



Research Paper

How Urban Form and Activities Affect Travel Pattern in Kano Metropolitan City

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ABSTRACT

Kano metropolitan city in Nigeria is growing and changing its pattern rapidly due to increase in number of population as well as constructions of both public and residential buildings. Though, Kano metropolitan is a place where cultural expressions and identity of its people were displayed in most of their institutional settings. It is also an urban city where basic traditional values of Hausa culture and traditional materials were kept for centuries. Consequently, the urban form of Kano metropolitan is no-longer in relation with the characters of travel pattern due to the nature of the residential settlements and other urban activities. The earlier residential patterns succeeded in expressing new cultural features regardless of the current road network systems and urban developmental elements. Meanwhile, the principles of contemporary urban sustainability include not only technological considerations in building designs, but also involved social, economic and appropriate urban travel network. Accordingly, in line with the potential needs and desires for people's change for better living, the need for responsible urban network keep escalating, especially during this social and economic activities. Similarly, in consideration of recent discuss on travel pattern, ideal and greater spatiotemporal patterns are considered as a rational, sensible proxy of human network and good accessibility. Therefore, Kano urban form, urban programs and the travel pattern are resulted in to series of challenges due to problems of connectivity and linkages. These kinds of cultural conflicts follow the form of design ideas, such as the like of concern and improper involvement of professional in design processes and like of consideration for land use programs. This paper aimed at discussing the nature of the settings of activities of Kano metropolitan and its urbanism with focus on problems of travel pattern and cultural factors associated with the problems of travel system. The paper will base its scope within the nature of the character of Kano urban form, urban activities, and the problem it generated toward travel pattern. In order to succeed with aim of the study, physical observation (photograph) and literature survey are the method adopted to source data for the analysis and evaluation.

KEYWORDS: Urban form, Travel pattern, Kano Metropolitan, Sustainability

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I. INTRODUCTION

In the past decades, scholars have acknowledged that Kano urban context (figure1) have experienced several numbers of activities in their built settings and other land use programs. And recently, several number of urban programs such as the roads, buildings facilities, and other infrastructural facilities were also built in the urban district (Unah, 2021). However, to maintain the existing features of the long-established cultural character and to keep the panorama of old setting of Kano city, the historic urban context within the city has not changed to some extent in the recent years (Oyesiku, 2003). Kano historic urban center usually has several types of travel activities patterns with high population density and various land use models. Subsequently, the urban area is experiencing overcrowding with extremely severe traffic issues as compared to the neighboring cities.

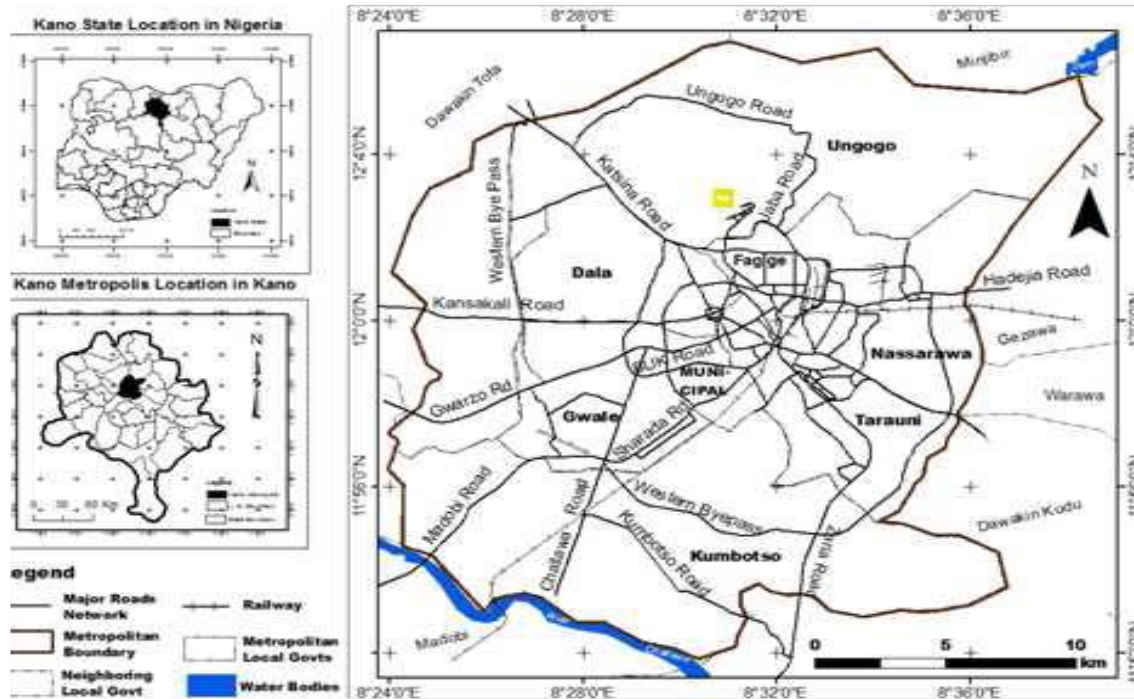


Figure 1. Land Cover derived from Landsat image of 1986.

Source: (Adzandeh et al, 2014)

Kano urban programs resulted in distinct travel patterns over unusual time windows, and the unrelated networking system departing from or reaching at different destinations, or some developed sites of the city reflect the nature of urban land use characteristics (Oyesiku, 2003). Therefore, the search for reasonable and sustainable travel program has showed increasing concentration to patterns of travel. Similarly, concern of reducing the unfavorable programs of the environmental impacts became the focal point in the city (Transportation Research Board, 1996).

However, in recent years there has been serious problem of urban form and travel network systems and many scholars developed interest in handling the travel pattern by encouraging some reasonable urban design programs whereby the design characters and layouts of the urban areas can help in managing travel activities (Berman, 1996). To this end, Cervero, (1996b) in particular acknowledged that advocacy for many different forms of recent traditional urbanism, small efficient cities, urban districts and general patterns of transport-oriented programs, all planned explicitly to land use authority programs and urban planning policies to guide in achieving equitable sustainable travel patterns (Cervero, 1996b).

Also, in recent years there are several bodies of research teams that are so worried about the reciprocal actions between the role of urban form, urban facilities, and the travel pattern activities at both local and advance levels (Cervero, 1996b). In same line, studies have developed from different channels, and include a quality of geographic measurements, places and locations with focus on urban form, urban facilities and nature of travel pattern. Subsequently, to add to this diversity of research, Kano urban area will be evaluated on the bases of its spatial form, human activities and travel pattern. Many different characteristics of urban form will be discussed and put in place in this study, and as well the problems of travel patterns will be discussed from different perspectives. Generally, this research brings in the results of contemporary discussions on urban form, human activities, and travel patterns with their attributes. The research studied the relationships between urban structure, activity characteristics and their nature of the travel patterns.

Consequently, at the strategic level, Kano urban form and the travel pattern problems concerning the location of infrastructure, facilities and other services will be evaluated. Accordingly, town facilities and city programs, as well as the dimensional extent and the general character of the movements and the type of land use will also be considered during the discussions. As such, this paper will further be discussing how urban form and urban activities affect travel pattern in Kano metropolitan city with focus on social, economic, and cultural aspect of urban development. While discussing the problems of the urban form related to travel pattern the study will suggest some concepts on the travel activity schemes in the urban areas and how it will help transportation policy makers or travel network planners to better grasp the characteristics of travel activity programs and as well can develop strategies to manage the congestions in the urban districts.

II. LITERATURE REVIEW

2.1 Urban Form

Sharma, (2014) in a long statements says the history of form has its roots in ancient Roman lexicon, and the Latin form of “Form” is “Forma” and it is used in the same form in the majority of modern European languages such as Italian, Spanish, Polish, and Russian. He further acknowledged that it is pronounced and written as form in English, French and Germany. However, the long history of this word and its wide use has created ambiguities in semantics of the word. Apparently, etymology of the word may lead us to a transparent meaning of this word at present. Sharma, (2014) go ahead and said Tatar Kivich is one of the renowned Western researchers who has paid deserving attention to the semantics and meaning of the words. He noted that Kivich believes before any survey on historical transformation of the word in various artistic fields we must first identify its multiform semantics, and then continue with the meaning of the word and its formation (Sharma, 2014).

However, Ramin, 1998 cited in Sharma, (2014) and acknowledged that “aesthetic researches have clarified at least five meanings for form, all of which need deserving attention for correct understanding of concepts and discussions on form”. Therefore, Form is taken as the arrangement and discipline among various components of any work. Form in the meaning of what is directly perceived by senses (Sharma, 2014). Similarly, scholars noted Form is a concept that indicates the presence of something that distinguishes it from other subjects (Eluwa et al. 2012; Sharma, 2014). Form is the conceptual essence of something that is placed opposite casual features. Form means contribution of the mind for understanding things. To this end, the idea of the evolution of urban form is a phenomenon in relation to activities with its society.

To refer the concept to the urban form, however, scholars further said “if we denoted 20th century as the era of urbanization and beginning of urban existence, yes of course because never before in the record of human urbanization developed so drastically – the new era has experienced human with space of urban exitance that dwell in an urbanized living environment” (Winters et al. 2010; Sharma, 2014). Transition and transformation are complex phenomenon in every changing situation that brings about important program such as economic, technological, cultural, social and political impacts (Koranis, 2011). The series of changes in economic globalization in present time is having a great impact on governance and nature of space development in most districts of all settlements (Unah, 2021; Sharma, 2014). In the contest of aggressive competition to bring other businesses, cities are upgrading their stand in the global trend of world and many developed cities are effectively organized to generate and keep the new comparative chances by creating economic activities through the successful development of urban interrelations and growth linkages (Winters et al. 2010). These development activities have led to the formations of urban patterns based on complementary events as a required condition for increasing such development and the economic programs.

However, Berrigan & Troiano, (2002) acknowledged that coming up of a revitalized “global-oriented reasoning” has markedly distorted the way public urban activities are discussed and discharged. This factor has sudden consequences on development of urban program show it was created, organized, designed, as well as planned. Though, environmentalist and other related professionals keep studying the urban form more or less unreluctantly for the better living of inhabitants, and come to conclusion that it is not just urban form that has changed, but also how the designers such as architects and urban planners perceive the expected functions of urban space. Therefore, professionals usually play vital roles in the organization of an urban form and its functions. To this end, it is well known and clearly defined that urban development programs are to some extent correlated with the developmental processes of travel systems and patterns of cities.

2.2 An Overview of Travel pattern

Contemporary cities that are always subject to changes and developments, as well unmethodical expanding and constant addition of components usually stand to face new challenges and problems regarding urban development (Koranis, 2011). Development is significant at every stage and also necessary to the sustenance and upgrade of any urban area as well as the nation at large. Urban settlement, local community, or nation is advertised as a developed entity only when is capable to provide adequate, reasonable and qualitative living programs for its citizens. Accordingly, the great achievement of every government is the accomplishment of higher value level of organized facilities in such a way that its people would gain natural connections to the environment and governance in all sectors of development. However, some scholars arguably say for a settlement to be in a constant stage of development certain necessary things must be in active state, which include social programs, infrastructure and good economic stability (Tolu & Abe, 2011).

Therefore, travel pattern and its organizational activities are somehow related to socio-economic programs of a place. The ability to move to a place and its network patterns are freight and the aspects of territorial linkages and accessibility are always at the basic of relationships (Olaniyi & Yusuf, 2016). Subsequently, favorable economic conditions are likely to exist where transportation network systems are able to respond to mobility needs and ensure access to market places and other social facilities (Jean, Claude &

Brian, 2006). The development of good travel pattern in all activities of an urban area or country is the ability to yield an improved, well organized, reasonable, affordable, reliable, accessible, unharmed, and well-integrated road network patterns which will flourish the social, political and economic part of a place. All these functions will make a good transportation systems and responsible travel pattern a derived demand by the public. Though, the sector as a whole is not producing much as per say, but is usually responsive to other factors generation in the creations and consumption parts of any urban settlement (Unah, 2021).

Therefore, a spatial collaboration is always a realized connection of people, good for transportation, or information generation between a source and a destined end. Accordingly, it is a good travel pattern demand expressed over a geographical space that brought about urban settlement qualities (Olaniyi & Yusuf, 2016). Therefore, appropriate travel pattern generates good spatial interactions that usually opened to greater extent of movements such as trip to office places, leisure places, migrations, the journey to social facilities, the market or retailing activities, religious places and freight sharing (Jean, Claude & Brian, 2006). Similarly, economic and social activities usually generate and attract flows of community programs, and flow of community program lead to interactions at all distances. If such programs are not coordinated in a manner that fit the sustainable proximity, travel pattern problems will be the case as may be.

Therefore, as the spatial interaction developed, every city has created its own special spatial form and travel pattern network to create access to the people and other relevant places. Nonetheless, noticeable important development patterns usually come-up with regard to the greatest usual mixtures of urban spatial form and travel network systems. However, as such, given the physically powerful dependency of these interaction of network system, scholars on urban design called these system as “urban travel patterns activities or urban accessibility pathways (Eluwa et al, 2012). Consequently, the defining sustainable features of these travel pattern is the extent to which accessibility is balanced and based on the closest distance covered between the travel source and destined end or on travel network solutions, which likely overcome the problems of proximity and challenge spatial separation in the urban areas.

a. *Understanding Kano metropolitan Urban Form*

Kano metropolitan city (figure 1) is one among the Hausa speaking domain and is the second largest commercial city in Nigeria with the excellent settlement pattern enclosed by ancient protective walls. Consequently, is considered as the center of Hausa trade and culture, as well reflects a higher degree of specialization and diversification (Oluwagbemiga & Modi, 2014). As noted by the researchers the city shared boundary with “Madobi and Tofa Local Government Areas (LGAs) to the South West, Gezawa LGA to the East, Dawakin Kudu LGA to the South East, and Minjibir LGA on the North East. Similarly, the study area is also made up of eight (8) LGAs. This include Dala, Fagge, Gwale, Kano Municipal, Nassarawa, Tarauni and parts of Ungogo and Kumbotso local governments” (Adzandeh et al, 2014). Accordingly, the city is distinguished with narrative cultural and traditional built features. It is also a place that is characterized with different varieties of designs that portrayed Hausa traditional settlement. Kano is a place where most important traditional symbols of Hausa architecture were preserved for decades (Aliyu, 2019). However, before the arrival of the colonial leaders (1960), every resident in Kano metropolitan incorporated an architectural practice that was culturally and traditionally significant to the so-called community Qurix, (2007) and the settlement pattern was still in line with the cultural characteristics.

With the shift in economic and social factors, city of Kano has witnessed a sudden several increase in population and construction, due to out-migration from neighboring towns and suburbs to the city in search of quality government work, business, as well as searching for better place to live. These factors lead to changes in the settings of Kano city as well impact character of urban development (Aliyu, 2019). Subsequently, the strength of the commercial facilities, improved economic activities and growth in population are increasingly straining the city’s development and the travel pattern (Unah, 2021; Sharma, 2014). The challenges of inconsistency urban development, unplanned urban programs, increase in population and improper design of travel network are predominant issues in Kano metropolitan today. The management of Kano metropolis, in particular its travel network planning unit, usually faced challenges in handling the scheme of the travel proximity programs with regard to the urban expansion (figure 2). Subsequently, the interactions between travel network system, urban facilities, urban activities, land use programs, and urban form is always complicated due to the fact that change in any one of these factors will surely result to shift in the other program.

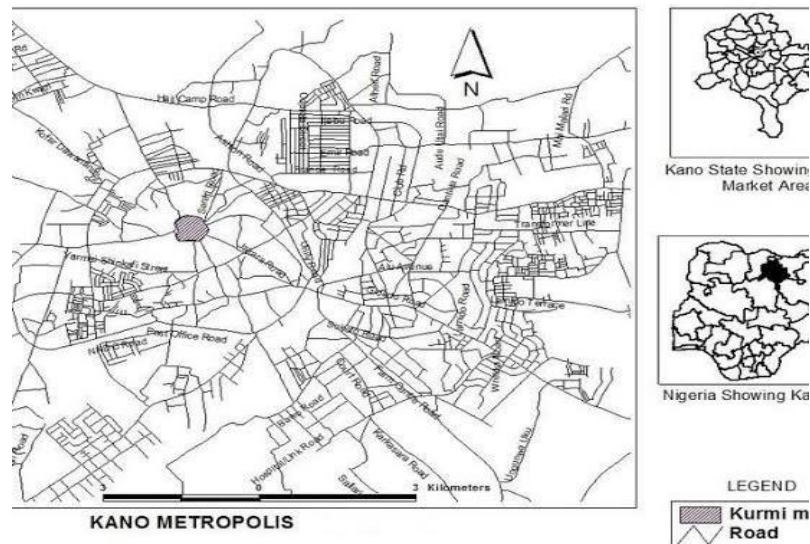


Figure 2. Map of Kano Metropolis. Source: (Adzandeh et al., 2014)

To this end, Kano Urban area is in the nature of dynamic form, complex interconnected structures with different urban programs, and is pertinent to the development in different physical shape, economic and social programs that is term urban growth. And, scholars acknowledged urban growth in a physical form is a complicated process that contain spatial temporal activities of physical components such as urban travel network (Sharma, 2014; Adzandeh et al, 2014). Accordingly, these activities or the changes are increased by many strong forces and some essential factors. Among the factors is movement from one place to other and is perceived as one of the main factors of urban changes and as well could be a problem in social activities. Similarly, researchers in the field of urban development noted that advances in good travel pattern, good network system have reduced the cost of commuting within urban centers and foster adequate urban scattering (Sharma, 2014; Olaniyi & Yusuf, 2016). Equally, travel network and good travel pattern with planned infrastructures and excellent facilities expansion has encouraged urban development and land use programs. At the same time, if care is not taken such development can affect travel pattern in the cities everywhere around the globe.

III. STUDY CONTEXT AND METHODOLOGY

The Area selected for this study is Kano metropolitan city in Nigeria. It is situated between latitudes $11^{\circ} 25' N$ to $12^{\circ} 47' N$ and longitude $8^{\circ} 22' E$ to $8^{\circ} 39' E$ east and 472m above sea level (Adzandeh et al. 2014).According to Adzandeh et al, (2014) “Kano metropolis is bordered with Madobi and Tofa Local Government Areas (LGAs) to the South West, Gezawa LGA to the East, Dawakin Kudu LGA to the South East, and Minjibir LGA on the North East. They further said the study context is made up of eight (8) LGAs,which includeincludeDala, Fagge, Gwale, Kano Municipal, Nassarawa, Tarauni and parts of Ungogo and Kumbotso local governments” (Adzandeh et al. 2014). As such, Kano metropolis is the largest town in northern Nigeria and has a population of 4,103,000 people (2021-Wikipedia estimate).

However, the study context is known as the “center of commerce” among the states because of the long steady commercial activities. This is due to the fact that business and other hand creative activities has been the reigning economic programs of the populace of Kano metropolitan city for decades (Adzandeh et al. 2014). In this study the nature of the characters of the urban programs in the metropolitan city was considered theoretically to conduct the relevant analysis on the travel patterns, human activities and their problems. The description of the urban area is shown in Figures. This study utilizes the theoretical and picturesque reference materials for assessing the spatial-nature of urban form and travel network situations in Kano metropolitan. And therefore, varieties of literatures were also collected to facilitate spatial temporal analysis of urban form and travel pattern in the city. Subsequently, the data that have significant connections with the main theme was collected through personal observations (photographs) and survey of related literatures as stated, and was presented in the theoretical evaluation part of the research.

IV. KANO URBAN FORM AND THE PROBLEM OF THE TRAVEL PATTERN

Adzandeh, et al. (2014) in their statistical analysis on urban growth in Kano metropolis pointed out that earlier before the recent changes urban planning unit in Kano have led to formation of some types of approaches paying attention to the impact of culture and its various manifestations on urban form. Creating about

intellectual principles, rules and laws, as well as the process of design and consequences that will be very effective in interference of development in the urban design. The presupposition placed emphasis on the role of urban planner as a subjective factor in promoting the quality of sustainable urban environment. Again, Oluwagbemiga & Modi, (2014) go ahead and pointed out that in the past with advent of modernism, development in Kano was subject to relatively fixed and resolute laws of urban development. During that time there were common laws in connection with urban form such as the presence of a consolidated and uniform generality, conformity to nature and living environment, conformity with residential units and urban facilities, observing artistic and aesthetic consideration, conformity with the travel pattern, and finally observing hierarchy in operations.



Figure 3: Ariel view of Kano metropolitan settlement.
Source: (Goggle Satellite, 2021)

However, with advent of political era associated with Hausa social behavior and responses, presently the urban form and the travel network have undergone drastic changes with no conformity to the previous rules and regulations (figure 3). These changes have affected the relations between mass and space, urban form and natural environment, culture and social connections and have broken apart the previous bonds and identity of the city to some extent (Oluwagbemiga & Modi, 2014). Suddenly, some of urban features and the nature of the road network within and outside the city are terrible as against the earlier culture and aesthetics of the urban development, due to some social and political interest. The travel pattern and human social conveniences that the urban planners have publicized for modern living, and their impacts on nature and character of urban form are no longer in place (Abiodun, 1979).

Given the significant understanding of the external factors of Kano urban form, and condition that usually lead to the problem of travel pattern characterized by sprawling activities, one most know what constitute travel pattern and how it will be affected by the urban form. However, scholars noted that travel pattern and its community network constitute a form of spatial interrelation and spatial interaction of people within urban spaces (Abiodun, 1979; Lawanson, 2006; Sharma, 2014). This is due to the location of urban facilities that lead to the increase in travel activities such as trip to offices, schooling, marketing, going to leisure places, shopping and so on. Though, there are many different programs on urban setting and interaction notably travelling regularly between one place to another, arrival of settlers in a place, which are normally based on the ability to grasp the idea of spatial interaction in the urban areas. The conceptual ideas have been variously stated but all the definitions moved gradually to accord with Abiodun (1979) that the concept of sustainable urban diffusion such as the reasonable travel network, good travel pattern, adequate proximity of things, proper locations of facilities, and meaningful spatial separation made up sustainable urban area.

As such, in Kano urban context, travel pattern usually faces challenges due to the increase in less active facilities, unorganized infrastructure, unplanned commercial activities, as well as meaningless and discouraging factors varying from congestion to market areas and other related commercial places. This for example, have been experienced in areas like Hotooro Tsamiya to Gingginyu settlement where commercial operation change the form of the settlement due to unplanned programs. This in-turn affected human conveniences and changed the travel pattern to some extent. It is important to note that urban facilities and social network is the main program of sustainability in these days with high beneficial responses (Tolu & Abe Oluwatoyin, 2011). However, the overarching objective supposed to remain everywhere such as the provision of good access to facilities rather than just the travel itself. Kano is car-oriented urban agglomerations, and many unscheduled programs of urban planning became the major failures of the travel pattern as the way of expansion whilst acknowledging that these programs vary in degree of characteristics and complexity. The most clearly defined ones are the introductions of commercial places in unnecessary districts without proper connectivity and linkages, and this

leads to the congestions/changes in the urban form while affecting the travel pattern. This is so evident in movement from Karkasara residential settlement to Aminu Kano Teaching Hospital where unnecessary commercial operations changed the travel pattern of the residents. These changes have seriously affected the travel pattern and usual proximity designed by the urban planners.

However, one among the 21st century scholars acknowledged that the mechanization of organized transport system connected with the decrease in inflows and movement, have freed urban areas in congestion crisis and as well can expand freely in a sustainable manner (Lawanson, 2006). Accordingly, this helped in the issues of accessibility by closeness with that access by distance earlier yielded by the onset of commercial vehicles and the related systems (Rode, et al. 2014, 2013). In Kano metropolitan urban context reverse is the case, and this series of actions extended to a new and completely fresh dimension with the introduction of large form of motorization and the free movement of commercial buses, tricycles (keke) and privately-owned cars which lead to expansion as well affects travel pattern in an unusual form. If such program can be rearranged in an orderly sustainable pattern by the Kano urban planners, however, the efficient this access of mass motorization, the greater the economic benefits and advantages through the space utilization.

The first principle of achieving good travel pattern within and outside the urban centers relayed on the physical activities of people related to their service areas, daily economic activities and religious programs. To some extent Kano metropolitan, based on its sociocultural and religious factors has developed its own unique urban form and travel network system that somehow provide access to people, goods and other facilities locations, but not to satisfactions due to some factors. Nonetheless, unusual principal changing patterns have showed up with respect to the ideal usual combinations of cultural, social and religious issues. A defining characteristic of these factors resulting to change in urban form and is the extent to which travel pattern is affected within kano urban district. This however, occurs based on the physical proximity between residential locations and commercial places which supposed to challenge the spatial separations.



Figure 4: Pictorial view of Kano metropolitan settlement
(Goggle Satellite, 2021)

As well according to Adzandeh, et al. (2014) while discussing in their statistical analysis on urban growth in Kano Metropolis, they acknowledged some defining factors that certainly affected the travel pattern systems, such as high density residential settlements, workplace densities (improper zoning of government offices), the spreading of related urban facilities, inappropriate land-use programs, inappropriate level of centralization of activities, and unprofessionalized urban design programs. And, therefore, more congested and unplanned urban city (usually referred to as unsustainable settlement-figure 4.) are typical examples of factors facilitating the problems generated by urban form and travel pattern.

V. CONCLUSION & RECOMMENDATIONS

A review on the literatures show that some previous studies have analyzed the characteristics of transportation activities, travel patterns and travel network with their causes and effects in urban settings. Those studies mostly paid attention to European countries and other developed nations where urban form and the travel pattern situation in the whole areas were challenged and reciprocal. However, urban form schemes configure urban spatial distribution and thus influence travel pattern. Unplanned urban form not only increases travel network problem but also, causes facilities and services pressure and consequently generate excessive traffic congestion. Therefore, urban sprawl, is strongly related to travel pattern which in-return causes and the effects Causality in-return changes, and reciprocal issues are apparent factors of urban expansion and the characteristics of travel pattern. However, from the research I came to realize that the relationship and the interactions could be seen as four important interacted activities: the travel pattern, increased population, travel demands, and change

of land use. Therefore, if these programs are coordinated according to urban design there will not be a problem in the travel network. And certainly, the relationship between travel network systems, travel pattern, facilities programs, land use and urban structure is complicated due to the fact that issues in any of this program will also bring in changes in the other three programs. Therefore, the ability to understand and show the possible dynamics between the levels of land use, urban developmental processes and the appropriate network of travel systems and travel demand would be helpful to urban planners so as to yield sustainable urban environment.

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