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PRIORITIZING FACTORS OF FAILURE IN CONTROLING PHYSICAL DEVELOPMENT IN NIGERIAN CITIES

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ABSTRACT

One of the problems development control in Nigerian cities has been found to be the prioritization of problem solving. Development control in Nigeria, a developing country and the entire sub-Saharan African countries is bereft with several problems in decision making .Which calls for a priority selection solution in decision making due to scarce resources. This research seeks to determine a way of systematically and empirically selecting the factors and problems militating against effective development control and causes of its failure in Nigerian cities, finding the way to select the problems that are of most priority. The combination of the Ahp and the Delphi technique has been used to determine the significant factors and compared to each other to find the problem of most priority to be solved. In carrying out a development control process, it was found that expert opinions all have consistency ratio value of less than 0.1, which shows a significant value, therefore priority selection of problems was based on nearness to 0.1, where only 3 factors of the expert opinions fall within the category of selection, therefore factors such as, insufficient financial capacity, absence of public enlightenment on the importance of development control, unsuitable organisational structure for implementing the urban plans were selected as of most priority to solve a development control problem.

Key words: development control, decision analysis, selecting prioritised problems.

INTRODUCTION:

Many African countries face tremendous challenges to provide a decent living condition for all. Countries in the sub Saharan Africa are presently witnessing the world's fastest increase in population. Countries, like Kenya and Nigeria, need only 17 years to double their population, with Nigeria's major cities growing fast with a typical yearly increase of 10%. This high figure reveals an

increasing rate of urbanization, which gives reason for concern. Nigerian cities are already showing symptoms of rapid urbanization, like inadequate housing problems and lack or inadequate basic services facing the built environment (Aribigbola, 2007). Several attempts to mitigate these challenges have been applied by the government. These they did by the introduction of programs and policies to control and manage landuse. These policies concentrated on direct construction of housing, sites and services programs, and the 1978 landuse act, which supports the transfer of ownership and land management from individuals and communal ownership to public ownership. Housing policies from 1991, which was later modified in 2002, sought to ensure that all Nigerians have access to a decent, safe, and sanitary housing accommodation at affordable cost. This is to be realized through private sector initiative and partnership with the government and also the urban and regional planning law of 1992, which seeks to reorganize physical planning in Nigeria (Aluko, 2000).

The growing problems of unguided landuse have attracted attention, both locally and internationally. Most of the noticeable problems confronting cities in Africa and their inhabitants have been enumerated by the Habitat II agenda, 2002, which includes:

- Increasing vulnerability of urban population to natural disasters, resulting from the extension of residential settlement into areas prone to floods and natural hazards and
- Inadequate shelter, poorly maintained and deteriorating urban physical infrastructure, and services. Particularly water supply, power and housing. (Banyikwa, 1989)

However, the most challenging problem is the problem of development control. This is characteristically similar in the sub Saharan African countries, where the cities have been found to continue to grow in a haphazardly, uncontrolled manner. This has made planning policies and implementation difficult and is most noticeable in the study area.

The Nigeria town and country planning law of 1992 defines development control as the process of ensuring that developments are carried out as approved by local planning authorities. The term accords with the concept of quality control.

Lokoja is one the cities in Nigeria that is faced with development control problems, which came about as a result of increase in population due to natural increase and immigration of people from the neighboring towns. This has been attributed to the change in status of the town to a state capital.

There has been influx of people into the town in search of jobs and a better life. There is, therefore, a high demand for construction of more buildings and pressure on available facilities and amenities. The city is experiencing a high demand and competition of several land uses, with problems such as blockages of sewages, construction on prime agricultural lands and wet lands, inadequate setbacks for buildings, loss in size of reserved open spaces, and haphazard development over available land. (Egene, 2008)

Even though efforts have been made by the state town planning development board to curb these problems, it has yielded little or no positive results due certain bottlenecks. Several factors of failure have been cited in literatures as the cause of failure of development control in Nigeria. These include insufficient legal frame work, lack of tools, inadequate personnel, corruption, lack of data and information for decision making, inadequate funding, e.tc (Jiboye, 2005). But the main reason given for failure in development control is funding. Therefore, the control implementers must devise a way to prioritize the problems to solve first within available resources.

The questions now are:

- How do you select the problem of immediate priority and at what hierarchy of importance?
- How do we solve the flaws of development control of not involving the stakeholders in decision making?

These calls for a change of strategy in order tackle some of these bottlenecks.Suggestions have been put forward in this research to involve professionals and experts who are stakeholders. The planning boards are to get their priorities straight. This research is aimed at identifying various factors resulting in the failure of implementing development control in the study area using the Delphi method and the Analytical Hierarchy Process (AHP) technique. It is used in determining the significance of the factors in comparison to each other .The research shows that a combination of the concepts of Delphi and AHP techniques can be utilized to solve the aforementioned problems.

Delphi method

The Delphi method is known to have originated from United States of America in the 1950's. It was tagged the "Delphi project" and was a study based on expert opinion at the Rand Corporation for defense research. The method brings a broad range of ideas to bear on solving problems based on expert judgment by the use of a series of questionnaires interspaced with controlled opinion feedback (Amos & Pearse 2008)

According to Taleai and Mansourian (2008) and Linestone and Turoff (2002), the Delphi process exists today in two main forms, which are the conventional Delphi and the real lucre Delphi. The real lucre Delphi is the one in conference form. In the conventional method, the group of participants do not have to have face to face contact; this is used for experts who cannot come together physically. They could connect to the individual panel members via mail; there were instances where the mail was used to distribute questionnaires (Saint-Germain, Ostrowski & Dede, 2000). The e-mail version of the Delphi method has been found to preserve much of the traditional method and provides a quicker response to reduce the drop out rate among participants.

In this study, the conventional Delphi approach was applied because of the convenience of assembling experts together in a conference, which serves as one of its limitations.

The Delphi method can be briefly described as an iterative process designed to achieve a consensus among a group of experts on a given issue, which allows the querying of expert judgments. It is usually useful where there are no standard criteria for evaluation of factors. This method is used for developing forecasts of future events. It is for conceptualizing and inventing the future, when available data provides little or no insight into the probability of events of interests. The method is also useful where there is lack of agreement or complete state of knowledge concerning the nature of problem (Delbecq, Van de Ven, & Gustafson, 1975) or in a case where modelling is difficult (Gibson & Miller, 1990). The technique is also characterized by the use of a group of a knowledgeable panel of experts. The collection of opinion of these experts is used as a source of information (Denzin & Lincoln, 1984). Clayton (1997), here, defines an expert as "someone who has the required knowledge and experience to participate in a Delphi and membership could be from same discipline or different professional strata".

Lastly, this method requires also that the group of experts respond to iterative series of written questionnaires (called rounds) interspaced with summarized information and feedback opinions derived from earlier responses, this is given to each respondents with the objective of reaching a consensus. The consensus is observed through the convergence of variances or decrease of standard deviation in subsequent iterations, which is, then, defined as an agreement in opinion of all concerned or as a majority view (Williams & Webb, 1994).

This method has been used in various researches that are similar to this by Taleai and Mansourian (2008) and Shiftan, Kaplan, and Hakkert (2003). Fischer (1978) gives the summary of the conventional Delphi steps method as follows:

(i) The designing of Questionnaire and selection of experts.
(ii) Performing the first round survey of anonymous experts.
(iii) Experts are provided with the opinions of others (first round opinion).
(iv) Experts are required to answer, again, on the first round problems while observing if new solutions were proposed or different views were put forward.
(v) Opinions are the synthesised to reach a consensus.
(vi) Steps iii and iv are, then, repeated to achieve a result for the topic in question.

AHP method

The AHP approach, developed by Saaty in 1980, is used mainly in the Multi-Criteria Decision Methods (MCDM). This procedure has been used by many researchers to solve complicated city problems (Yuskel and Dagdeyiran, 2007). It was found that solutions in the AHP are not a statistical procedure because it can help either a single decision maker or a decision group to solve a MCDM problem (Sadigheh, Habibi, & Mohammed, 2009; Chang, 2007). It has the advantage that it can measure both quantitative and qualitative characteristic of a decision.

The application of AHP involves 3 steps:

(i) It begins by decomposing the overall goal (suitability) into a number of criteria and sub criteria. The goal, itself, represents the top level of the hierarchy.
(ii) Comparison of judgments using the Pairwise comparison data on elements of the hierarchical structure.
(iii) Syntheses of priorities or constructing an overall priority rating (Harker & Varges, 1987).

At the first stage, the decision maker breaks down complex multiple criterion decision problems into its component parts and attributes are arranged into multiple hierarchical levels. Since the criteria and sub criteria are not equally important to the decision at each level of hierarchy and each alternative rated differently, the AHP will provide an analytical process to combine and consolidate the evaluations of the alternatives.

Once the second step of the AHP is modelled, the relative importance between each pair of criteria to the overall goal is evaluated. The Saaty nine point scale is used for these evaluations. (See table 1).

LEGAL FRAMEWORK

According to Ola (1984), planning should be seen as related to development control, without which it will fail to achieve its objectives. It was emphasized that development control ensures an orderly growth of settlements by stipulating adequate planning standards in areas of lighting, ventilation, open spaces, and other socio-cultural factors that make life worth living in accordance with the development plan. Aribigbola (2007) also noted that development control aims at realizing an ideal, social control production of good health and guiding development according to plan and conflict resolution. It is a device for regulating the misuse of land and the environment. Aribigbola (2007), too, noted that there is both a people's purpose and property purpose in development control. The property interest relates to the coordination of investments on land and building, conservation of natural heritage, functional development works, and the issue of pleasing

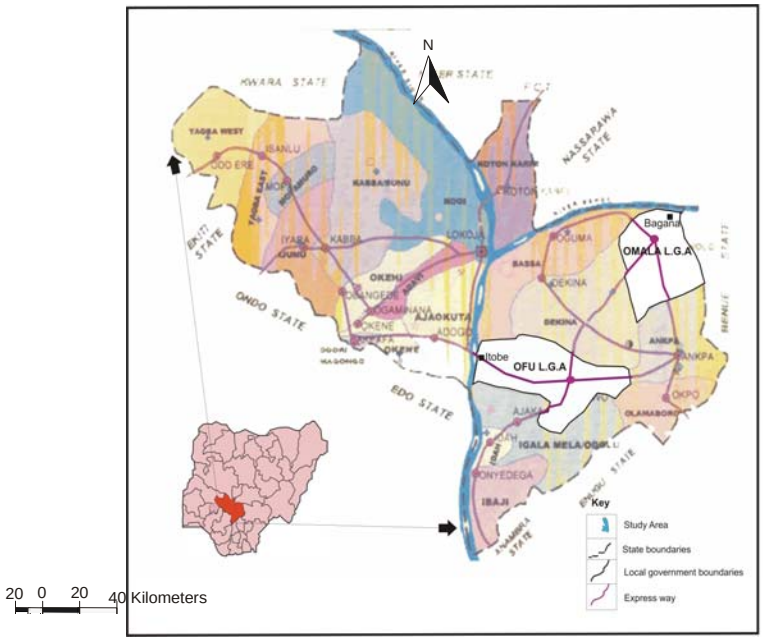
The bases for development control in Nigeria are a reflection of its laws. This is referred to as the town and country planning laws and regulations and was carried out on legal basis from a charter granted by authority or government. The basis for this law is to ensure orderly development in an area and to maintain laid down standards.

The need for development control in Nigeria came about in an attempt to curb haphazard development and the outbreak of the bubonic plague, which ravaged the city of Lagos in 1928. Prior to this period, the building and regulation laws of the country were based on the Great Britain Town and Country Planning Law of 1932. By 1946, an indigenous town and country law was carved out of this. This continued to be operative until in 1992, when a new urban and regional planning was promulgated backed by the decree 88 of 1992.

It is the section 27(1) of this law that concerns development control, stating that the control department, at the federal level, shall have power over the federal lands and estates. The states' control department shall, in turn, have control power over the state lands .While at the local government level, the power of development control shall be within the jurisdiction of the local government. The control department should be a multi-disciplinary department charged with responsibility of matters relating to development control and implementation of physical development plans. All land development should require the approval of the relevant control

department. Also, a developer should submit a development plan for approval to the development control department as stated in section 28.

Study area



Source: Adapted from Kogi State map 2009

Figure-1 Lokoja in Kogi State, Nigeria

Lokoja, a city in Nigeria has been selected a case study in this research. Lokoja lies between latitude $7^0$45'N and longitude $6^0$45'E. Lokoja is the administrative headquarters of Kogi State in Nigeria (figure-1). It is well connected and accessible through state and federal highways. It is also located close to confluence of the River Niger and Benue. The area is sandwiched between a water body and a hill. River Niger and Mount Patti had streamlined the settlement to a linear one and had a modifying effect on the climate.

The climate is characterized by a wet and dry season and situated in Guinea Savannah Region. The annual rainfall is between 1016mm and 1524mm, with the mean annual temperature of 33.2”C.

MATERIALS AND METHODS

The research is based on empirical data which focuses on failure of development control in Nigeria, using Lokoja as a case study. The research is based on primary and secondary sources of data. The primary data was collected from direct interviews. Responses to questionnaires, administered to the

people and professionals in the field of planning and related fields, were utilized by town planners, architects, and estate surveyors. The secondary data was collected from books, journals, and the internet. The basic data set for the paper was collected using questionnaires. There were two sets of questionnaires used. The first was administered for data generation for the Analytical Hierarchy Method (AHP) and posited to the inhabitants of the town. The second set of questionnaires were prepared and distributed to the experts for the Delphi technique. Only ten experts participated in Delphi session, twelve were invited.

This study utilizes 6 steps to carry out the Delphi method as follows:

1. The designing of the questionnaire and selection of experts.
2. Performing the first round survey of anonymous experts.
3. Experts are provided with the opinions of others (first round opinion).
4. Experts are required to answer, again, on the first round problems while observing if new solutions were proposed or different views were put forward.
5. Opinions are the synthesised to reach a consensus.
6. Steps 3 and 4 are then repeated to achieve a result for the topic in question.

This was then complimented with application of the AHP technique, which was carried out through the steps shown below:

1. It begins by decomposing the overall goal (suitability) into a number of criteria and sub criteria. The goal itself represents the top level of the hierarchy.
2. Comparison of judgments using the Pairwise Comparison Data on elements of the hierarchical structure.
3. Syntheses of priorities or constructing an overall priority rating. Once modelled the second step of the AHP, the relative importance between each pair of criteria to the overall goal is evaluated, the Saaty nine point scale is used for these evaluations.

(See table -1 below)

Table 1: Pairwise comparison matrix

Intensity of importance	Definition
1	Equal importance
2	Equal to moderate importance
3	Moderate importance
4	Moderate to strong importance
5	Strong importance
6	Strong to very strong importance
7	Very strong importance
8	Very to extremely strong importance
9	Extremely importance

Source: Saaty 1980

All scores were assembled in a Pairwise comparison matrix. This contains expert opinion regarding the relative importance of the criterion.

The final step in the AHP is the evaluation of the Pairwise matrix using measurement theory. A standardized Eigen vector is extracted from each comparison matrix, allowing the assembling of a suitable value for each land mapping unit. For each hierarchy level it is pertinent to note that if the Pairwise comparison is consistent in order to accept the result of the weighing, then the parameter that is used to check this will be called the Consistency Ratio (C.I.). The Consistency Ratio is therefore a measure of how much variation is allowed and must be less than 10%. The consistency ratio is indicative that the comparisons of criteria were perfectly consistent and the relative weights were suitable for use in the suitability analysis.

Therefore, to establish a pairwise comparison matrix X, let m_1, m_2…, m_n denote the set of elements, while a_{ij} represents a quantified judgment on a pair of elements m_i and m_j. The hierarchy of importance of the elements are rated using the Saaty's table -1 given above. A construction of hierarchical matrix for X is given below as:

$$X = (a_{ij})\ ij = \ldots, \quad \begin{matrix} m_1 & 1 & a_{12} & . & . & . & a_{1n} \\ m_2 & 1/a_{12} & 1 & . & . & . & a_{2n} \\ m_n & 1/a_{1n} & 1/a_{2n} & . & . & 1 & \end{matrix}$$

As a result if values ij makes the following Equation-1, because it is reciprocally equal; then matrix a/an (positive/opposite), is a reciprocal pair-wise comparison matrix:

So when aji =1 and a_{ij}= 1/a_{ji} then ij= 1, 2…..,n (1)

And if the elements m_i and m_j are equally important to the property they are compared to, then a_{ij}= a_{ji}=1 i,j =1, 2……, n (2)

If an element is compared to itself then the equation becomes

a_{ij}=1 i=1, 2……., n (3)

The next task is assigning weights to the n elements m_i, m_2 ….m_n. In adapting the application of Sadigheh et al (2009), the relationship between weights w_i and judgments a_{ij} can be given by w_i/w_j=a_{ij}(for ij= 1,2,….,n) and the assigned relative weight enters into the matrix element a_{ij} and reciprocal of the entry 1/$a_{ij,}$ which goes to opposite side of the diagonal (see matrix below).

$$X = (a_{ij}) = \begin{matrix} w_1/w_1 & w_1/w_2 \ldots\ldots\ldots w_1/w_n \\ w_2/w_1 & w_2/w_2 \ldots\ldots\ldots\ldots\ldots \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\ w_n/w_1 & w_n/w_2 \qquad w_n/w_n \end{matrix} \quad (4)$$

Satty (1980) showed that there is a relationship between the vector weights, w, and the pairwise comparison matrix, X, shown in equation 5.

$Aw = \lambda_{max} W.$ (5)

Where A = the comparison matrix.

W = Eigen vector.

λ_{max} = Max value of eigen for matrix A.

The value becomes more consistent the nearer the maximum Eigen value is to the Value – (λ_{max}) n. Where the consistency ratio is high, the situation means that values entered are inconsistent. In order to maintain consistency when deriving priorities from the pair-wise comparisons, the number of elements in a decision problem should be ≤ 9. The AHP, therefore, allows for inconsistency in each set of judgments, which is deemed unacceptable if it is ≥ 0.10. Consistency is, therefore, measured by the consistency ratio (see equation 5). Consistency Ratio, CR, is therefore,

CR = CI/RI where CI is the Consistency Index

RI is the Ratio Index…….. (5)

CI = $(\lambda_{max} - n)/n-1$……... (6)

Where λ_{max} is as above; n is the dimension.

The preferences presented by each expert are aggregated to obtain a single weight for each factor. This is carried out in the AHP environment with use of the Geometric Mean Method (GMM). Individual preferences were aggregated to generate the aggregate comparison matrix and compute group consistency of the individual weights.

In this research, the aggregation of individual priorities is utilized by using the Eigen Vector Value Method (EVM) as the prioritizing procedure and the Weighted Geometric Mean Method (WGMM) as the aggregation procedure. This is to arrive at an acceptable decision making.

Determining factors of failure in controlling development

To determine failures of development control, the following five steps were followed:

- Defining major factors causing failure in development control implementation,
- Establishing judgment matrix,
- Calculating the significance of the factors for each expert,
- Testing consistency of each expert judgments, and,
- Aggregating expert judgments.

RESULT AND DISCUSSIONS

Major factors causing urban development control non implementation

The collected information was integrated, analyzed and compressed as follows: Following first step as given above in determining the causes of non implementation and failure, these was found as-

1. Insufficient legal framework - [A1]
2. lack of equipments and tools - [A2]
3. inadequate skilled personnel - [A3]
4. infiltration of corrupt and compromising officials - [A4]
5. Insufficient organizational structure for implementing development control -[A5].
6. absence of public enlightenment on the importance of development control -[A6]
7. Lack of data and information for decision making - [A7]

8. Non involvement of other urban management organization for preparing urban plan - [A8].
9. Unsuitable organizational structure for implementing the urban plans - [A9].
10. Insufficient financial capability - [A10].

Judgment Matrix

At this stage which is the second stage, experts ranked and made priorities of the factors given and an analysis was then made of their decision by the use of the AHP method, where relative scores were assigned to the expert decision elements (see table 2: an example of one expert judgment). Each expert made a judgement matrix of the decision elements, for example factors that have been previously determined at the first stage. They are, then, assigned relative scores based on the AHP method.

Table 2: Showing judgment matrix for one of the expert (expert - 1)

Major factors	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
A1	1	0.50	0.333	0.333	0.333	0.20	0.1429	0.20	0.20	0.143
A2	2	1	0.50	0.20	1.00	0.333	0.50	1.00	1.00	1.00
A3	3	2	1	0.333	5.00	5.00	2.00	2.00	2.00	0.40
A4	3	5	0.333	1	1.00	0.50	0.50	0.50	0.50	0.40
A5	3	1	0.20	1	1	0.50	0.50	0.5882	0.5882	0.667
A6	5	3	0.20	2	2	1	0.6667	1.00	1.00	0.667
A7	7	2	0.50	2	2	1.5	1	1.4286	1.4286	1.00
A8	5	1	0.50	2	1.7	1	0.70	1	1.00	1.429
A9	5	1	0.50	2	1.7	1	0.70	1	1	1.00
A10	7	1	2.50	2.5	1.5	1.5	1	0.7	1	1

Individual priorities

Here the Eigen Vector Method was used for the prioritization and the Geometric Mean Method as the aggregation procedure to determine the significant factors as compared to each expert judgment (see table 3 below).

Table 3: Priority vector of all experts

Expert weight Of factors	expert -1	Expert -2	Expert -3	Expert -4	Expert -5	Expert -6	Expert -7	Expert -8	Expert -9	Expert -10	aggregated weights
WA1	0.0239	0.0205	0.0254	0.0232	0.0262	0.0222	0.0238	0.0229	0.0292	0.0214	0.024
WA2	0.0683	0.0904	0.1616	0.0462	0.0275	0.0444	0.1287	0.0884	0.0873	0.0427	0.079
WA3	0.1963	0.1214	0.1986	0.0933	0.0524	0.1550	0.1494	0.0804	0.0873	0.0641	0.104
WA4	0.0785	0.1179	0.1207	0.1166	0.1021	0.0878	0.1283	0.0488	0.1464	0.0641	0.101
WA5	0.0594	0.0654	0.1348	0.1642	0.1872	0.1562	0.0705	0.0458	0.2107	0.0907	0.104
WA6	0.1020	0.0708	0.1141	0.0916	0.1072	0.1111	0.0705	0.1153	0.1463	0.1077	0.114
WA7	0.1278	0.1139	0.1188	0.0700	0.0769	0.1111	0.0483	0.1153	0.1463	0.1077	0.104
WA8	0.1042	0.1026	0.0366	0.1171	0.1312	0.0449	0.0483	0.1611	0.0593	0.1463	0.095
WA9	0.0986	0.1486	0.0447	0.1171	0.1259	0.1111	0.1661	0.1611	0.0593	0.1674	0.112
WA10	0.1407	0.1486	0.0447	0.1605	0.0834	0.1560	0.1661	0.1611	0.0277	0.1879	0.128

Testing the consistency of Judgments for each expert:

To find the consistency of each judgment, the measures used for EM as in the AHP, proposed by Saaty (1980), was employed. For example, CR= CI/RI where

CR= consistency ratio

CI=consistency index

RI= random consistency

And a CR that is less or equal to 10% is acceptable as consistent (CR<0.1) and that which is greater is rejected (CR>0.1), then the subjective judgement will have to be revised. The use of this formula can be seen on Table 5, where the result shows that the priority vectors of all the 10 experts were acceptable.

Aggregating Expert Judgments

The aggregation of individual priorities (AIP) was used to aggregate the opinion of all experts. It is believed that the geometric mean, which combines group inconsistencies for aggregation, is much better than the use of an individual inconsistency for aggregation. Table 3 above shows the differing opinions of experts. The last column of the table represents the geometric mean. This is to ensure that the opinions of the majority are considered.

Table 4: Consistency Index (CI)

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Source: Standard Consistency Index Table

Table 5: Consistency Ratio (CR) values for all experts

	expert-1	expert-2	expert-3	expert-4	expert-5	expert-6	expert-7	expert-8	expert-9	expert-10
CR	0.016	0.053	0.069	0. 068	0.069	0.077	0.069	0.064	0.075	0.086

From the on going discussion, it can be seen that all the factors are consistent since the opinions all have consistency ratios less than 0.1. This means they are all significant and that they are, therefore, all accepted (Table 5). None were rejected; however, the level of acceptance was used to select the most prioritized opinion based on the nearness to, 0.1. Based on this, only 3 opinions have been found to be most significant. Therefore, the following have been selected, respectively:

- Insufficient financial capability
- Absence of public enlightenment on the importance of development control
- Unsuitable organizational structure for implementing the urban plans

The above, therefore, stands as the problem that needs the most prioritized solution for effective development control implementation in Lokoja.

CONCLUSION

Most development control activities in Nigeria, at large, and its cities, particularly, are faced with many bottlenecks which have made plan implementation and control difficult or impossible. Several factors have been found responsible for these; however the difficulty in tackling all at once calls for a method of prioritization, where the most germane problems are dealt with first.

In this study, the combination of the Delphi-AHP have been developed to define the main problems of development control and to prioritize the most important problem that calls for immediate attention. The study has shown the Delphi method as a useful instrument for querying and achieving consensus among a group of professional planners (experts), of the most important factors causing the failure of development control.

The AHP methods were also found useful because it helped to transform qualitative opinion into quantitative factor and were used to transform the numerical indicator of the failure of development control implementation failure. The Pairwise comparison was also useful in comparing various factors with each other in a matrix. It can, therefore, be concluded that the Delphi-AHP approach is useful in defining problems and causes of failure of development control in Nigerian cities.

From the findings of this research, the problem that needs urgent attention for effective implementation of development control and that should be of priority have been found be: solving the problem of financial incapability, increasing public enlightenment on the importance of development control, and reorganizing the organizational structure on ground for implementing the urban plans.

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