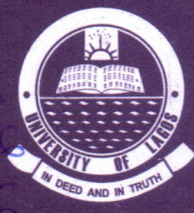

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TOPIC:

DATA SUFFICIENCY: SOLUTION TO COMPLEXITY OF SOCIETY

By
PROFESSOR JOSEPH NNAMDI MOJEKWU

DATA SUFFICIENCY: SOLUTION TO COMPLEXITY OF SOCIETY

An Inaugural Lecture Delivered at the University of Lagos Main Auditorium on Wednesday 21st October, 2015

By

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DEDICATION

This inaugural lecture is dedicated to the memory of my parents, Mr and Mrs Benjamin Dibiaezue Mojekwu

The Vice-Chancellor;
Deputy Vice-Chancellor (Academic & Research);
Deputy Vice-Chancellor (Management Services);
The Registrar;
Other Principal Officers;
The Provost, College of Medicine;
The Dean of Business Administration and Other Deans here present;
Members of Senate;
My Colleagues;
Members of Academic Community;
Dear Students;
My Family and Friends;
Distinguished Guests;
Ladies and Gentlemen.

Preamble

I thank the Almighty God for this special day in my life and in the history of the family of the late Mr and Mrs Benjamin Dibiaezue Mojekwu. This is a great day, as it is an opportunity for me to present my thoughts and works towards my commitment to improve the well-being of the Nigerian society, especially in the area of understanding the value of data in decision-making.

Mr Vice- Chancellor, Sir, this inaugural lecture, titled "Data Sufficiency: Solution to Complexity of Society" focuses on the data which constitute the most essential inputs for valid decision-making towards effective planning and development.

My inspiration from the love of playing with figures started during my days at Oraifite Secondary School, Anambra State, via my Further Mathematics Teacher - Mr Harold Ndulue, who was repeatedly telling us: "For you to be a complete human being, you must know what is meant by data, play with data and work with data at any point in time."

This statement formed the major part of my inspiration which aspire me to study Mathematics to the highest level. I was further empowered and encouraged when I saw my name on

the list of those who were given Anambra State Special Scholarship Award to study Mathematics at the University of Ife, Ile-Ife. As I progressed from 100 level to 200 level in the University, I noticed that Mathematics lacks an aspect of my Teacher's statement, which Statistics, as a discipline, seems to capture. That particular aspect of the statement is concerned with the interpretation of results emanating from playing with data. This gap made me to quickly apply to switch over to the Statistics programme. Therefore, with today's inaugural lecture, I stand fulfilled in realising my dream to be a Professor of Social Statistics and make a significant contribution to the development of the society. Of course, my vision encompasses not only University of Lagos and my town, but the entire Nigerian society.

Introduction

Data are the input raw materials from which information is to be obtained. Hence, information is data which have been processed in such a way as to be useful to the recipients for decision-making processes.

As a result, the importance of data cannot be ignored, as it is through the planned and systematic collection, analysis and interpretation of data that the society would be able to arrive at feasible solutions to most of the problems facing it and at the same time advance in knowledge. Data help to create new ideas viz-ã-viz the growth and stability of the society. From the available data, it is possible to correct abuses, prevent evils and eliminate corrupt practices within a society so as to achieve the desired change through the formulation of new policies and programmes. Furthermore, in seeking changes and innovations in any society, data play an important part especially in providing the framework for achieving the desired change. It is worth mentioning that this process cuts across all disciplines of human endeavour. Hence, the focus of this lecture is on the area of the social well-being of the society, which is termed Social Statistics. The challenge here is the search for statistical and mathematical solutions, with a view to achieving deductions relating to all aspects of the social well-being of the society. Therefore, data and information being the

pillar of development, any organisation or government that does not keep sufficient data and records will fail in its planning and decision-making processes.

Importance and Uses of Social Statistical Data

Generally, Statistics is concerned with the total collection, tabulation, presentation, analysis and interpretation of available data to arrive at reasonable decisions. Most often, people take quick decisions without taking measures to study deeply the characteristics of the available data. This usually ends up in unrealistic decisions or total failure. However, if available data are sufficient and adequately studied, one should be able to utilise the information derived to:

i. Acquire a good background knowledge of the study area or problem at hand;
ii. Plan and develop future activities;
iii. Set future targets;
iv. Formulate policies for achieving the set objectives or targets; and
v. Take relevant valuable decisions.

Social data are the forms of data generated to study human behaviour in a social environment. In order to generate such data, a group of people is normally selected and a set of data relating to their behaviours are obtained. After the analysis of the generated data, the results obtained are used to assess the people's well-being in terms of quality of life, availability of social amenities and health situations as well as formulating relevant policies and programmes to improve on their well-being.

Social Statistics and Demographic Data

Social Statisticians usually make use of demographic data to describe, analyse and interpret population phenomena. Generally, social statisticians adopt certain procedures to transform data into useful information for effective decision-making which can affect the societal situation.

With sufficient demographic data, a social statistician seeks to develop a mathematical and statistical description of human

populations which covers the examination of the following population characteristics:

i. Size – the number of persons in a defined territory.
ii. Distribution – the arrangement of persons in a defined territory at a given time.
iii. Structure – the distribution of people according to age and sex.
iv. Population changes overtime – the growth or decline of the population.
v. Causes and effects of population change – factors responsible for such changes.

Generally, the study of social data can be extended to cover the social, economic, historical and political characteristics of the population and related demographic process. This requires extensive and sufficient data. Although, it is expensive, the costs can be justified in economic terms in a country which can use the results valuably for administrative, social and economic planning purposes.

Having carefully looked at the foregoing tasks, it is not in doubt that the impact of Social Statisticians has not been significantly felt in Nigeria as a result of insufficient data. Many of them are committed, but their efforts are usually frustrated by the availability of only scanty data and unhealthy political motives.

Sources of Social Statistical Data

There are three major available sources of data which can enable Social Statisticians to build a model to study and seek solutions to the problems impeding the social well-being of a particular society. These three sources include:

i.) Population Census.
ii.) Demographic Sample Surveys.
iii.) Vital Registration System.

Each source has a specific laid-down procedure for generating the required data. Any deviation from the procedure will seriously affect the precision of such data and thereby might not be sufficient. Hence, Statisticians must be adequately trained in such a manner that they would not compromise the

precision of the expected data and would regard the sufficiency of the data as paramount.

It must be noted that the nature of the expected data determines the source and method to be used in collecting the data. Adopting a wrong method or source normally provides data with very poor quality, that is, insufficient data.

Population Census

Population Census involves the process of collecting data about every individual in a country on the census date. It is normally conducted at a regular interval of 10 years because census data take very long time to analyse.

Census data provide detailed information regarding households and individuals, their ages, history, occupation, beliefs and education.

The data obtained through the census are usually subject to errors because people tend to lie about their ages, incomes and marital status for various reasons. In addition, data from census are also subject to the duplication or omission of some people, if they are travelling on the census date. The process of census is extremely expensive in terms of time and resources; hence, it relies on the honesty and co-operation of the population, despite the use of trained data collectors. The conduct of census must involve fully government participation due to the sensitive nature of the exercise. The compilation and publication of census data are usually done according to the geographical areas and basic demographic variables (See Table 1).

Table 1: Population Census Data for a Particular State Classified by Sex and Number of Deaths

Age Group	Population of 30th June		Number of deaths	
	Males	Females	Males	Females
0	53,500	52,500	293	254
1-4	204,000	188,000	224	187
5-9	255,000	236,000	19	14
10-14	305,000	276,000	22	21
15-19	280,000	260,000	34	22
20-24	230,500	244,500	35	21
25-29	210,000	168,000	40	20
30-34	190,000	71,000	286	266
35-39	164,000	44,000	28	27
40-44	106,000	93,000	36	30
45-49	98,000	74,000	40	37
50-54	95,000	81,000	58	45
55-59	74,000	50,000	62	44
60-64	68,000	45,000	71	50
65-69	47,000	36,000	132	12
70-74	32,000	24,000	104	125
75-79	29,000	9,000	112	115
80+	15,000	12,000	310	237

Source: *Hypothetical Data*

Demographic Sample Surveys

This source of generating social statistical data is usually smaller in size and much more economical to conduct than population census. They provide a limited amount of information, based on a section of the population. The data obtained from this exercise are usually used to construct comparative results in inter-censorial periods to indicate changes and trends, rather than absolute experience. Under-reporting of incidences of births and deaths normally occur during the exercise. Hence, it is mainly used to estimate important demographic indicators.

Vital Registration System

Vital registration system involves a continuous registration of vital events whenever they occur. Such vital events are births, deaths, marriages, divorces, legitimacy, adoption, separation, immigration and emigration. In Nigeria, the data obtained from this exercise are usually inadequate and defective to the extent

that they can hardly serve to measure accurate levels and trends of fertility and mortality at any given point. The extent of coverage for this exercise is low because it is centred only on the urban areas and the majority of the people are ignorant of the exercise. As reported by Ndong, Glyod and Gale (1994), a large proportion of the populace are aware of the vital registration, especially birth registration, but the practice remains poor. The exercise is usually affected by:

i.) Culture and norms.
ii.) Imposition of fees, especially for obtaining death certificates.
iii.) False declaration of date of birth.
iv.) False declaration of medical status.

However, if properly maintained, the complete vital registration system is capable of yielding reliable demographic, economic and socio-economic indicators, which can enable any government to design effective development planning programmes and policies as briefly shown below.

Major Uses of Vital Registration

Data obtained from vital registration system are used mainly to:

i. Study the trends and patterns of fertility or mortality;
ii. Determine sex ratio at birth for population projection;
iii. Plan for future development of the society;
iv. Check census enumeration for correctness;
v. Formulate population policies;
vi. Determine rate of marriages, divorces, mortality, and fertility including migration;
vii. Plan and develop health programmes; and
viii. Carry out epidemiological studies.

All these sources provide the basis for the calculation of indicators that reflect the economic and well-being of a given nation. Hence, for any meaningful development planning to take place, these derived indicators must be thoroughly put into consideration and the policies should be formulated based on the nature of the indicators. An example of such records, which can be used to calculate fertility index is shown in Table 2.

Table 2: Number of Women of Childbearing Age and the Number of Live Births

Age	Number of Women in Thousand	Number of Live Births
15-19	1910	108
20-24	1600	440
25-29	1420	360
30-34	860	220
35-39	640	120
40-44	560	60
45-49	280	15

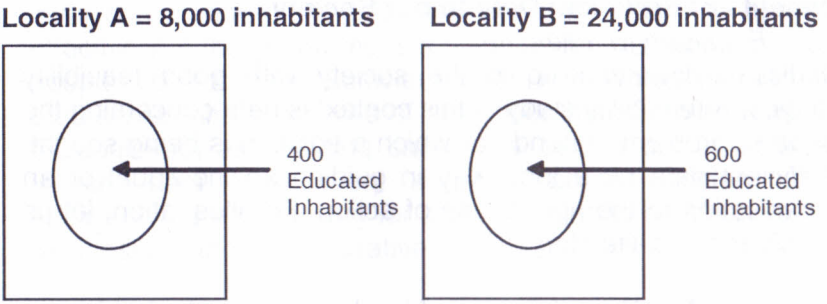
Source: *Hypothetical Arbitrary Data*

Use of Relative Numbers

In practice, a lot of people claim to be statisticians. This class of quacks applies wrong methods in analysing data and reaching conclusions which are capable of misleading the end users. A good example of such an unwholesome practice is the use of absolute values to make a comparison between two variables and taking decisions based on it. The point is that absolute numbers are not likely to aid meaningful comparisons. Relative numbers provide a better and more realistic comparative analysis in this situation. Hence, we use relative numbers to summarise huge figures to a manageable size and then compare the different resultant figures for analysis and planning purposes.

Illustrative Example

Consider two localities A and B, with population sizes of 8,000 and 24,000 inhabitants respectively. It is found out that these two localities have 400 and 600 educated inhabitants respectively. Using the absolute values to compare, one would be tempted to conclude that locality B is more educated than locality A, but comparing the two localities in relative terms, we have one educated person out of every 20 inhabitants in A while in B, we have one educated person out of every 40 inhabitants, (see figure 1).



Do Data Lie?

Data do not lie, provided they are sufficient and used appropriately. I illustrate the answer to the above question with my experience as a Research Executive on the Okigbo Panel.

I served as a Research Executive to the Late Dr Pius Okigbo Panel for restructuring the Central Bank of Nigeria in 1993.

While serving on the panel, I was given a research assignment to compile the total amount received from the Nigerian National Petroleum Corporation (NNPC) by the CBN and the expenses incurred under the same account (Dedication Account), based on the available records. The funny but serious issue arising from the compilation was that the expenditure was more than the income by 1.2 billion US Dollars. This generated a lot of interest and worries for the country.

As a result, I was arrested and detained in Kaduna for six weeks by the Late General Haladu, who gathered a team of professionals to work on the same data with me, to prove the authenticity of such a result. At the end, we arrived at exactly the same result and a letter of commendation was awarded to me without any apology. If we had initially reported wrongly, perhaps, I would have been silently killed or imprisoned and may not have the opportunity to stand in front of you today. The lesson is that one should try as much as possible to report facts from any given data to avoid wrong decisions. Today, the Dedication Account has been renamed the Petroleum Trust Fund (PTF). The general public is not only enjoying it, its impact on our society is quite visible.

Benefits of Sufficient Data to our Society

a.) Feasibility Studies:

Sufficient data can equip the society with good feasibility studies. A feasibility study in this context is data concerning the issue or problem at hand, for which a solution is being sought. Sufficient data go a long way in guiding an individual or an organisation to the right cause of action. For illustration, let us consider a true-life story:

Mrs A and Mrs B are two close friends. They graduated from a university in the same year with the same grade and they started seeking for employment at the same time. Eventually, Mrs A set up a business outfit as a cover for her other hidden activities outside the business which were fetching her lot of money than the open business line. Within a few months of operation, she purchased a flashy car, rented and furnished three-bed room flat and was generally living big. Mrs B, on noticing that, quickly took a loan from her relations, set up a similar business line, thinking that the business was viable, without gathering sufficient data on the content and modality of Mrs A's business. Within a few months, Mrs B folded up and was in a worse situation than when she started the business. This is a typical example of the damage insufficient data can do.

b.) Planning and Development:

Availability of sufficient data promotes adequate and proper planning and aids efficient development. Persistent poor planning leads to the total failure and underdevelopment of a society. Many people and indeed, organisations in our society remain all the time in debt and deficit as a result of poor planning. In other words, every individual and organisation should assess the resources available to them in the context of their environments before embarking on planning, as no organisation or body plan with what they do not have.

Thus, without adequate planning, families will be adversely affected, organisations will not operate or function properly, society will be at a disadvantage and the whole nation will be the worse for it. Therefore, sufficient data are needed at every

level of decision-making for the societal system to function effectively. If the government is planning for the people and the people do not have sufficient data with which to plan for themselves, the objectives of the government's plan may not be achieved, as planning cannot be carried out in isolation. Hence, data from every segment of the society (data sufficiency) are necessary for such planning to be effective. Let us consider another Illustrative example:

Two friends, Mr A. and Mr B, who are working in the same organisation, receive the same monthly salary and live in the same environment.

Mr A always keeps accurate records and budgets of what to do with his salary at the end of the month without any deviation and has been living happily with his family. In contrast, Mr B spends his monthly salary indiscriminately, without any form of planning, even before the salary is paid. As a result, Mr B accumulates excessive debts from his friends and colleagues and cannot fulfil his primary responsibility to his family. He ended up having a serious illness. Therefore, it is necessary to utilise sufficient data, at both the individual and group levels, to plan ahead and promote development. Imperatively, then, the foundation of any viable economy is sufficient data. Any economy that is not planned with reliable and up-to-date data would be unstable and unable to sustain the needs and requirements of the society (Mojekwu, 2002).

c.) Setting a Target (Forecasting)

"Rome was not built in a day", so goes the saying. For any great achievement in one's life, there exists a day when one sets one's mind to it and then works towards achieving it. Most achievable targets are normally obtained through having knowledge of sufficient data of the past, studying it together with present data before determining what one wants to achieve in the future.

A target is normally set to give direction for activities towards a given objective within a certain time frame and with sufficient data available; one can easily achieve the set target with success.

Setting a target involves providing a true position of the present, comparing the present with the past, drawing a conclusion and predicting the future with the aid of available data. Hence, availability of sufficient data is a *sine qua non* for the setting of future targets.

d.) Prediction

A typical application of sufficient data, if available, that readily comes to the decision-makers' mind is how to utilise the data for a brighter future. Nobody will like to remain in one situation without striving to improve upon that situation. Hence, prediction, like all decision-making processes, flourishes on the assessment of the twin foundation of the past and present data for the purpose of making projections or forecasts for the future. Analysis of data usually facilitates giving a true position of the present, comparing the present with the past and drawing conclusions. This implies that a prediction will be realistic if the available data are sufficient. On the other hand, the decision-maker may be misled if the available data are not sufficient (Mojekwu, 2002).

However, any economy that is planned without reliable and up-to-date data would be unstable and unable to sustain the needs and requirements of the citizenry. Garvin (1983) supported this view when he reported that the American plants that had the worst quality were those that did not have data on quality.

e.) Formulation of Policies

If available data are sufficient, results from analysis of such data should provide a good basis for the formulation of efficient policies and intervention programmes for the development and progress of the human society.

Also, results from the analysis of sufficient data can generate evidence-based guidance for policy actions to improve the welfare of society. These results tend to promote appropriate policy prescriptions which assist the society to cope with the many challenges that keep confronting it.

Data Presentation

After collecting data, with the assumption that they are sufficient, with minimal error, there is always the need to organise the data in the form the users will understand and find adequate for their purpose, with little stress. According to Mojekwu (2012), such organisation of data may be done via classification or frequency tables (see Table 3).

Such organisation of data provides:

i.) A summary of the data at a glance;

ii.) An opportunity for comparison among the variants that make up the variables; and

iii.) An additional opportunity for internal comparison within each variant.

Furthermore, an organised set of data can be represented with the aid of charts or graphs, depending on the nature of the data available (See Figure 2). These tools provide a visual, easier and quick understanding of the data, especially for those who cannot easily interpret them.

Table 3: Brands of Cars Used by Different Professionals in a University.

Brand of Car / Profession	KIA	Toyota	Honda
Sociologists	40	76	120
Scientists	110	80	50
Educationists	60	24	80

Source: Hypothetical Data

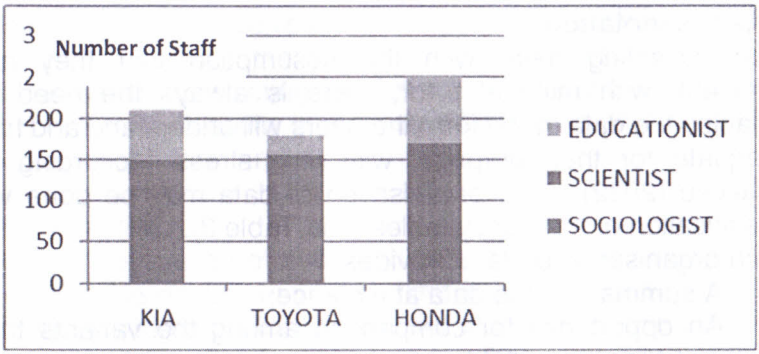


Figure 2: Multiple Bar-Charts Showing the Brands of Cars Used by Different Professionals in a University

Data Analysis

Data Analysis is a practice through which raw data are ordered and organised so that useful information can be extracted from them. The process of organising and thinking about data is key to understanding what the data contain and do not contain (Wilmoth Jnr. *et al*, 2012). There are two forms of data analysis, namely: descriptive and inferential data analysis. The descriptive form of data analysis tends to describe the characteristics of the data, using statistical tools, such as charts, frequency tables, graphs and descriptive measures, such as mean, mode and fractions. This form of analysis does not study deeply the characteristics of the data so as to arrive at reasonable conclusions. On the other hand, the inferential form of analysis tends to study deeply the general characteristics of the available data to arrive at reasonable conclusions and uses the more scientific statistical tools to make inductions. Apart from these two forms, there are varieties of ways of approaching data analysis. It is easy to manipulate data during the analysis to derive certain conclusions or objectives. However, it is always important to think critically about the data before the conclusions which are drawn from the result of the analysis. Modelling the data with the use of mathematics and other tools can sometimes exaggerate such points of interest in the data to make them easier for the researcher to see. Hence, extreme care should be taken during the stage of data analysis.

Charts, graphs and textual write-ups are all forms of data analysis. They are usually designed to refine and distil all the available data so that readers can obtain interesting and useful information, without going through all the data on their own. Summarising data is often critical to supporting arguments made with that data, as the summary presents the data in a clear and understandable way.

Interpretation of Data

It is usually advisable to present raw data in a simpler form for the viewers to critically analyse it themselves objectively so as to avoid the possibility of data manipulation.

In the course of organising the raw data, trends often emerge. These trends can be highlighted in the report on the data to ensure that readers take a good note of the data characteristics.

When people encounter summarised data and conclusions, they should view them critically. Hence, it is important for them to ask for:

(i) The source of the data.
(ii) The type of sampling methods applied to collect the data.
(iii) The size of the sample.

However, if the source of the data appears to have a conflict of interest with the type of data being gathered, this can call the results into question. Also, data gathered from a small sample, or a sample which is not truly random, may be of questionable utility.

Wrong Application of Data

Data, even if sufficient, when wrongly applied, are as dangerous as the use of insufficient data for making decisions. It is sad to observe that, in the contemporary society, those who are not professionals in data processing parade themselves as statisticians. Those in academics are most guilty of this activity. Perhaps, during their degree programmes, or after graduation, they made an attempt to be teaching statistical courses, claiming that statistics is all about

"mean, median and mode". They may end up teaching their students to apply inappropriate statistical tools to wrong data, thereby eventually leading users to misleading interpretations and conclusions. Let us consider the following illustrative examples:

Parallel Census

During the immediate past Nigerian National Census, Lagos State conducted a parallel census, thereby duplicating some of the units and creating confusion in respect of most of the household units. Such duplication would have done more damages than good as a result of over-sufficient data.

Use of Registered Voters Card and National ID card

This is another example of double registration as some people may travel to their states of origin to register, then return to their states of residence to register, thereby creating the incidences of multiple registration which may lead to misleading decisions, confusion and difficulties in analysis of the data generated.

Frequent Changes and Multiple Registrations of Car Plate Numbers

Change of car plate numbers in Nigeria has occurred three times within the last ten years that so many car owners can no longer remember or recognise their cars' registration numbers in a public place. The exercise which discards the old number and assigns a new one is an abuse of data. This allows a particular car or vehicle to register three different times in an existing pool. How, then, can the authorities determine the number of cars in the system and their ages? The best option should have been, once a car is registered, even if there will be a change in the plate numbers, that particular car will be allowed to retain its registered number until the car stops existing. Multiple registrations provide over-sufficient data and create a lot of problems when realistic decisions need to be taken.

Reliability and Validity of Data

One of the major problems militating against the availability of accurate data and the taking of realistic decisions is insufficient data, although, in some cases, the illiteracy of the general public and the non-release of results from the analysis of the previous data are vital contributory factors. I attended a workshop at the University for Development Studies, Navrongo, Ghana, in 2008, where a German Professor was discussing the problems facing researchers in Africa. During the questions and answers session, someone asked him to explain the reason why African researchers found it difficult to access research grants as he had mentioned that grants were sufficiently available.

In his response, he noted that Africans, especially Nigerians, were very intelligent people. Most Nigerian businessmen, he added, who were not interested in research, would normally pose as researchers and approach young academicians, who would write good proposals for them and collect as low as ₦50, 000 in return. The business researchers would, then, use the proposals to obtain research grants worth about ₦10million each and would never carry out any research. The Professor then concluded that the real problem was not inadequate funding, as various governments and some United Nations Agencies had a lot of funds available, but our corrupt nature and the resultant mismanagement of funds which were among the major factors militating against the successful conduct of research viz-a-viz obtaining sufficient data in our society.

Contributions

Most of my works are tailored towards the characteristics of life-insurance business, as insurance serves as a handmaid to commerce and industry. In every economy, the insurance sub-sector is usually the last to collapse, despite all odds and other sectors of the economy depend on the insurance industry for their survival. Hence, socio-economic well-being of a given nation can hardly be achieved without the existence of a strong insurance sector.

Mojekwu and Adeyele (2010) studied the mortality patterns of Civil Servants and their implications for the Pension Reforms Scheme in Nigeria in view of the available data which we had noticed were not sufficient enough for meaningful analysis. Although, the data were not adequate, we successfully managed the data and observed the following:

i.) Income and retirement decisions play important roles in the stability of tenure.

ii.) There is a strong association between income and retirement decisions.

iii.) Those who retired early tend to have more years to live than those who retired at the normal retirement age.

However, we concluded that there was a need to redesign the pension scheme in such a way that it could reduce job turnover among employees and increase productivity in organisations which I can say that the 2014 Pension Reform Scheme has addressed some of the issues..

Mojekwu (2002) carried out a study on the "Factors Militating against the Growth of Life-Insurance Business in Nigeria." One of the major findings is that the life insurance tables, which the insurance practitioners use for determining the premiums, are not appropriate. As a result, the general public tends to lack full confidence in the life-Insurance business. Other factors, identified during the course of the study are summarised in Table 4.

Table 4: Factors Responsible for Poor Performance of Life-Insurance Business in Nigeria

Factor	Number of Respondents %
Lack of Awareness	34.00
Non-Settlement of Claim	5.00
Poor Premium	48.00
Lack of Trust	6.00
Inappropriate Government Policies	3.00
Poor Economy	4.00

Source: *Mojekwu (2000)*

All factors, if put together, tend to suggest that sufficient data /information have not been provided to the general public to convince them of the need for contracting life insurance policies. Data on the problems facing the society were not made available to both the insurance practitioners and the general public.

The study carried by Mojekwu (2002) further highlighted this fact and, thereby, encouraged most of the insurance companies to embark on the intensive training of underwriters who penetrated the public to create the required awareness. The effect is now significantly being felt by both the general public and the operators of the life insurance business.

Due to lack of sufficient data on the incidences of deaths in Nigeria, life insurance operators in Nigeria business environment have been using the mortality tables developed, based on the mortality experiences and patterns of foreign countries (Australia, USA, England & Wales) to determine the appropriate premiums which life-insurance policy holders are expected to pay. Mojekwu (2002) therefore considered it necessary to manage the available data to design a life-table, based on the mortality experiences of Nigerian life insurance policy holders (see table 5).

Table 5: Graduated Mortality Rate (q^1_x)

Age (x)	Crude Mortality Rate (q_x)	($q^1_x{}^{(1)}$)	($q^1_x{}^{(2)}$)	($q^1_x{}^{(3)}$)	($q^1_x{}^{(4)}$)
25	0.01282	0.00774	0.00908	0.00684	0.00697
26	-	0.00767	0.00872	0.00673	0.00713
27	0.00617	0.00767	0.00854	0.00677	0.00729
28	0.00445	0.00767	0.00845	0.00688	0.00750
29	-	0.00781	0.00854	0.00703	0.00775
30	0.00541	0.00800	0.00872	0.00722	0.00800
31	0.00524	0.00818	0.00890	0.00754	0.00830
32	0.00529	0.00853	0.00925	0.00797	0.00858
33	0.00552	0.00891	0.00959	0.00855	0.00890
34	0.00863	0.00930	0.00992	0.00919	0.00926
35	0.00863	0.00970	0.01038	0.00990	0.00973
36	0.00927	0.01019	0.01090	0.01065	0.01026
37	0.01929	0.01070	0.01153	0.01139	0.01088
38	0.02518	0.01118	0.01218	0.01210	0.01164
39	0.00784	0.01170	0.01285	0.01281	0.01245
40	0.0866	0.01224	0.01363	0.01350	0.01332
41	0.00983	0.01278	0.01445	0.01430	0.01420
42	0.01714	0.01332	0.01535	0.01513	0.01507
43	0.02524	0.01386	0.01624	0.01604	0.01594
44	0.01449	0.01439	0.01717	0.01699	0.01681
45	0.03008	0.01492	0.01815	0.01794	0.01769
46	0.01786	0.01544	0.01915	0.01888	0.01860
47	0.01064	0.01597	0.02017	0.01978	0.01951
48	0.01130	0.01648	0.02121	0.02063	0.02045
49		0.01700	0.02225	0.02145	0.02139
50	-	0.01750	0.02315	0.02227	0.02234
51	0.01235	0.01800	0.02435	0.02311	0.02329
52	-	0.01850	0.02540	0.02400	0.02423
53	-	0.01898	0.02645	0.02483	0.02517
54	-	0.01995	0.02750	0.02584	0.02610
55	-	0.01995	0.02854	0.02676	0.02703

Source: *Derived from the Study Data (2002)*

The resultant locally based life insurance table, if adopted and applied, should go a long way in winning back the confidence of many potential life-insurance policy holders. Only very few of the operators have started using the table and the effect has started manifesting as the trend of the growth of the life-insurance policies has been steadily on the increase as shown in the Table 5.

Table 6: Annual Number of Life Policies Recorded between 2004 and 2014

Year	Number of Life Policies Contracted
2004	18
2005	42
2006	6
2007	11
2008	65
2009	39
2010	105
2011	7,329
2012	11,171
2013	26,087
2014	54,220

Source: *Nigerian Insurance Year Book (2014)*

Mojekwu (2002) examined the adequacy of premium charges made by insurance companies on the life-insurance policy-holders and their implications for the performance of the insurance sector. The findings revealed that some vital information, which ought to have been made available to the general public, was not actually made available, as a result of insufficient education and creation of awareness. Also, the study found that premium charged by the operators of life insurance business does not take cognizance of the ever-changing erratic inflation rate. The resultant effect, as observed in the study, is that the value of the sum assured at maturity would have been eroded by the inflation in the economy. At the end, the study recommended that adequate information should be provided by the operators on modalities used to determine the premiums payable by the potential life-policy holders, if the business was to be sustained.

Mojekwu (2002) assessed the views of the insurable Nigerian populace to find out the possible factors affecting the growth of life-insurance business in Nigeria. The results derived from the study seem to suggest that the factors militating against the rapid growth of the insurance business in Nigeria are, among others:

(i) The inflation rate of the country in use.
(ii) The negatively fluctuating economic situation.

Hence, the study suggested that there should be intensive and serious education for the potential insurable public in Nigeria so as to provide sufficient data on the activities of the insurance industry and, in turn, promote a faster growth of the insurance business.

Mojekwu (2009) attempted to examine the factors responsible for the high rate of lapsed life-insurance policies in the Nigerian insurance sector and make these factors known to the general public so as to win back their confidence in the business. Information was generated from the public and after a thorough analysis; the study listed the key factors that seem to be responsible for the high rate of lapsed life-insurance policies as:

(i.) Instability in government policies;
(ii.) Political instability
(iii.) Inconsistencies in societal behaviour; and
(iii) The poor economic situation, which are all as a result of insufficient data as shown in Table 6 below.

Table 7: Distribution of Age of Life Policy Holders by Mode of Exit

Mode of Exit / Age Group (Years)	Lapse	Surrender	Death
25-29	44	25	3
30-39	186	68	32
40-45	44	18	17
46 +	13	17	6
Total	**287**	**128**	**58**

Source: *Mojekwu (2002)*

Table 7 shows that for all the age groups of the life insurance policy holders, the number of those who allowed their policies to lapse is the highest, except for the age group 46 years and above.

Mojekwu and Yusuf (2008) carried out a study to harvest the opinions and perceptions of the general public on the rating of the performance of the Nigerian life-insurance sector. A structured questionnaire was designed and distributed to the members of the public who had taken or who are currently

enjoying life-insurance policies in Lagos and Abeokuta, as most of the economic activities of Nigeria are centred in the South-Western Zone.

Table 8: Reasons Given by the Life-Policy Holders for Low Regard for Life Policies in Nigeria

Reason / Age	Commercial life style and poor economy	Lack of understanding and trust in insurance operation	Other reasons
25-30	7	5	9
30-35	5	9	5
35-40	17	40	15
40-45	23	36	9
45-50	15	28	10
50-55	9	7	15
Total	**74**	**125**	**61**

Source: *Study Questionnaire*

The study revealed the following:

(i.) Young people rush to take up life-insurance policies and tend to withdraw almost immediately because of the harsh and difficult economic situations prevalent in the Nigerian business environment.

(ii.) The concentration of life-insurance policies in the age range of 30 and 40 years seems to suggest that the average age at marriage of an average Nigerian is the same age range.

(iii.) Nigerians are not well-educated on life-insurance business; that is, they lack sufficient information on it.

(iv.) There are no sufficient data available for the operators of the sector to enable them formulate effective policies.

(v.) The unpredictable nature of the Nigerian economy makes life-insurance business appear fraudulent in the eyes of the generality of the society, thereby making most people to lose interest in the business.

Life assurance is a very important business which seems to have been misconstrued by the insuring public due to inflation and the attitude of Nigerians. This lack of interest in investing in life assurance seems to have retarded the development and the growth of the life insurance business in the Nigerian

market. This striking situation prompted us to embark on the study of Effects of Insufficient Data on the Trends and Patterns of Exits of Life-Insurance Policyholders in the Nigerian Insurance Industry.

The study found that many life-insurance policy holders do not have adequate information on the need to have life-insurance policies and on the way it is being operated, resulting in a high rate of lapse, surrender and paid-up status. The study therefore suggests that insurance companies should invest more in public enlightenment and manpower development so as to provide sufficient data/information to the general public and give life assurance business its pride of place in the Nigerian economy.

Contribution to the Well-Being of the Society

Mojekwu (2000) tried to examine the role of an efficient vital registration system as one of the main sources of social data in our society, if adequately maintained. Although, Kpedekpo (1970) stated that the need for establishing an efficient vital registration system in existing schemes depends to a considerable extent on the administrative and statistical requirement of the country concerned, we found that epidemiological studies, based on morbidity data, have a strong influence on the reduction of mortality and are usually dependent on the sufficient records of the events captured through vital registration system.

Tables 9 and 10 below show some of the useful information that can be derived from efficiently conducted vital registration system.

Table 9: Birth Rates, Death Rates and Rate of Natural Increase in Selected African Countries in 2012

Country	Crude Birth Rate ('000)	Crude Death Rate ('000)	Growth Rate (%)
Cameroun	38	12	4.6
Cote d' I vorie	37	14	9.5
Ethiopia	34	8	8.7
Ghana	31	9	8.8
Mali	47	13	-0.4
Nigeria	42	13	6.7
Senegal	38	8	3.5
Sudan	34	8	-10.1
Tanzania	40	9	6.9
Uganda	44	10	3.4
Zambia	43	11	7.3
Zimbabwe	32	10	5.3

Source: *World Development Indicators Tables, 2013*

Table 10: Infant Mortality Rates and Total Fertility Rates in Selected Sub-Saharan African Countries (2012 Estimates)

Country	Infant Mortality Rate ('000)	Total Fertility Rate ('000)
Cameroun	61	4.9
Cote d' Ivorie	76	4.9
Ethiopia	47	4.6
Ghana	49	3.9
Kenya	49	4.5
Malawi	46	5.5
Mozambique	63	5.3
Nigeria	78	6.0
Senegal	45	5.0
Sudan	49	4.5
Uganda	45	6.0
Zimbabwe	56	3.6

Source: *World Development Indicators Tables, 2013*

Ajijola, Adewara and Mojekwu (2009) attempted to measure infant mortality rate as socio-economic and biological forces on the mother's health that influence the outcome of her pregnancy. The greatest challenge we encountered was the non-availability of data, as some of the input data were nowhere to be found, especially data on socio-economic factors that lead to infant mortality. Data were collected from National Bureau of Statistics. Although, the data were not sufficient, we were able to make some reasonable deductions.

The study shows that income inequality, maternal employment, fertility rate, maternal education and access to health care services appeared to be the most significant predictors of infant mortality in Nigeria.

Mojekwu and Ibekwe (2012) in an effort to provide sufficient information on the type and amount of intervention programmes that had been put in place to reduce the incidences of maternal deaths in Nigeria, carried out a study entitled "Maternal Mortality in Nigeria: Examination of Intervention Methods". Our interest in the study was aroused when Nigeria was mentioned as having one of the highest maternal mortality rates in the world. Some of the indicators identified are shown in the Table 11.

Table11: Reproductive Health Indicators in Nigeria 2007

Average number of children per woman	6
Material deaths per 100,000 deliveries	1100
Antenatal coverage	47%
Institutional delivery	33%
Infant deaths per 1000 birth	97
Birth Registration	33%

Source: *UNICEF, 2009*

In carrying out the study, we collected data from the Nigeria Demographic and Health Survey 2008, the Annual Abstract of Statistics of the National Bureau of Statistics and the Society of Obstetrics and Gynaecology of Nigeria on the 36 States of the Federation, including the Federal Capital Territory (FCT), Abuja, so as to obtain nearly sufficient data.

At the end, we found out that, although, the data for such a task was not sufficient at the time, we were able to establish that the main factor affecting maternal mortality is the non-availability of skilled professional birth attendants who are supposed to provide maternal care during childbirth. Also established from the study as a major negative factor, is the absence of maternal education especially for women of childbearing age.

Mojekwu (2005) carried out a study, using two randomly selected private hospitals in Ajegunle, Lagos State, Nigeria. The data obtained through extraction from the records of the two selected hospitals were examined to determine the patterns of the maternal deaths.
The results from the study tend to agree with the patterns obtained in other parts of the low-income groups of the world, although the data used lacked sufficiency (World Health Organisation, 2010).

The study revealed that maternal mortality is not only affected by the variables of immediate interest but also by a much wider array of socio-economic factors and until attitudes towards women change and people are sufficiently motivated to improve their living conditions, maternal mortality rates and patterns will remain significantly unchanged.

Mojekwu and Adeleke (2010), in an attempt to provide valuable information to the Nigerian Society on the alarming rate of fatal road accidents on Nigerian roads, collected road-accidents data on Lagos roads from 1998 to 2007, as recorded by the Operations Department of the Nigerian Police Force. With the insufficient data available, we tried to predict future occurrences using negative binomial models. The results confirmed that negative binomial models can yield good estimates for future prediction of the number of fatal accidents that can occur.

Figure 3 shows the trend, based on collected data and fitted model.

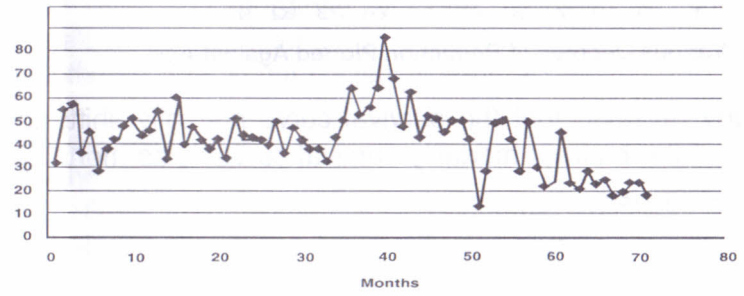


Figure3: Trend of Fatal Accidents and Fitted Model

Mesike and Mojekwu (2012) examined the available data on the causes of child mortality in Nigeria. Although, the data were not sufficient to provide realistic conclusions, we tried to fit a regression model. From the model, we deduced that household environmental characteristics have a significant impact on mortality. Some of the identified environmental factors are lack of health facilities, poverty level; access to good sanitation and good waste management facilities. At the end of the study, we suggested that government policy should be tilted towards promoting the use of low polluting fuels and discouraging, in particular, the use of firewood and charcoal which cause deforestation and other environmental problems. We also suggested that Government should endeavour to maintain uninterrupted power supply to discourage the burning of fuels from generating plants so as to reduce the rate of childhood mortality by over sixty percent.

Mojekwu and Ikomi (2011) investigated the factors responsible for compression of mortality occurrences usually observed in human survival curves, as in Figure 4.

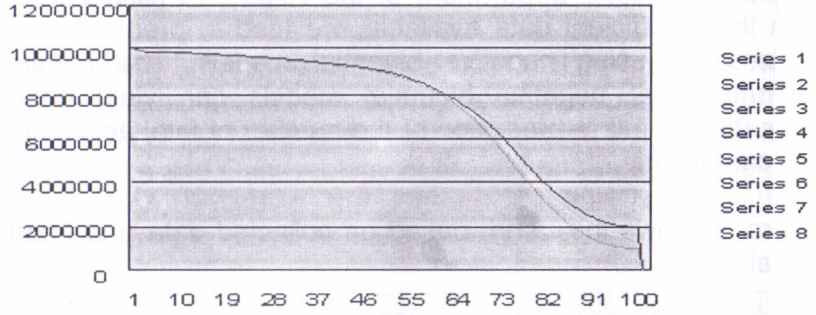


Figure 4: Various Degrees of Reduction Plotted Against Age

The study revealed that the survival curve normally shifts to the right of the base of mortality survival curve l_x as mortality situation improves.

We applied the following mathematical framework in the study: Let l_0 be the radix of a stationary population and d_x the number of people dying between ages x and x + 1, then the number of people alive at age x is denoted by

$$l_x = l_o - \sum_{t=o}^{X-1} d_t$$

From the above model and the results obtained, we concluded that the process of the compression of mortality cannot continue indefinitely.

Conclusion

In general, most of my studies on maternal mortality support the findings that insufficient data generation of maternal deaths might be attributed to lack of adequate training for hospital personnel as well as to the ignorance of the importance of providing data on the part of women.

I stand fulfilled and convinced that I have been able to let the society know the importance of seeking for sufficient data, playing with data, understanding data in our day-to-day activities, as the only appropriate means of solving all the problems facing the society is the analysis of sufficient data.

My main objective is to assist the government, in particular, and the society, in general, to take the right steps in ensuring that they collect, store and analyse vital records and data for the benefit of the present and future generations.
I have been able to reposition data keeping practice as being the utmost importance in the pursuit of sustainable development for Nigeria and highlight the challenges posed by insufficient data in our society in general.

Recommendation

To the University of Lagos

i. Data on some socio-economic factors impacting indirectly on the University community are not normally captured. Rather, we concentrate only on data relating to academics. This approach does not usually yield sufficient data for efficient planning and formulation of

relevant policies for the university environment. Hence, we urge the university management to establish data collection unit under the Quality Assurance Department or the Academic Planning unit to capture these data on a regular basis so as to be data sufficient.

ii. University of Lagos, "The University of First Choice", "The Pride of the Nation", and "The Centre for Excellence" should set the pace and carve out a Department of Social Statistics and Demography from the existing Department of Actuarial Science and Insurance. This will, no doubt further buttress the importance of social Statisticians and Demographers in the development of our society.

iii. I urge my fellow statisticians earning their livings here in the University of Lagos, to let us unite and rise up to prove our worth by forming an Association of Practicing Statisticians in order to save our institution and the society at large from the hands of those mismanaging data and causing confusion with their wrong application, interpretation and decisions.

To the Nation

i. Every state Government should establish a standard centralised database for collection of data, especially records on births, deaths and migration within each State. National Bureau of Statistics should liaise with each State to build a national database.

The United States of America discovered hidden patterns about terrorists through the analysis of their immigrant data after the '911' attack. According to Ezepue (2013), an inmate escaped from a Nigerian prison in one State to another State and lived a free life due to the lack of operational data bases in Nigeria. However, these operational data bases should be established in all the parastatals throughout the country.

According to Tobin *et al* (2013), awareness of birth registration was high and awareness of death registration

showed differing views. This assertion tends to suggest that the practice of birth registration is higher than that of death registration. The observed differential is a clear indication of insufficient data and will seriously affect the relevance of the data.

ii. The Federal Government should encourage and support young Nigerians to study Social Statistics and Demography by introducing a scholarship scheme for those who desire to be future Demographers.

iii. Effort should be made to set up Data mining and related ICT capabilities which can enable the nation to gather systematic data from all aspects of human endeavour on a regular basis. It is observed that in areas where some of the data are in existence, they are left to waste. Adequate efforts should be made to analyse them so as to discover hidden information which should help the government to take better management decisions and formulate more fruitful policies.

iv. The Federal government should make the necessary effort to establish a national statistical system so as to produce sufficient official statistics. It is through an efficient National Statistical System that policy makers can formulate policies for the nation to enable it to fulfil primary objectives towards its citizenry. Also, the vital data obtained can be used by the interested stakeholders, such as the government, researchers, private organisations and individuals.

More vigorous efforts should be made by the government and the health sector to create more awareness on the need to have total coverage on the recording of data relating to reproductive activities to enable the society have a better living.

Health Sector

The government should, through the constant generation of sufficient data, ensure that every woman, whenever possible, lives and grows up in a family unit, with care and security in

healthy surroundings, receive adequate nourishment, health supervision and efficient medical attention and taught the elements of healthy living.

Maternal health must comprise preventive as well as curative aspects of problems arising in pregnancy as the potential mothers are the pillars of every society.

The Insurance Industry

We observed the unintended restrictions placed on providing life insurance to low-income group. Hence, we recommend that there should be new policies and regulatory frameworks which would reduce constraints on providing life insurance in small amounts to low-income households without losing the institutional and client protections inherent in the existing regulations. This will, no doubt, significantly improve the quality of life in the society at large.

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remain eternally grateful to these people because without them, I would not be here delivering this inaugural.

Mr Vice Chancellor sir, I specially thank you, together with all our principal Officers, for your immense contributions towards making the University of Lagos, the University of First Choice in Nigeria, what it is today. I am sincerely proud of you and in all honesty, I doff my hat!

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Mr Vice Chancellor Sir, I have not forgotten the most critical persons and contributors to the fruition of this inaugural. I have intentionally reserved the best for them. I committed this last paragraph to my immediate family, an indicator of how special they are to me. I want to publicly acknowledge my God-given partner, a lady of inestimable value and virtue, an epitome of womanhood, pillar of my strength and support, my PA on emotional matters, my very dear wife, Mrs Christy Mojekwu (Principal Lecturer, Nutrition and Dietetics Department, Yaba College of Technology). I fondly call her Nky meaning; my future. The Lord gave her, a disciple tongue to know how to

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Mr Vice Chancellor Sir, I still have a long way to go because anyone who stops learning is old, whether at 20 or at 80. Anyone who keeps learning stays young. The greatest thing in life is to keep your mind young **(Henry Ford)** I want to keep my mind young and I wish to acknowledge upfront, those that will sharpen the axe for me, light the path and tell me boldly and truly, whenever I am wrong. I wish to finally acknowledge the support of 'enemies', who kept me on my toes, who always criticised me, even if unjustly and who drew the best from me by being necessarily or unnecessarily unfriendly. To all, I say, Thank you. May God reward you abundantly. Amen

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