return home, they attempt to modify their culture. The culture of Bamenda is no longer respected due to the influence of civilization and modernity. The building materials used for building construction are blended, such as earth soil with cement blocks [36].

The culture of Bamenda has undergone adjustments in terms of architectural construction. The indigenes of Bamenda have been using local building materials existing in their area for construction. With evolution and modernization, the culture of Bamenda has undergone significant changes. Some have been fortunate enough to stay out of Bamenda, thereby learning how to use other new modern construction materials. They have even gone as far as using a blend of the local and the modern materials in the construction process. Cornilus contradicts the popular opinion that: I think the culture of the Bamenda is dying. As I mentioned earlier, when we started building bamboo from one stage to another, it was accompanied by rites and rituals. You were being initiated, but today that aspect of the culture is no longer there because people pay workers to build their houses. In the past, the people of Bamenda would mobilize friends and neighbors to entertain them at the end of the day. That community spirit is no longer there. Culturally, the people of Bamenda have traveled and adopted Western cultures. When they return home, they attempt to modify their culture. The culture of Bamenda is no longer respected due to the influence of civilization and modernity. The free communal working spirit is no longer there. If you invite people to come and do work for free, you will see only a few people. People want to work and get paid, not to come and work and receive food or drinks [37]. The transition in architecture in Bamenda represents a step down from the local culture. The arrival of people from diverse backgrounds has some negative consequences, as the culture has been altered. Some values that were usually practiced are gradually being abandoned. In the past, before constructing a structure, certain rites and rituals were performed, as they used traditional building materials from the community to build their houses. In some communities, men were being initiated since building a house in those days was a sign of maturity. There were things and conditions to be met before you were considered a man; putting up a structure was one of them. It was not easy for men to undergo some initiation rites. Modernity and civilization are imposing a new way of life on the inhabitants, causing them to care less about the cultural values of the past.

Chart 2: Demonstrate the Percentage of Respondents on Cultural Impacts of Dynamics in Architecture in Bamenda



Source: (Ngala, 12 December 2022)

Out of the 94 informants who participated in this data collection exercise, 79 informants indicated that this change in architecture has seriously affected the culture of the Bamenda people, causing it to depreciate, representing 90%. The indicators of these cultural disappearances include cultural values, types of building materials used for construction, festivals, ceremonies, shrines, rites, and rituals. The ancestral worship sites, such as the Bamendankwe shrine, have been transformed into a dumpsite. Modernity poses a threat to culture and tradition, thereby erasing the cultural heritage of the Bamenda people. Meanwhile, 21 informants emphasized that this change in architecture is altering the culture of the Bamenda people, representing 10%. Among the people interviewed, it was made clear that the culture of Bamenda is deteriorating. If care is not taken, the situation will worsen if the trends of modernity continue to spread globally, including in Bamenda. The switch in architecture is causing a significant problem for Bamenda's culture. That is why the elites of Bamenda are doing everything to revamp their culture by organizing yearly cultural festivals and ceremonies to appease their ancestors.

8. Environmental Impacts of Dynamics in Architecture in Bamenda

Environmental impacts examine the interaction between human beings and natural resources within each habitat. The desires of human beings within an environment are enormous and constantly changing; that is why structures within the environment are designed to adapt to these needs. A relationship exists between the inhabitants and the built environment [37]. The relationship that exists between human beings and their environment should be mutual (Dent, 1998). The role of values and attitudes is essential for creating a favorable environment for human habitation in a changing society [37].

8.1 Positive Environmental Impacts of Dynamics in Architecture in Bamenda

Considerable efforts have been made so far to construct sustainable buildings, especially in the Western world, inspired by Agenda 21; however, these results are not enough to give real hope. Therefore, we must continue to work towards creating awareness about the problems and taking practical steps towards achieving a balance between people, buildings, and the environment, especially in the developing world, where high population growth rates coexist with scarce and dwindling resources. At the same time, we must recognize the importance of considering local and regional circumstances, demands, limitations, and opportunities, particularly in developing countries, which are exacerbated by migration trends, as well as political, economic, and social turbulence [38].

Architecture has played a significant role in shaping our environment. If you go around, you will see development everywhere. People are planting flowers, trees, and carpet grass. Upon closer examination, it appears to be good. You can admire it; everywhere is clean and beautiful. We have been sensitizing people to plant trees because it will make the environment friendly. In the past, the area was a forest and was occupied by elephant grass stocks. It is difficult to see an empty land today in Bamenda. Before, houses were scattered and dotted across the landscape. It was challenging to carry out construction works because there were no roads; only footpaths existed. The roads we had in the past were narrow, and during the rainy season, they would become muddy, while in the dry season, they would become dusty. The tarring of roads has made the environment clean [36, 37].

According to the information provided above, he believes that this mutation in architecture has transformed the landscape of Bamenda. The scene looks different from how it was in the past. Environmentally friendly trees, flowers, and carpet grass have been planted by the residents to enhance the urban landscape. When environments are pleasant, they can make us feel excited and stimulated, causing the release of chemicals like oxytocin. Alternatively, they can induce a pleasant sense of relaxation and peace, helping our autonomic nervous system function smoothly [39].

8.2 Negative Environmental Impacts of Dynamics in Architecture in Bamenda

Rapid changes in globalization and urbanization are a serious challenge that most urban areas around the World are facing. It has far-reaching consequences, such as the degradation of natural ecosystems, which is negatively affecting climate change (World Bank, 2018). According to studies, nearly 9.8 billion people are expected to reside in cities by 2050 (United Nations, 2015). Regarding statistics, 80% of greenhouse gas (GHG) emissions into the atmosphere are attributed to metropolitan areas [35]. Considering these setbacks, efforts have been intensified to ensure sustainable development and guarantee human security and property. Hence, a

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sprawling land use settlement causes a voluminous quantity of pollution and CO2 to be emitted into the atmosphere [10]. Peri-urban areas in developed as well as developing societies have been undergoing social, physical, and economic transformation.

People are building in swampy areas. The whole of this place is a swamp. People are building and getting closer to swampy areas. If you visit Below Foncha during the rainy season, you will see for yourself. Many people will leave their homes and move to other neighboring areas due to flooding, only returning when the water level has receded, as they live in a region prone to flooding. When you fill a swampy area and construct a house, the water that comes in is blocked, and the people behind who did not block theirs will suffer the effects of the floods. If you visit Mulang, you will see houses where water has already covered the entire building, leaving only the rooftop visible.

These houses were built during the dry season, as people began to purchase plots around the area, without realizing that floods would occur during the rainy season. When they buy these plots, they fill the foundation of the house with ground. The City Council is strongly opposed to land reclamation and settlement in high-risk zones, but when you visit these swampy areas. Despite the council's cry for people not to settle in these swampy areas, they still go ahead and settle in these risky zones without considering the consequences [15, 16].

Mile 4 Nkwen is a swampy area, but due to the inhabitants' desire to build their own structures, they are forced to go right into the swampy areas. A glaring example is Below Foncha, where during the rainy seasons, the inhabitants abandon their homes and relocate elsewhere for safety, staying there until the water table recedes. This is because they buy these plots during the dry season without considering the effects of rain and prolonged rain during these periods. Faced with this problem, they must flee to another stable area. If you visit the Below Foncha or Mulang quarters, you will see it for yourself; most of the houses in these quarters are being affected by floods. Backfilling seems to be a permanent solution to fight floods, according to our informants. It requires raising the foundation to approximately 2m and filling it with earthy soil. The soil is dammed well before they start elevating the structure. The reason for backfilling is to prevent water from penetrating inside the foundation. The Bamenda City Council frowns upon land reclamation due to the dangers associated with it. However, the inhabitants, for one reason or another, are stubborn in not yielding to council regulations.

Figures 2 and 3: Showing Houses Constructed in a Swampy Area around Foncha

Source: Ngala (9 August 2021).

Taking a close look at Figures 2 and 3 above, you can see that the entire building is submerged in water. Below Foncha is one of the risk zones forbidden for construction by the Bamenda City Council and Sub-divisional

Councils. These structures have been abandoned by their owners due to the adverse effects of flooding. Grass has been growing in and around these buildings because of the presence of runoff. Since the buildings are unsafe for human habitation, they have been abandoned. The buildings are filled with water. The effects of floods have transformed the building into an aquatic environment. During the rainy season, the entire area of Below Foncha is flooded with water, making human activities difficult. Below Foncha is a swampy area because when it rains, all the runoff water from the upper sections of Bamenda is drained here, making this place waterlogged and very hazardous for human habitation. The color of the standing water is an indication that the water has been standing for a long time and is continuing to accumulate, especially during the rainy season when there is a severe downpour every year. The buildings are sinking due to the adverse effects of flooding. It should be mentioned that the cutting of trees to construct buildings is seriously destroying the environment as one of our informants indicated below that: The cutting down of trees for the construction of houses and buildings has accelerated flooding within Bamenda, the amount of rainfall trapped by roof tops are so much compared to the past where we had tress that helps to trap intercept rain and infiltrate it into the ground. The volume of runoff has increased significantly, leading to the collapse of buildings and structures [38].

Another informant pointed out that we are now suffering from poor waste management, land pollution, air pollution, and water pollution due to the high concentration of houses. Looking around, there is a lot of dirt being deposited almost everywhere, especially along the road. These places have been transformed into dump sites. We also experience floods due to population increase, which causes severe traffic problems after rainfall. It is not easy to leave one end of the town for the other [31]. Our information suggests that this mutation in architecture has caused significant environmental problems, including waste management issues, air pollution, and land pollution, among others, and that the concentration of houses is mainly responsible for these issues. The recent concentrations in the planet's history raise the specific problem of an entirely constructed environment, including pollution, technological vulnerability, and the difficulty in organizing space, among others [11]. It is very easy to find dirt everywhere because there is no proper mechanism in place to ensure that waste is well treated. Major roads have become dumping grounds for waste, as evidenced by the heaps of litter scattered everywhere.

The transition in architecture in Bamenda has brought the problem of waste management. The structures have increased; the population has also doubled, allowing for the accumulation of garbage. The disposal of the waste has remained a big challenge for the City Council. In those days, with a small population and limited farmland available, household garbage was used as manure to enrich the farms. However, the quest for improved living conditions has prompted the inhabitants of Bamenda to convert their farmland into houses and buildings. They are forced to accumulate this garbage and dump it at road junctions after waiting for weeks without any signs of them passing by.

Figure 4: Showing a Huge Pile of Garbage alone on Mile 3 Road

Source: Ngala (25 August 2021).

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The population of Bamenda has doubled, resulting in a significant increase in the number of houses available for refuge. Figure 4 above confirms the fact that Bamenda is facing a serious waste management problem. Some roads have been transformed into dump sites. They have been dumping waste on the road until a point where the pile of dirt is occupying a particular portion of the road, slowing down the movement of people and vehicles. This road link connects Mile 3 and Mile 4 Nkwen, but the waste disposal on this stretch of road cannot accommodate two vehicles passing each other at the same time, hence causing severe traffic congestion. The environmental problem of poor waste management poses a serious threat to human habitation, as it serves as a breeding ground for mosquitoes. The odor generated from these piles of refuse is a nuisance to the inhabitants living around these dump sites, making them feel uncomfortable in these areas. Having a keen look at Figure 4, one can say with certainty that there are times when the dirt goes right into the middle of the road. The long-term effect of waste disposal damages the tar on the road, causing it to deteriorate faster due to the toxic content of some of these materials. In the middle of the waste is an electric pole, which will also be damaged due to the waste disposed of around it.

Figure 5: Showing the Massive landscape above Sisia Quarter

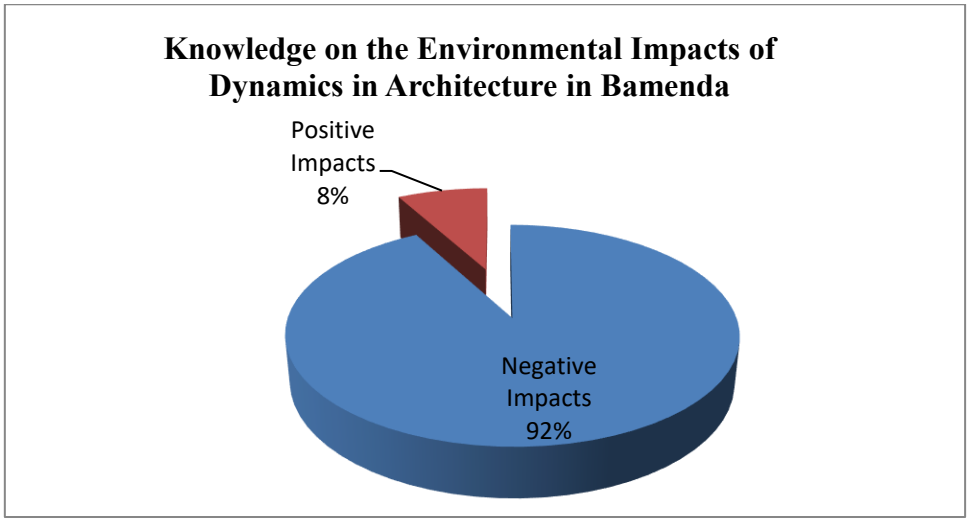
Source: Ngala (7 August 2021).

Figure 5 shows Sisia, a quarter situated under the slopes of the Bamenda Up-Station hill. Above the Sisia quarter is a huge rock that, due to fear, the Bamenda City Council decided to forbid its inhabitants from constructing on this site, despite warnings from the administration, and the City Council's people went ahead and constructed there. The Sisia quarter is one of the designated risk zones for non-human habitation, as designated by the Bamenda City Council. Some inhabitants of Bamenda have violated the law and constructed on this site due to scarcity and the desire to build their own houses, as land is sold at a cheaper rate compared to other safe areas around Bamenda. Landslides are becoming one of the significant environmental problems in Bamenda, primarily due to rapid urbanization. Landslides are typically observed during the heart of the rainy season, specifically between July and September, with rainfall ranging from 340 mm to 450 mm per month. Landslides in Bamenda are thus provoked by rapid urban development resulting from the progressive occupation of steeper slopes, which is achieved by cutting terrace-like areas and redistributing materials to create building sites. Heavy rains tend to soak and dislodge large rock masses, sometimes resulting in the complete crushing or burial of an entire housing unit [27].

Furthermore, Edward added that: Imagine if landslides occur on this slope soon, it will cause severe human and material loss. The population of Bamenda is stubborn, which is why they continue to construct and settle here, despite the government's lack of severe sanctions to discourage them from building on this slope [39].

Looking at Figure 5 above, there are numerous green plants, which justify the site's situation. It is challenging to construct here, despite the risks associated with this site, but some inhabitants are breaking the law and building on these sites. They have not learned from the landslide that happened on 7 November 2024 in Ngouche neighborhood around Bafoussam, killing close to 43 people, and Mbankolo, with 30 inhabitants killed on 28-29 October 2019.

Chart 3: Demonstrate Percentages of Respondents on the Environmental Impacts of Dynamics in Architecture in Bamenda



Source: Ngala (16 December 2022)

Based on the data we collected from the field, 81 of our employees reported that this change in architecture is negatively affecting Bamenda. This has a significant impact on the environment, accounting for 92%. Our indicators included flooding, habitation in risk zones, settlement, deforestation, poor waste management, land pollution, landslides, water pollution, air pollution, and climate change. They believe that this change is causing significant harm by destroying the environment. Nineteen of the informants indicated that this mutation is positively affecting Bamenda, contributing 8%. They believe that the transition has added beauty to Bamenda with the construction of monuments, schools, churches, markets, hospitals, and tarred roads, thereby transforming the landscape. Additionally, the change has improved and developed Bamenda, making it a cleaner and healthier environment for human habitation. On the other hand, the construction of these structures: houses, bridges, roads, markets, and hospitals, etc., has done more harm than good to the inhabitants of Bamenda.

9. Discussion

The inhabitants, together with the government, are leaving no stone unturned to ensure that Bamenda receives the facelift it deserves. A significant amount has been accomplished in terms of infrastructure and development. According to respondents, the transformation of structures and buildings in Bamenda has had both positive and negative impacts.

First, about social impacts, the construction of structures and buildings aimed at improving Bamenda's infrastructure has enhanced socialization and interaction. Many people meet in places such as markets, hospitals, schools, parks, and even over snacks. This development has significantly increased the population, as many villagers and rural dwellers are relocating from their villages and other remote areas to resettle in Bamenda. One can confidently state that this architectural transition has significantly improved the living conditions of urban dwellers in Bamenda. On the other hand, it has resulted in congestion and overcrowding, a high crime rate, armed robbery, prostitution, and kidnapping, as many struggle to make ends meet.

From an economic perspective, many inhabitants have constructed houses and story buildings, earning income from the rents collected monthly from these properties. This transformation has also created numerous business opportunities, including financial institutions such as microfinance institutions and banks, as well as markets, parks, travel agencies, insurance companies, car wash stations, and snack vending businesses, among others.

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Culture is another domain in which the dynamics of architecture have been strongly felt. Although culture is often described as the backbone of every community, the culture of the Bamenda people is witnessing a decline. Many respondents attribute this to the wave of change sweeping across the world, commonly referred to as urban dynamics. Some ancestral sites have been transformed into dump sites. Areas that were formerly reserved near palaces have been sold, and buildings have been constructed around these palaces, which are now encroached upon for various human activities. All quarters and the entire community have been illuminated with streetlights, and night rituals that were once performed are no longer practiced.

One positive development is that many inhabitants are reverting to the use of sundry blocks, which were among the important building materials used in the past. This shift is partly due to the weakness of cement blocks in the context of the ongoing Anglophone crisis in the Northwest and Southwest Regions of Cameroon, where bullets have penetrated houses constructed with cement blocks, resulting in fatalities. Additionally, people are now buried in public cemeteries, and traditional burial rituals are no longer performed because of insufficient space within residential compounds.

The environment is the domain most affected by these urban dynamics. In terms of positive environmental impacts, the Bamenda landscape has transformed, giving the city a facelift. Buildings and structures constructed over the years have enhanced the aesthetic appeal of the area. Roads have been built, facilitating the movement of people and goods. Green spaces and gardens have also been introduced, contributing to environmental protection.

Nevertheless, the negative environmental impacts have been severe. The desire to live in Bamenda has led to rapid population growth, forcing many people to settle in high-risk zones such as the Sisia, Mulang, and Below Foncha neighborhoods. The cutting down of trees for human settlement has caused severe flooding, resulting in material losses and property damage. These developments have contributed to climate change, with rising temperatures. Bamenda has a cool climate, but it is now noticeably hotter during both the day and night. Furthermore, population growth has intensified waste management challenges, as waste is frequently disposed of along roadsides, in streets, and in rivers, leading to water pollution and environmental degradation.

10. Conclusions

The mutation of architecture in Bamenda has significantly impacted the cultural, social, economic, and environmental landscape of the Northwest Region of Cameroon. The interplay between traditional and modern architecture has shaped the city's urban identity, influencing how people live, work, and interact with one another. The findings indicate that architectural dynamics have generated several impacts, including social, economic, cultural, and environmental effects.

Numerous schools, roads, markets, health facilities, travel agencies, and other amenities have been constructed in Bamenda, facilitating mobility and promoting social cohesion. Many landlords have built houses and earn income from them through rent. However, the culture of the Bamenda people is rapidly disappearing, as ritual sites are increasingly converted into waste disposal areas. The cutting down of trees for construction has also contributed to flooding and landslides.

Consequently, the transition in architecture in Bamenda has produced both positive and negative impacts. While modern architecture has created new opportunities for economic growth and development, it has also led to the loss of traditional cultural practices and the homogenization of architectural styles. This study has examined the impacts of architectural mutation in Bamenda, Northwest Region, Cameroon, without addressing adaptation strategies. Therefore, further research could focus on measures to mitigate and manage the impacts of architectural dynamics in Bamenda.

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Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent

Not applicable. This study uses publicly available, de-identified secondary data and does not involve human subjects.
participants or personal information.

Competing interests

The authors declare no competing interests.

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