SMARTER STREETS VIA PERCEPTION, PAPER SUBMITTED TO THE INTERNATIONAL SYMPOSIUM OF THE ANALYTIC HIERARCHY PROCESS HOLDING AT WASHINGTON, DC, JUNE29TH TO JULY 2ND

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ABSTRACT

Streets are the most public of all public spaces. They are everywhere and the most fundamental integrators of the city. They are used for all kinds of purposes depending on how people perceive the streets. This study uses the Analytic Hierarchy process (AHP) to determine more accurately what perceptions best determines how streets are used. Multistage sampling of Makurdi was done clustering the wards that make up the city into low, medium and high density housing. From these clusters random sampling is done to select 2 neighborhoods in each of the three clusters totaling six neighbourhoods.The second stage of clustering is done based on two categories of streets connectors and minor arterials in the selected neighborhoods. On the second stage of clusters random sampling is also done to select 2 categories of streets each totaling twelve streets. On the streets systematic sampling of every 5th residence of two households for every street was done where resident's perception was measured using questionnaires. Anticipated findings include major activities carried out on streets. Perceptions that influence use of streets AHP was applied to analyze data findings. This data is crucial for evaluation of street use in Makurdi.

1. Introduction

This study aims to measure the influence of perception on the use of streets in Makurdi a fast growing urban center in Makurdi. Though streets make up public space in the rural and urban context. This paper is focused on urban streets. Streets encompass the road carriageway, shoulder, utilities, walkways, land use and activities one plot next to the road. They are arterials of movement akin to blood vessels in the body; they serve vital functions of traffic distribution, dispensing utilities and ejecting wastes through drainages from all over the settlement. Roads and

streets as public spaces are an indispensible element of urban life; they contribute huge economic, social, environmental, physical and psychological benefits however; how public urban space is used is majorly influenced by perception of the public. Perception is the mental process of organizing sensual stimuli gathered from the external environment through the senses into meaningful patterns. Thus, everything one does, thinks or feels and ultimately behavior can be linked to perception (Dikshit, 2006).

Understanding and measuring environmental imageries is central to the study of environmental perception in urban design. These measurements form strong data base for evaluation of urban designs and strengthening theories of environmental perception. In Makurdi measuring influences of perception on the use of important public space such as streets is crucial for the evaluation of the performance of adhoc planning process which is the existing planning method in Makurdi. In furtherance, Perception studies presents one of the biggest challenges for researchers in terms of accuracy particularly in designing structured questions for survey research (Traugott and Lavrakas, 2000).Hence This study aims to use AHP a method recently developed and thought to be more accurate to measure choice ,ranking and priority influences on the use of streets in Makurdi.

2. Literature Review

Visual stimulus of an external environment sends messages to the brain that are stored and effect changes in the brain so much so that exposure to the same external stimuli will invoke the same response or behavior based more on memory and experience than on the actual external environment. This is a vital part of perception which is called intentionality or phenomenology by (Relph, 1976 in Carmona Heath, Oc and Tiesdall, 2003) Phenomenology in perception is at the core of environmental behavior because it is the store house of the interaction that occurs between humans and the external environment. Phenomenology is difficult to measure for the following reasons; differences in environmental perception according to Carmona et al,2003 depend on

factors such as age, gender, ethniticity, lifestyle, length of stay in an area, physical, cultural, social environment. However, similarities in socialization, past experience and prevailing urban environment mean that certain aspects of environmental imagery can be generalized by people in common urban environments. Also, Observer variation, the validity of aggregating the environmental images of people with different back grounds and experience, the difficulty of indicating precise choice from a number of alternatives because one can have preferences for two or more alternatives for one question. The difficulty in ranking one choice above another; one can have ties in terms of first position, and one can prefer one alternative better but in relation to another alternative. As well, a respondent's choice may be to please the surveyor or to sound politically correct and not really the respondent's choice and lastly, respondent's actual preference may not be on the list of alternatives. All these factors make measurement of perception difficult using known statistical parameters; **hence the study sets out to measure the influence of perception on the utilization of streets in Makurdi using the Analytical Hierarchy Process to determine choice, priority, ranking and future trends,**

3. 0 Hypothesis and Objectives

a. An inventory of streets in Makurdi. Taking note of hierarchy, surrounding land uses, street surface material, setbacks, street furniture, vehicular access, rate of use and observation of set standards.
b. An observation of pattern of activities along the streets of Makurdi.
c. A perceptual /demographic analysis of residents of Makurdi
d. Application of Analytical Hierarchy Process, to determine choice, priority, rank and future trends.

1.1. the study tests the following hypothesis

1.1.1. people visit friends on the streets they perceive as safe more than on streets they perceive as unsafe

1.1.2. People walk on streets more if there are many activities to see and engage in that if there are not.

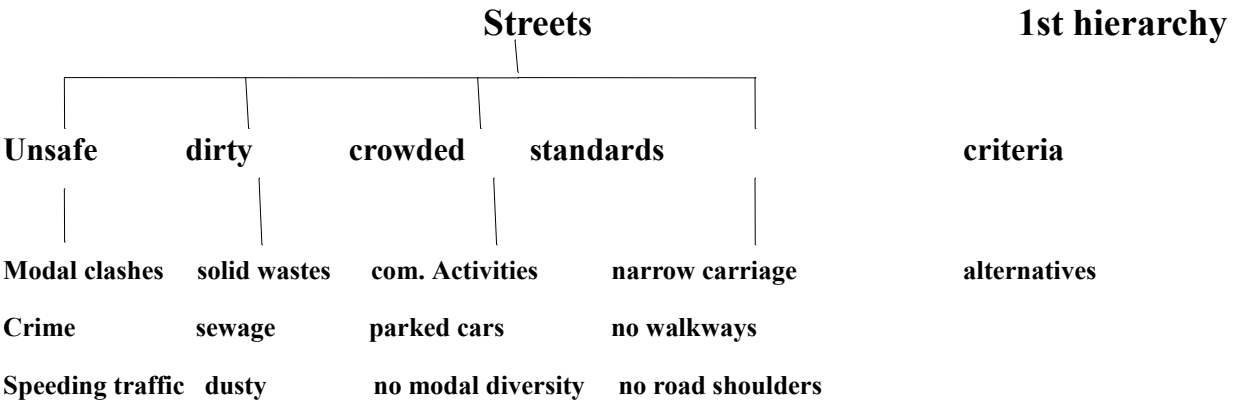
1.1.3. People like to walk on streets that they perceive as clean more than if the streets are perceived as dirty

4.0 Research design/methodology

Streets in Makurdi are the basic population for this study. Only neighborhood connectors and minor arterials which are the lowest category of streets will be used.Neighbourhood clusters based on residential density will be determined using low, medium and high density neighbourhoods.Sample size of two neighborhoods for convenience in each of the clusters giving a total of six neighborhoods were randomly selected .The send stage of sampling involves clusters of streets in the six neighborhoods based on connectors and minor arterial category of streets. Random sampling will determine one connector and one minor arterial in each of the six neighborhoods totaling twelve streets .On the chosen streets systematic sampling of the first and last household on every street will be done to give a total of 24 households. Questionnaires will be used to gather data on the perception of residents

Observation of street activity will be done to get an inventory of how streets are used. Based on reviewed literature perception of streets form the first heirarchy.They are perceived with criteria as Unsafe, Dirty, crowded and not to standard specification.Alternatives under unsafe perceptions include criminal activities, modal clashes and speeding trafic.Under dirty we have streets used as collection points for solid wastes, streets perceived as places where sewage flows and streets as dusty if they are not properly surfaced. Under crowded alternatives are perceived as jammed with parked cars that hinder free flow, filled with commercial and other activities that distract and filled with speeding cars which don't allow other modes like pedestrian, bicycle and motorcycles. Under specifialternatives streetsstreets are seen as too narrow carriage ways, no road shoulder and no pedestrian walkways

5. Data/Model Analysis



6. Limitations

The study makes use of only connectors and minor arterials which are the lowest category of streets. This is a limitation because there are two other categories of roads in a town .those categories cater for more volume, diverse modes and higher speeds. How they are used will have more impact in planning for a city. Also the study is limited by time only 2013 is used .This may not give a true picture in terms of history of streets.

7. Conclusions

The major contribution this study aims to show is local perspectives on street utilization which may or may not differ from other parts of the world. The study aims to demonstrate that AHP is more accurate by using other analytic techniques to measure perception and comparing differences. Areas for further research include the use of other street categories like major arterials. Also a design alternative proposal where areas of problems exist.

8. Key References

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