CHAPTER ONE

Introduction

Introduction

1-1 preface:

To study any phenomenue or population from scientific research and data collection sight of view one of the main following methods may needed these are - Sampling or Complete survey.

Sampling method is normally preferd because of it distinctive charactristics, which include reduction of time, effects and costs. Its results can be generalized and applied on population accurately without need to total survey. But some factors should be considered because they may affect the sampling method.

For a sample to be suitable and accurate representative a sample size should be chosen, depending on the population size and type of the studied (phenomenue). population size is considered to be the most important factor for sample size designing because of its effect on the precision, cost and evaluation of the study.

Therefor the available budget precision requirements, population size and the way of samples collection should be considered in sample size determination.

1-2 The sudy Proplem:

Sample size calculation is usually conducted through a pre-study power analysis. The purpose is to select a sample size such that the selected sample size will achieve a desired power for correctly detection of meaningful difference at a given level of significance. In the research, however, it is not uncommon to perform sample size calculation with inappropriate test statistics for wrong hypotheses regardless what study design is employed. The determination of sample size required not only for testing equality, but also for to the proportion, standard error, level of significant, and variance. (shein-chung chow , jun shao , hansheng wang, 2017).

However, any one of this variables under-study did not inapparently estimating, will lead to inaccurate results generlized to population.

The question of this study is to determine, how the standard error, variance, population proportion and type of test can affect sample size in propbility sampling, most of the previose studies did not include the factors that affect sample size determination. Even the studies which took that in consideration dealt with only one factor in propbility sampling.

The process of sample selection is covered by many orders and controls, so some factors which have strongly effects on samle size, such as population size, homogenity of population, method of determination, standard error and population proportion.

1-3 The Hypotheses of the study:

This study is trying to give the a real participation in samlple size determination depending on different factors and variables, so that its final findings may be a good addition to previous studies in this filed of research. It may help the researchers in social science stratigic planning organizition and quality control systems in general and studants of statistics to use the obtained results in other similer feild of research. The final results should exilihibit the effects of the different factors in increasing the efficiency and precision of measurements and determinations, when the optimum required conditions are employed. The hypotheses of the study is:

1- There is significant correlation between sample size (n) and standard error (e).
2- There is significant Correlation between variance value (s^2) and sample size (n).
3- There is significant difference between sample sizes obtained from one tail and two tails.
4- The effect of standard error on sample size determination.
5- The effect of proportion on sample size determination.
6- The variance is affecting on sample size determination

1-4 study objective

1- The aims of this study is to show:
2- The effect of the standard error on sample size determination
3- The effect of level of significance on sample size determination
4- The effect of population proportion on sample size determination
5- The effect of variance on sample size determination
6- To find the sample size determination method which may be employed to obtain high degree of precision and reliability leading to reduction of time and cost.

1-5 The data and research methodology:

This research depend basically on a data which will be stimulated by excel office programing by using values for the factors that affect sample size determination. The SPSS pakege will be used for detearmining final sample size.

In this study the descriptive analytical method will be used this methodology depends on population description to reach the reasons and the factors that geven it. The result are then extracted for generation.
In this research, sample size determination will be studied in general way taking in consideration the reasons and factors which may affect it. The study will concentrate mainly on the standard error, variance, population proportion and type of test, where it is from one tail or two tails.
The analytical methodology is charactrized by flexibility to applied excel office and SPSS pakege will be used in the applied of the study.

1-6 previous studies:

1-6-1 Altalbi study, mohamed salih (2011) the relation between sample size and coust in stratfied random sampling, used the infraincing methodolgy to achieve aims of study, he obtained to the nigative relation between sample size and coust. We can aget enught sample size if we obtained the coust of ome unit to any strata and total coust of study. He recommended by, we must determine a good coust because it have a big effect in sample size.
1-6-2 mhmoud study, maraai mohamed (2009). Factors effecting on sample size, the result of study getting the factors affected on sample size is standard error, significance level, the perpouse of sample size, the population variance, sampling desigen, the coust of one unit on stratfied sampling, and the steps of the multi-stage sampling.
1-6-3 alshibly study, osman ali (2010), harmonizing between sample size and a coust in stratified random sampling. The study obtained to must determine some factors to harmonizing between sample size and a coust, its determine the coust, the variances of strata is consist, the coust of one unit in strata is consist or variaty.
1-6-4 **alzbon study, habs (2013).** The effect of standard error on determination sample size. The study aimed to know the effect of standard error on determination sample size in simple random sampling, by using the inferaince methodolgy. The study condacting to more results as follow. The standard error has a nigative approprating with sample size. The determaine of standard error must be a right. Which getting from previose study or piolt study, the recommendation of this study is to cares by standard error because its very interested in sample size determination.
1-6-5 **narula– feb 2018**, Sample size precision function. the study develops the concept of precision function for given sample size when testing a simple

hypothesis against a simple alterative hypothesis the constriction of sample size precision functions is discussed with reference to the location and scale parameters.

The aim of this study was to employ formula for determining sample size, when simple random sampling formula is used to known the effect of confidence level with (test from one tail and two tails), level of precision, the degree of variability (proportion), and the variance in the sample size determination.

CHAPTER TWO

Literature review

Literature review

2-1 preface:

According to (Elizabeth Burmeister BN M.Sc., Griffith University), Sample size is one element of research design that actualized needs to consider as they plan their study. Reasons to accurately calculate the required sample size include, achieving a statistically significant result and ensuring that research resources are used efficiently and ethically.

Study participants consent to study involvement on the basis that it has the potential to lead to increased knowledge of the concept being studied. However if a study does not include sufficient sample size to answer the question being studied in a valid manner, then enrolling participants may be unethical.

Although sample size is a consideration in qualitative research, the principles that guide the determination of sufficient sample size are different to those that are considered in quantitative research ((Elizabeth Burmeister, Leanne M Atiken. (2012)).

Sufficient sample size is the minimum number of participants required to identify a statistically significant difference if a difference is truly exists. But before calculating a sample size researchers need to decide what is considered an important or significant difference for their proposed study question and then calculate the sample size needed to estimate this meaningful difference with statistical precision.

Elements that influence sample size include the size effect, the homogeneity of the sample, the risk of error considered appropriate for the question being studied and the anticipated attrition (loss to follow up) for the study.

The sample size calculation should be based on the primary outcome observation (population). After a relevant primary outcome observation will be identified. The expected difference or size effect in that outcome is to be estimated. Determination of an expected difference can be achieved by examining pre-existing data.

As general, the smaller the anticipated size effect requires larger sample size.

Homogeneity of the sample refers to how the participants in the study are similar to each other and is a reflection of how well the sample represents the study population. Homogeneity is generally measured by using the standard deviation (Elizabeth Burmeister, Leanne M Atiken. (2012)).

2-1-1 The steps of a sample survey

As preface to discussion of the role of the sample survey, it is usual to describe briefly the steps involved in planning and execution of a survey vary greatly in their complexity.
The principle steps in survey are grouped under 11 headings (William G. Cochran – john willey & sons, (1977).

2-1-1-1 Objective survey:

The statement of objectives must be clear and helpful. Without this, it's easy in complex survey to forget the objectives when copied in details of planning and to make decisions that are at variance with the objective.

2-1-1-2 Population to be sampled:

The word "population" used to denote aggregate can which the sample is chosen. These rules must be usable in practice; the enumerator much be able to decide in the field, without must hesitation, whether or not a doubtful case belongs to the population.

The population to be sampled should coincide with the population about which information is wanted. Sometimes the reasons of practicability of the sampled population are more restricted than the target population. If so, it should be remembered that, results drawn from the sample apply to the sampled population. Any supplementary information that can be gathered about the nature of the differences between sampled and target population may be helpful.

2-1-1-3 The Collection of Data:

They mean the all the data are relevant to the purpose of the survey and no essential data are deleted. There is frequently there is a tendency, practically with human population, to ask too many questions, some of which are never subsequently analyzed. An overlong questionnaire lowers the quality of the answers to important as well as unimportant questions (William G. Cochran – john willey & sons, (1977).

2-1-1-4 Desired Degree of Precision:

The results of sample survey are always subject to some incertitude because only part of the population has been measured and because of measurement error. This incertitude can be reduced by taking larger samples and by using superior facilities of measurement. But this usually costs time and money. Thus, the specification of the degree of precision required in the results is an important step. The responsibility of the person who is going to use the data, it may present difficulties, since many administrators unaccustomed to thinking in terms of the amount of error that can be tolerated in estimates, consistent with making good decision. The statistician can often help at this stage (William G. Cochran – john willey & sons, (1977).

2-1-1-5 Method of Measurement:

There may be a choice of measuring instrument and method of approach to population. The survey employ a self-administered questionnaire, an interviewer who reads set of questions with no discretion, or an interviewing process that allows much latitude in the form and ordering of the questions. The approach may be by mail, by telephone, by personal visit, or by combination of the three.

A major part of the initially work is the construction of record forms in which, the questions and answers are to be entered. With simple questionnaires, the answers can sometime be preceded that is, entered in a manner in which they can be routinely transferred to mechanical equipment. For the construction of good record forms, it's necessary to visualize the structure of the final summary tables that will be used for drawing conclusions (William G. Cochran – john willey & sons, (1977).

2-1-1-6 The Frame:

Before selecting the sample, the population must be divided into parts that are called sampling-units, or units. These units must cover the whole of the population and they must not overlap, in the sense that every element in the population belongs to one and only one unit. Sometime the appropriate unit is obvious, in a sampling the units might be individual particulars as member of family, living in a same city, sampling agricultural crop, the unit might be field, a farm or area of land. (William G. Cochran – john willey & sons, (1977).

The construction of this list of sampling unit, called a frame, is often one of major practical problems. From bitter experience, samplers have acquired a critical attitude toward lists that have been routinely collected for some purpose. A good frame may be hard to come by when the population is specialized (William G. Cochran – john willey & sons, (1977).

2-1-1-7 Selection of the sample:

There is now a variety of plans by which the sample may be selected. For each plan that is considered, rough estimates sample size can be made from knowledge of the degree of precision desired. The relative cost and time involved for each plan are also compared before making decision (William G. Cochran – john willey & sons, (1977).

2-1-1-8 The Pre-test:

It has been found useful to try out the questionnaire and the field methods on a small scale. This nearly always results improvements in the questionnaire and may reveal other troubles that will be serious on a large scale (William G. Cochran – john willey & sons, (1977).

2-1-1-9 Organization of the field work:

In full-scale surveys many problems of business administration are met. The personnel must receive training in the purpose of survey and in the method of measurement to be employed and must be adequately supervised in their work. A procedure for early checking quality of the returns is invaluable. Plans must be made for handling non-response. That is failure of the enumerator to obtain information from certain of the units in the sample (William G. Cochran – john willey & sons, (1977).

2-1-1-10 Summary and analysis data:

The first step to edit completed questionnaires, in the hope of amending record errors, or at least of deleting data that is obviously erroneous decisions about computing procedure are needed in cases in which answers to certain questions were omitted by some respondents or were deleted in the editing process, after the computations that lead to the estimates are performed. Different methods of estimation may be available for the same data. One the advantage of probability sampling that is such estimates can be made, although they have to be severely qualified if the amount of non-response is substantial (William G. Cochran – john willey & sons, (1977).

2-1-1-11 Information Gained for Future Survey:

firstly we have more information about population; any completed sample is potentially guided to improved future sampling in the data that is supplies about the means. Standard deviations and nature of the variability of the principal measurements and about the costs involved in getting the data, sampling practice advances more rapidly when previsions are mad to assemble and record information of this type (William G. Cochran – john willey & sons, (1977).

There is another important respect in which any completed sample facilities future samples. Things never do exactly as planned in a complex survey. The alert sampler learns to recognize mistake in execution and see that they do not occur in future surveys (William G. Cochran – john willey & sons, (1977).

(2-1-2) The Role of Sampling Theory

The list of sample survey has been given in order to emphasize that sampling is a practical business, which calls for several different types of skill. in some of step “ definition of the population, determination of the data, to be collected and the methods of measurement, and the organization of the field work” sampling theory plays at most a minor role Their importance should be realized. Sampling demands attention to all stages of the activity; poor work in one phase may ruin survey everything else is done well.

The purpose of sampling theory to make sampling more efficient. It tries to develop methods of sample selection and estimation that provide with lowest possible cost, precise enough (William G. Cochran – john willey & sons, (1977).

To apply this principle we must be able to predict, for any sampling procedure “that in under consideration” the precision and cost to be expected. We cannot forecast exactly how large an error may be present in an estimate in any specific situation. We may require knowledge of the true value for the population. Alternatively the precision of a sampling procedure is judged by examining the frequency distribution generated for the estimate if the procedure is applied again to the same population (William G. Cochran – john willey & sons, (1977).

With sample size there are common in practice, there is often good reason to suppose that sample estimates are normally distributed. With normal distributed the whole form of the frequency distribution is known, if we know the mean and the standard deviation or (variance). The largest part of sample survey theory is dealing with finding formulas for these means and variance. A considerable part of sample survey interested in finding formulas for these means and variance (William G. Cochran – john willey & sons, (1977).

There are two differences between standard sample survey theory and classical survey theory. In classical theory the measurements made on the sampling units in the population usually assumed to follow a frequency distribution. In sample survey theory the attitude has been to assume limited information about the frequency distribution. In particular, it’s mathematical form is not assumed to be known, so that the approach might be described as distribution-free this attitudes natural for large survey in which different measurements with differing distributions are made on the units. Surveys in which only a few measurements per unit are made studies of their frequency distributions may justify the assumption of known mathematical forms permitting the results from classical theory to be applied. (William G. Cochran – john willey & sons, (1977).

(2-1-3) Definitions:

2-1-3-1 Samples:

Subgroups drawn from the population to represent the population".

"Subset of a population" (Browne, R. H. (1995).

2-1-3-2 Sampled population:

The collection of all possible observation units that, might have been chosen in a sample; the population from which the sample was taken (William G. Cochran – john willey & sons, (1977).

2-1-3-3 Population:

The entire group of people that a particular study is interested (Browne, R. H. (1995).

"The complete collection of observations we want to study". Defining the target population is an important and often difficult part of the study

The choice of target population will profoundly affect the statistics that result.

2-1-3-4 Sampling Unit:

Is a unit that can be selected for a sample, we may want to study individuals, but do not have a list of all individuals in the target population.

Sampling frame: A List or other specification of sampling units in the population from which a sample may be selected, For example "a list of all residential telephone numbers in the city"

In an ideal survey, the sampled population will be identical to the target population, but this ideal is rarely met exactly. In surveys of people, the sampled population is usually smaller than the target population (William G. Cochran – john willey & sons, (1977).

(2-1-4) Precision of Results:

One crucial aspect of study design is deciding how big your sample should be. If you increase your sample size, you increase the precision of your estimates, which means that, for any given estimate effect of size, the greater sample size according to the result will be more "statistically significant". In other words, if an investigation is too small then it will not detect results that are in fact important. Conversely, if a very large sample is used, even tiny deviations from the null hypothesis will be statistically significant, even if these are not, practically important. In practice, this means that before carrying out any investigation you should have an idea of what kind of change from the null hypothesis would be regarded as practically important. The smaller difference you regard as important to detect, the greater the sample size required (Rosie Cornish. 2006).

Factors such as time, cost, and how many subjects are actually available are constraints that often have to be taken account of when designing a study, but these should not dictate the sample size. There is no point in carrying out a study that is too small, only to come up with results that are inconclusive, since you will then need to carry out another study to confirm or refute your initial results (Rosie Cornish. 2006).

According to (Paula Lagares Barreiro - Justo Puerto Albandoz-2001) to obtain really good result from research, we may need to assure that we make a right choice of our samples. There are some topics which should be clearly defined once we want to sample:

1. The selection method for the elements of the population. This is also known a sampling method to be used.
2. Sample size.
3. Reliability degree, which we are going to have in terms of probability (Rosie Cornish. 2006).

(2-1-5) Types of Sampling:

We have already stressed the importance of a right choice for the elements of the sample so as to make it representative of our population but, we can classify the different ways of choosing a sample into three types of sampling (14):

Probability Sampling: It is the one in which each sample has the same probability of being chosen.

Purposive Sampling: It is the one in which the person who is selecting the sample tries to make the sample representative, depending on his opinion or purpose, thus being the representation subjective.

No-rule Sampling: We here take a sample without any rule, being the sample representative if the population is homogeneous and we have no selection bias (James Dean Brown, 2007).

(2-1-6) Errors of Sampling

We always make probability sampling, because in case we choose the appropriate technique, it assures us that the sample is representative and we can estimate the errors for the sampling (James Dean Brown, 2007).

Possible Errors: Selection error: if any of the elements of the population has a higher probability of being selected than the rest. The way to avoid this kind of errors is to choose the sample in a way, so that all the clients have the same probability of being selected (James Dean Brown, 2007).

Non-answered Error: It's possible that some elements of the population do not want to answer or cannot answer certain questions. This may also happen, when we have a questionnaire including personal questions, which some members of the population do not answer honestly. This error is, generally, very complicated to avoid, but in case that we want to check honesty in answers, we can include some questions to detect if the answers are honest (filter questions) (James Dean Brown, 2007).

Elevation Factor: it is the quotient between the size of the population and the size of the Sample (N/n). It represents the number of elements existing in the population for each element of the sample.

Sampling Factor: it is the quotient between the size of the sample and the size of the Population (n/N). If this quotient is multiplied by 100, we get the percentage of the population Represented in the sample (James Dean Brown, 2007).

(2-1-7) Advantages of the Statistical Sample

A statistical sample has too important characteristics. The estimation of the require sample size and the objective projection and evaluation of the sample results. From (Audit Manual: Chapter 13 Statistical Sampling).

When a sample is obtained by this method, it is possible to state with a desired level of confidence that the sample result is no further away than some calculable amount from the result attainable from a complete examination of all items. This provides a number of advantages which are explained as follows (MaMaEuSch, (2001) :

a. Objective and Defensible of Sample Result

One important feature of statistical sampling is that, in an un-stratified random sampling plan, all items in the population have an equal chance for selection as a sample item. This random selection process eliminates bias and would reduce any possible argument, that, the sample is not representative.

b. Method Provides for Advance Estimation of Sample Size

An advance estimation of the necessary sample size can be computed based upon statistical principles. The advance estimation provides both a defense for the reasonableness of the sample size and a justification for the expenditure involved

However, determination of sample size is not purely mechanical, but calls for good analytical skills and decisions by the auditor.

c. Estimate the Sampling Error

When a judgment (non-statistical) sample is performed, there is no way to evaluate the reliability or accuracy of the results. When a probability sample is used, the results may be evaluated in terms of how far the sample projection might deviate from the value that could be obtained by a 100 percent examination of the population.

d. Statistical Sampling May Save Time and Money

With the ability to calculate an advance estimation of the required sample size, the statistical sampling approach may result in a smaller sample size than might be used on the basis of a judgmental approach. Although the statistical sampling approach will not always produce smaller sample sizes, the ability to estimate the required sample size in advance will help to reduce the possibility of over sampling.

e. Combined and Evaluated of Multiple Samples

When the entire test operation has an objective and scientific basis, it is possible for different auditors to participate independently in the same test and for the results to be combined as is the test was accomplished by one auditor. For instance, in an audit covering a number of locations, the audit can be accomplished independently and separately at the different locations and the results combined for an overall evaluation, if statistical sample techniques were applied.

f. Objective Evaluation of Test Results Is Possible

The results of a judgmental sample can be projected to the population, but there is no way of objectively evaluating the reliability or accuracy of the test. If the statistical method is used, the audit test result can be projected, given a stated confidence level, to be within not more than a known interval from the result that would have been obtained if the population had been examined on an actual basis.

2-1-8 Probability Sampling:

- Simple Random sampling (with and without replacement).
- Stratified sampling.
- Cluster sampling.
- Systematic sampling.
- Multi-stage sampling.

2-1-8-1 Simple Random Sampling:

Simple random samples are usually easy to design and easy to analyse. But they are not the best design to use it in the following situations:
Simple random sampling is the most basic form of probability sampling, and provides the theoretical basis for the more complicated forms. There are two ways of taking a simple random samples with replacement, in which the same unit may be included more than once in the sample, and without replacement, in which all units in the sample are distinct. (William G. Cochran – john willey & sons, (1977).
A simple random sample with replacement (SRSWR) of size$n$from a population of$N$units can be thought of as drawing independent samples of size.One unit is randomly selected from the population to be the first sampled unit, with probability $1/N$. Then the sampled unit is replaced in the population, and a secondunit is randomly selected with probability $1/N$. This procedure is repeated until thesample has$n$units, which may include duplicates from the population (William G. Cochran – john willey & sons, (1977).
In a finite population, sampling the same person twice provides no additional information. A simple random sample without replacement (SRS) of size n is selected so that every possible subset of n distinct units in the population has the same probability of being selected as the sample. There arec_n^N possible samples, and each is equally likely, so the probability of selecting any individual sample S of n units is

$$\frac{1}{c_n^N} = \frac{n!\,(N-n)!}{N!}$$

As a consequence of this definition, the probability that the$i$th unit appears in the sample is $\pi i\ = n/N$.

To take an SRS, you need a list of all observation units in the population; this list is called sampling frame. In an SRS, the sampling unit and observation unit coincide. Each unit is assigned a number, and a sample is selected so that each possible sample of size n has the same chance of being the sample actually selected. This can be thought of, as drawing numbers out of a hat. In practice, computer-generated pseudo-random numbers are usually used to select a sample. (William G. Cochran – john willey & sons, (1977).

One method for selecting an SRS of size$n$from a population of size Nis to generate N random numbers between (0 and 1), then select the units corresponding to the n smallest random numbers to be the sample (Sharon L. lohr, (2010).

Simple random sampling is method of selecting n units out of N such that every one of the C_n^N distinct sample has an equal chance of being drawn. In practice a simple random sampling is drawn unit by unit. The units in the population are numbered from 1 to N. A series of random number between 1 to N is then drawn, either by means of a table of random number or by means of a computer program that produce such a table at any draw the process used must give an equal chance of selection to any number in the population not already drawn. The units that bear these nnumbers continue the sample. (William G. Cochran – john willey & sons, (1977).

2-1-8-2 Stratified Random Sampling:

The word stratify comes from Latin words meaning "to make layers"; we divide the population into subpopulations, called strata.

If the variable we are interested in takes on different mean values in different subpopulations, we may be able to obtain more precise estimates of population quantities by taking a stratified random sample

If a simple random sample is taken in each stratum. The whole procedure is described as stratified random sampling.

In a stratified random sample, the population is divided into subgroups called strata. Then an "SRS" is selected from each stratum, and the SRS in the strata are selected independently. The strata are often subgroups of interest to the investigator.

The strata do not overlap, and they constitute the whole population so that each sampling unit belongs to exactly one stratum. We draw an independent probability sample from each stratum, then pool the information to obtain overall population estimates. (William G. Cochran – john willey & sons, (1977).

In stratified sampling the population of N units is first divided into subpopulations of $N_1 N_2 \dots N_L$ units, respectively. These subpopulations are no overlapping, and together they comprise the whole of population, so that

$$N_1 + N_2 + \cdots + N_L = N$$

The subpopulations are called strata.Toobtain the full benefit from stratification, the values of the N_h must be known. When the strata have been determined, a sample is drawn from each, the drawings being made independently in different strata. The sample size within the strata is denoted by $n_1 n_2 \dots n_L$ respectively. (William G. Cochran – john willey & sons, (1977).

2-1-8-3 Systematic sampling

Systematic sampling is sometimes used as agent for simple random sampling, when no list of the population exists or when the list is in roughly random order. To obtain a systematic sample, choose a sample size n. If $N/n$is an integer, let $k = N/n$;

Otherwise, let k be the next integer after N/n. Then find a random integer between1 and k, which determines the sample to be the units numbered $R, R + k, R + 2k,$ etc. If the list of population is ordered by randomly generated identification numbers, we shall probably obtain a sample that will behave much like an SRS—it's unlikely that a person's position in the list is associated with the characteristic of interest. However, systematic sampling is not the same as simple random sampling; it does not have the property that every possible group of$n$units has the same probabilityof being the sample. For example it is impossible to have unit number 345 and 346 both appear in the sample. Systematic sampling is technically a form of cluster sampling. (William G. Cochran – john willey & sons, (1977).
In systematic sample, a starting point is chosen from a list of population members using a random number. That unit, and everykth unit thereafter, is chosen tobe in the sample.A systematic sample thus consists of units that are equally spacedin the list (Rosie Cornish. 2006).
Suppose that the N units in population are numbered 1 to N in some order. To select a sample of n units, we take a unit at random from the first k units and very kth unit thereafter. The selection of the first unit determines the all sample. This type of samples s called systematic sampling. (Rosie Cornish. 2006).

2-1-8-4 Cluster sampling

In a cluster sample, observation units in the population area aggregated into larger sampling units, called clusters. (Sharon L. lohr, 2010).

According tovillain G.Cochran. In cluster sampling, population is divided into units or groups, called strata (these are usually units or areas in which the population has been divided), which should be as representative as possible for the population, i.e., they should represent the heterogeneity of the population we are studying and they should be homogeneous among them. (Rosie Cornish. 2006).

The reason to make this sampling is that sometimes it is too expensive to make a complete list of all the elements of the population that we want to study, or that when we finish making the list it may have no sense to make the study. (Rosie Cornish. 2006).

The main disadvantage here is that, if the clusters are not homogeneous among clusters, the final sample may not be representative of the population. If we suppose, that, the clusters are as heterogeneous as the population, referring to the variable we are considering, and that the clusters are homogeneous among clusters, then to get a sample we only have to choose some clusters. We say that we make cluster sampling in one stage.

This sampling method has the advantage that it simplifies the collecting of the sample information. (Rosie Cornish. 2006).

2-2 Determination of sample size:

2-2-1 Sample Size: In the statistic the primary objective of most study trials is to demonstrate the effectiveness and safety under investigation.Sample size calculation plays an important role at the planning stage to ensure that there are sufficient amount of subjects for providing accurate and reliable assessment with certain statistical assurance. In practice hypotheses regarding scientific questions of the study are usually formulated based on the primary study objectives. The hypotheses are then evaluated using appropriate statistical test under a valid study design to ensure that the test results are accurate and reliable. With certain statistical assurance, it should be noted that a valid sample size calculation can only be done based on appropriate statistical tests for the hypotheses, which can reflect the study objectives under a valid study design. So, the hypotheses should be clearly stated when performing a sample size calculation. Each of the above hypotheses has different requirements for sample size in order to achieve a desired statistical assurance (95%assurance in precision (Sharon L. lohr, (2010).

In practice, we do not know the values of statistics from all possible samples, so we cannot calculate the exact confidence coefficient for a procedure

An investigator often measures several variables and has a number of goals for a survey. Anyone designing an SRS must decide what amount of sampling error in the estimates is tolerable and must balance the precision of the estimates with the cost of the survey. Even though many variables may be measured, an investigator can often focus on one or two responses that are of primary interest in the survey, and use these for estimating a sample size. For a single response, follow these steps to estimate the sample size (Sharon L. lohr, 2010).

1- What is expected of the sample, and how much precision do I need? What are the consequences of the sample results? How much error is tolerable? If the Survey measures the unemployment rate every month, if we would like the estimates to be very precise indeed so that we can detect changes in unemployment rates from month to month. A preliminary investigation, however, often needs less precision than an ongoing survey.

Instead of asking about required precision, many people ask, “What percentage of the population should I include in my sample?” This is usually the wrong question to be asking. Except in very small populations, precision is obtained through the absolute size of the sample, not the proportion of the population covered. Which is the only place that the population size N occurs in the variance formula, has little effect on the variance of the estimator in large populations.

2- Find an equation relating the sample size n and your expectations of the sample.
3- Estimate any unknown quantities and solve for n.
4- If you are relatively new at designing surveys, you will find at this point that the sample size you calculated in step 3 is much larger than you can afford.

Go back and adjust some of your expectations for the survey and try again. In some cases, you will find that you cannot even come close to the precision you need with the resources you have available; in that case, perhaps you should consider whether you should even conduct your study (Sharon L. lohr, 2010).

2-2-2 Estimation of Sample Size:

Sample size estimation is usually conducted through a pre-study power analysis. To select a sample size for achieving a desired power of correct detection of a meaningful difference at a given level of significance (Sharon L. lohr, 2010).

If we desire to estimate, with a confidence interval, the mean of a population (μ), one of the first question arise is how large the sample should be? This question must be given serious consideration, because it is a waste of time and resources to take a larger sample than is needed for the required results. On the other hand, if the number of samples is too small it may lead to results of no practical value. The key questions are how do you want our estimate to be close to the true value? Or, how wide would we like to make the confidence interval? The second question is, how much confidence do we want to place in our interval? That is, what confidence coefficient do we wish to employ? (Charles Guandaru, Kariuki, Samuel Nduati, 2012).

To answer these questions may need to use the confidence interval

$\bar{y} \pm z_{\propto/2} * \frac{\sigma}{\sqrt{n}}$ ... . → (3-1)

Where $z_{\propto/2} * \frac{\sigma}{\sqrt{n}}$ is equal one half of the confidence interval, accordingly question one can be answered, by the set up of the following equation:

$e = z_{\propto/2} * \frac{\sigma}{\sqrt{n}}$ ... . → (3-2)

Where $e$indicates how close the true mean we want our estimate to be. From equations 1 and 2sample size equation can be written as

$n = \frac{z_{\propto/2}{}^2 * \sigma^2}{e^2}$ ... . → (3-3)

Sample size estimation is referred to the calculation of required number of samples for achieving some desired statistical confidence of accuracy and reliability ((Charles Guandaru, Kariuki, Samuel Nduati, 2012).

Inman researches, sample size calculation may be performed based on precision analysis, variance of population, probability assessment or other statistical inferences (Sharon L. lohr, 2010).

To find an equation, in simple random sampling, the simplest equation relating the precision and sample size comes from the confidence intervals. To obtain absolute precision "e", find a value of$n$ that satisfies (shein-chung chow , jun shao , hansheng wang, (2017)

$e = z_{\propto/2}\sqrt{1 - \frac{n}{N}} * \frac{s}{\sqrt{n}}$ ……..→ (3-4)

To solve this equation for n, we first find the sample size$n_0$that we would use for an "SRSWR":

$n_0 = \frac{(z_{\frac{\propto}{2}} s)^2}{e^2}$ ... ... → (3-5)

Then the desired sample size will be:

$n = \frac{n_0}{1 + \frac{n_0}{N}} = \frac{z_{\frac{\propto}{2}} s^2}{e^2 + \frac{z_{\frac{\propto}{2}} s^2}{N}}$ ... ... → (3-6)

Of course, if$n_0 \geq N$we simply take $n = N$.

In surveys the one of the main responses of interest is a proportion; it is often easiest to use that response in setting the sample size. For large populations, $S^2 \approx p(1-p)$ which attains its maximal value when$p = 1/2$. So usingthe equation:

$$n_0 = \frac{(1.96)^2}{4\,e^2} \dots\dots.. \rightarrow \text{(3-7)}$$

The result at 95%confidence intervals with width at most $2e$ (shein-chung chow , jun shao , hansheng wang, 2017).

To calculate a sample size for obtaining a specified relative precision, substitute y

From"e"in (*) and (**) this results in sample size

$$n = \frac{n_0}{1+\frac{n_0}{N}} = \frac{z_{\frac{\propto}{2}}S^2}{(r\bar{y}_U)^2 + \frac{z_{\frac{\propto}{2}}S^2}{N}} \dots\dots\dots \rightarrow \text{(3-8)}$$

To achieve a specified relative precision, the sample size may be determined using only the ratio$S/\bar{y}_U$e.g. the CV for a sample of size. (Sampling design and analysis-Sharon. (shein-chung chow , jun shao , hansheng wang, 2017)

For example: Suppose, if we want to estimate the proportion of recipes in the Better Homes & Gardens New Cook Book that do not involve animal products. We plan to take an SRS of the=1251 test kitchen-tested recipes, and want to use a 95% CI with margin of error0.03. Then can be determined as:

$$n_0 = \frac{(1.96)^2 * (0.5)(1-0.5)}{0.03^2} \approx 1067$$

And When:

$$\text{n} = \frac{1067}{1 + \frac{1067}{1251}} = 576$$

With a sample size ignoring the fpc is large compared with the population size, so in this case when we would make the fpc adjustment and use

In the above example, the fpc makes a difference in the sample size because N is only 1251. IfNis large, however, typically$\frac{n_0}{N}$will be very small so that for large populations we usually assume $n \approx n_{0,}$ thus, we need approximately the same samplesize for any large population,—whether, that population has 10 million or 1 billion or100 billion units. If the population size is too large compared to the sample that the fpc should be ignored. For large populations, it is the size of the sample, not the proportion of the population that is sampled, that determines the precision. (shein-chung chow , jun shao , hansheng wang, 2017)

2-3 Factors effecting on sample size:

In addition to the purpose of the study and population size, four criteria usually will need to be specified to determine the appropriate sample size: the level of precision, the level of confidence or risk, the degree of variability (Proportion) in the attributes being measured, and the variance. e Is the Margin of a percentage that tells you how much you can expect your survey results to reflect the views of the overall population? The smaller the margin of error, the closer you are to having the exact answer at a given confidence level. p Is the degree of variability in the attributes being measured, refers to the distribution of attributes in the population. The more heterogeneous a population, the larger sample size required to obtain a given level of precision. The less variable (more homogeneous) a population, the smaller the sample size**.** (Glenn D. Israel2, 1992)

$\propto$ The confidence level is based on ideas encompassed under the Central Limit Theorem. Key idea encompassed in the Central Limit Theorem is that when a population is repeatedly sampled, the average value of the attribute obtained by those samples is equal to the true population value.

The researcher must make decisions as to which variables will be incorporated into formula calculations**.** (Glenn D. Israel2, 1992)

2-3-1 The level of precession:

The level of precision, sometimes called sampling error or Standard Error, is the range in which the true value of the population is estimated to be. This range is often expressed in percentage points (e.g., ±5 percent)

The reliability of sample information depends mainly on four characteristics, namely the sampling method, the variability of population, the sample size, and the population size. With these four variable features, there are many situations in which different proposed sampling schemes can be employed these depending on desired features**. (**Birkett MA and Day SJ, 1994).

Cochran (1977) addressed this issue by stating that “One method of determining sample size is to specify margins of error for the items that are regarded as most vital to the survey. An estimation of the sample size needed is first made separately for each of these important items. When these calculations are completed, researchers will have a range of n, usually ranging from smaller n’s for scaled, continuous variables, to larger n for categorical variables. (Rosie Cornish. 2006).

If the largest of n falls within the limits of budget, this n is selected. More commonly, there is sufficient variation among the n so that we are reluctant to choose the largest, either from budgetary considerations or because this will give an overall standard of precision substantially higher than originally contemplated.in this items the desired of standard of precision may be relaxed for certain of the items, in order to permit the use of smaller value of n [(24).]

Sometime, the standard error is simpler than the standard deviation, but in other ways, it is much more complex. (Gene Shack man, 2001)

The standard error is always an estimator of a population characteristic; it is not a descriptive statistic - it is an inferential statistic. The SE is an estimate of the interval into which a population parameter will probably fall.

Every sample statistic can be used to estimate an SE; there is an SE for the mean, for the difference between the means of two samples, for the slope of a regression line, and for a correlation coefficient. (Sharon L. lohr, 2010)

Before collecting data, it is essential to determine the sample size requirements of the study. For calculating the sample size requirements of a study we must answers some questions. Do we want to learn about a mean, mean difference, proportion, proportion ratio, or odds ratio. Are we like to estimate something with a given precision, or with given power. (William G. Cochran – john willey & sons, 1977)

The sample size is to be determined according to some pre assigned degree of precision. The degree of precision can be specified in terms of two criteria. The margin of permissible error between the estimated value and the population value. It is the measure of how close an estimate is to the actual characteristic in the population. The level of precision, may be termed as sampling error. It is the range to which the true value of the precision is to be estimated. (Amy L Whitehead, Steven A Julious, Cindy L Cooper, Michael J Campbell, 2016)

To estimate the sample size we may need to answer some questions such as, what is the expected of the sample, how much precision we need, what are the consequences of the sample results? And how much error is tolerable? Instead of asking about required precision, many people ask, “What percentage of the population should be include in the sample?” This is usually the wrong question to be asked. Except in cases of small populations, precision is obtained through the absolute size of the sample and not the proportion of the population covered. (Amy L Whitehead, Steven A Julious, Cindy L Cooper, Michael J Campbell, 2016)

Sample size is to be determined according to some pre assigned ‘degree of precision’. The ‘degree of precision’ is the margin of permissible error between the estimated value and the population value. In other words, it is the measure of how close an estimate is to the actual characteristic in the population. The level of precision may be termed as sampling error. (Amy L Whitehead, Steven A Julious, Cindy L Cooper, Michael J Campbell, 2016)

The desired precision may be made by giving the amount of error that need to tolerable in the sample estimates. The difference between the sample statistic and the related population parameter is called the sampling error. It depends on the amount of risk a researcher is willing to accept while using the data for decisions making. It is often expressed in percentage. If the sampling error or margin of error is ±5%, and 70% unit in the sample attribute some criteria can be concluded that, as (65% to 75%) of units in the population. (Rosie Cornish. 2006).

2-3-2 Proportion:

How big should my sample size be?" Statisticians are often asked this question. When studies involve data in the form of counts or proportions, the best answer is probably, (As big as you can afford) the reason for this is there is surprisingly little information in such data, even from quite big studies. (George W Brown, 2003)
The Survey studies are generally related to the inferences about the characteristics of population under study. The sample size determination is the act of choosing the number of observations or replicates to include in a statistical sample. Sample size is an important feature of any empirical study in which the goal is to make inference about a population from a sample. The sample size determination depends mainly on the degree of precision (standard error) proportion, variance, confidence level, effect of size. If a sample is not true representative of the target population it may lead to unreliable conclusions. So the determination of proper sample size using appropriate technique of sampling is vital in this type of studies. It is very much necessary to have an idea about the effect of precision and proportion on sample size determination. (Amy L Whitehead, Steven A Julious, Cindy L Cooper, Michael J Campbell, 2016)
The random sampling of a larger proportion of the same population, to attractive argument is to say that if we take a higher proportion of the population increase the size of the sample, will certainly improve the quality of information about the population under study. However, what happens, if we take a sample which is larger in size but the proportion smaller proportion because the population it is taken from is also larger. A superficially we may get better quality information. But, this ignores the fundamental statistical behavior which gives rise to the laws of large numbers. In small samples individual results exert great influence on the overall picture, whereas their contribution in a larger sample is considerably less influential**. (**Birkett MA and Day SJ, 1994**)**

2-3-3 Confidence (significant) level desired.

The confidence or risk level is ascertained through the well-established probability model called the normal distribution and an associated theorem called the Central Limit theorem. (Amy L Whitehead, Steven A Julious, Cindy L Cooper, Michael J Campbell, 2016).

The values obtained by these samples are distributed normally about the true value, with some samples having a higher value and some obtaining a lower score than the true population value. In a normal distribution, approximately 95% of the sample values are within two standard deviations of the true population value. In other words, this means that if a 95% confidence level is selected, 95 out of 100 samples will have the true population value within the range of precision specified earlier**. (**Birkett MA and Day SJ, 1994**).**

In general, the normal curve results whenever there are a large number of independent small factors influencing the final outcome. It is for this reason that many practical distributions, be it the distribution of annual rainfall, the weight at birth of babies, the heights of individuals etc. are all more or less normal, if sufficiently large number of items are included in the population. The significance of the normal curve is much more than this. It can be shown that even when the original population is not normal, if we draw samples of n items from it and obtain the distribution of the sample means, we notice that the distribution of the sample means become more and more normal as the sample size increases. This fact is proved mathematically in the Central Limit theorem. The theorem says that if we take samples of size n from any arbitrary population (with any arbitrary distribution) and calculate $\bar{x}$, then sampling distribution of $\bar{x}$ will approach the normal distribution as the sample size n increases with mean μ and standard error $\frac{\sigma}{\sqrt{n}}$. (Amy L Whitehead, Steven A Julious, Cindy L Cooper, Michael J Campbell, 2016).

A sample statistic is employed to estimate the population parameter. If more than one sample is drawn from the same population, then all the sample statistics deviate in one way or the other from the population parameter. In the case of large samples, where $n > 30$, the distribution of these sample statistic is a normal distribution. Generally, a question arises that how much should a sample statistic miss the population parameter so that it may be taken as a trustworthy estimate of the parameter. The confidence level tells how confident one can be that the error toleration does not exceed what was planned for in the precision specification. (Amy L Whitehead, Steven A Julious, Cindy L Cooper, Michael J Campbell, 2016).

Usually 95% and 99% of probability are taken as the two known degrees of

Confidence for specifying the interval within which one may ascertain the existence of population parameter (e.g. mean). 95% confidence level means if an investigator takes 100 independent samples from the same population, then 95 out of the 100 samples will provide an estimate within the precision set by him. Again, if the level of confidence is 99%, then it means out of 100 samples 99 cases will be within the error of tolerances specified by the precision. (Amy L Whitehead, Steven A Julious, Cindy L Cooper, Michael J Campbell, 2016)

2-3-4 Variance:

In view of the imprecision of parameter settings, investigated the effect on the realized α-risk of using a pilot sample variance to estimate variance on the sample size formula for testing population means. Their results suggested that researchers should recognize that the actual type I error rates may be substantially different than the nominal level. Shiffler and Harwood (1985).

Browne (1995) examined the deficiency of using a sample variance to compute the sample size needed to achieve the planned power for one- and two-sample t-tests. The empirical results of Browne showed that the actual power attained with the calculated sample size is quite likely to be less than the planned power. More importantly, he proposed to improve the underpowered condition by using the upper confidence limit of the sample variance rather than the sample variance estimate itself. The imputation of selected upper confidence limit for population variance in the sample size calculation can guarantee that the actual power will exceed the planned power with designated probability. In practice, the actual sample size required to guarantee the assurance probability with respect to the planned power is closely related to the underlying distributional property and magnitude of sample variance estimate from a pilot sample or related investigation.

the a priori determination of a proper sample size is necessary to achieve some specified power as an important problem frequently encountered in practical studies. To establish the needed sample size for a two-sample t test, researchers may conduct the power analysis by specifying scientifically important values as underlying population means while using a variance estimate obtained from related research or pilot study. In order to take account of the variability of sample variance, two approaches to sample size determinations should be considered. One provides the sample size required to given assurance probability, that, the actual power exceeds the planned power. The other provides the necessary sample size, such that the expected power attains the designated power level. The suggested paradigm of adjusted sample variance combines the existing procedures into one unified framework. Numerical results may be presented to illustrate the usefulness and advantages of the proposed approaches that, accommodate the stochastic nature of the sample variance. More importantly, supplementary computer programs are developed to aid the implementation of the suggested techniques. The exposition may help to clarify discrepancy and to extend the development of sample size methodology. Gwowen Shieh, (2013).

A sample size calculation for a randomized controlled trial (RCT) is undertaken to estimate the minimum number of participants required to detect as significant a pre specified effect, with a stated level of statistical power and at a chosen significance level Wittes J, 2002.

Here, the significance level equates to the risk of incorrectly rejecting the null hypothesis (a type 1 error), and power is the probability of detecting as statistically significant an effect of a specified magnitude, if it exists; this is equivalent to the probability of avoiding a type 2 error. Where the outcome variable of interest is an interval/ratio scale and the effect in question is a mean difference, the sample size calculation depends in part on the value of the variance of the outcome variable in the main RCT. This is unknown and often estimated by the variance from a pilot study; this process is equivalent to the estimation of a population parameter. Julius Sim, Martyn Lewis. (2012).

Accordingly, an RCT may turn out to be under- or overpowered to detect the specified effect, owing to the variance of data in the trial don which the hypothesis test is based being respectively larger or smaller than the value used in the prior sample size calculation. Under- or overestimation of the variance in the main RCT may be for two reasons. First, the estimate used in the calculation may not be appropriate for the clinical population in which the trial is conducted (e.g., it was derived from a previous study of patients whose age, chronicity, or symptom severity differed from that of the patients in the RCT). That is, the variance used in the sample size calculation may be biased (systematic error). Alternatively, as a random variable, the variance used in the calculation may have under- or overestimated the variance in the main RCT simply through sampling fluctuation (random error).

A pilot study can help to remedy the problem of bias in the estimate of the variance as it can be conducted on the same clinical population as will be included in the subsequent RCT. However, the estimate of the variance from a pilot study may still under- or overestimate the variance in the main RCT through random error. Julius Sim, Martyn Lewis. (2012).

To have, for example, 95% confidence of obtaining at least the nominal power of the statistical test in the main study, the researcher must base the sample size of the main study on the upper 95% one-sided for the variance from the pilot study. Hence, in relation to the example in the previous section, and assuming a pilot study of $n = 520$ and a nominal power of 80%, it can be calculated that to be 95% confident of achieving at least the nominal power of the statistical test in the main study, an variance not of 20 but of 27.41 (the upper one-sided CL) should be used in the sample size calculation (with a resulting increase in the minimum number of participants that would need to be analysed from 200 to 376). Julius Sim, Martyn Lewis. (2012).

CHAPTER THREE

Application

Application

3-1 Introduction:

There are different formula for determination of appropriate sample size when different techniques of sampling are used. Here, we need a formula for representative sample size, when, simple random sampling technique has been used. Simple random sampling is the most common and the simplest method of sampling because each unit of the population has the equal chance of being drawn in the sample. Therefore it is a method of selecting units out of a population of size by giving equal probability to all units [11].

Simple random sampling formula was used to determine the sample size from one and two tails. Z value for various levels were employed (table1), where level of significance is where level of significance is $\propto = 0.05, 0.01, 0.03, 0.08, 0.001$, variance values ranging from (0.1, 0.2, .03, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2), Standard Error ranging from $(e = 0.001, 0.002, 0.003, 0.004, 0.005, 0.006, 0.007, 0.008, 0.009, 0.01, 0.011, 0.012, 0.013, 0.014, 0.015, 0.016, 0.017, 0.018, 0.019, 0.02)$, and total population size was assumed to be $(N = 100{,}000)$. This was used to find the main sample size.

Cochran (1977) developed a formula to calculate a representative sample for proportions as, where is the pilot sample size, is the selected critical value of desired confidence level, the estimated proportion of an attribute that, is present in the population, e is the desired level of precision [6].

$$n_0 = \frac{(z)^2 * pq}{\boldsymbol{e^2}} \quad \ldots\ldots\ldots \rightarrow (3\text{-}1)$$

Where, $n_0$is the sample size, z is the selected critical value of desired confidence level, p is the estimated proportion of an attribute that is present in the population, $q = (1 - p)$ and e is the desired level of precision [11].

Cochran pointed that if the population is finite, then the sample size can be reduced slightly. This is due to the fact that a very large population provides proportionally more information than that of a smaller population. He proposed a correction formula to calculate the final sample size as.

$$n = \frac{n_0}{1+\frac{n_0}{N}} \ldots\ldots\ldots\ldots \rightarrow (3\text{-}2)$$

Where, n_0 is the sample size derived from equation (4-2) and N is the population size.

Z-test value was then used depending on level significant and test from (one tail, two tails). Standard error (margin of error) ranging (0.001 to 0.02), the value of the proportions ranging from (0.12, 0.15, 0.18, 0.21, 0.24, 0.27, 0.31, 0.34, 0.37, 0.40, 0.43, 0.47, 0.5) were used. The table's shows sample sizes for different proportions and margin of error.

3-1-1 Firstly: sample size determination based on standard error and variance

Table (3-1): sapmple size determination for variance $z_{\propto/2} = 1.96, e = 0.01$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.96	0.1	0.01	3842	3699	1
1.96	0.2	0.01	7683	7134	1.92863
1.96	0.3	0.01	11525	10334	2.79373
1.96	0.4	0.01	15366	13319	3.6007
1.96	0.5	0.01	19208	16113	4.35604
1.96	0.6	0.01	23050	18732	5.06407
1.96	0.7	0.01	26891	21192	5.72912
1.96	0.8	0.01	30733	23508	6.35523
1.96	0.9	0.01	34574	25691	6.94539
1.96	1	0.01	38416	27754	7.50311
1.96	1.1	0.01	42258	29705	8.03055
1.96	1.2	0.01	46099	31553	8.53014
1.96	1.3	0.01	49941	33307	9.00433
1.96	1.4	0.01	53782	34972	9.45445
1.96	1.5	0.01	57624	36557	9.88294
1.96	1.6	0.01	61466	38067	10.2912
1.96	1.7	0.01	65307	39506	10.6802
1.96	1.8	0.01	69149	40880	11.0516
1.96	1.9	0.01	72990	42193	11.4066
1.96	2	0.01	76832	43449	11.7461

Source: prepared by researcher, using excel, SPSS, 2019

By using z-test value from two tails, $\propto = 0.05$ the value of $z_{\propto/2} = 1.96$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$ was used to obtain different size of samples.

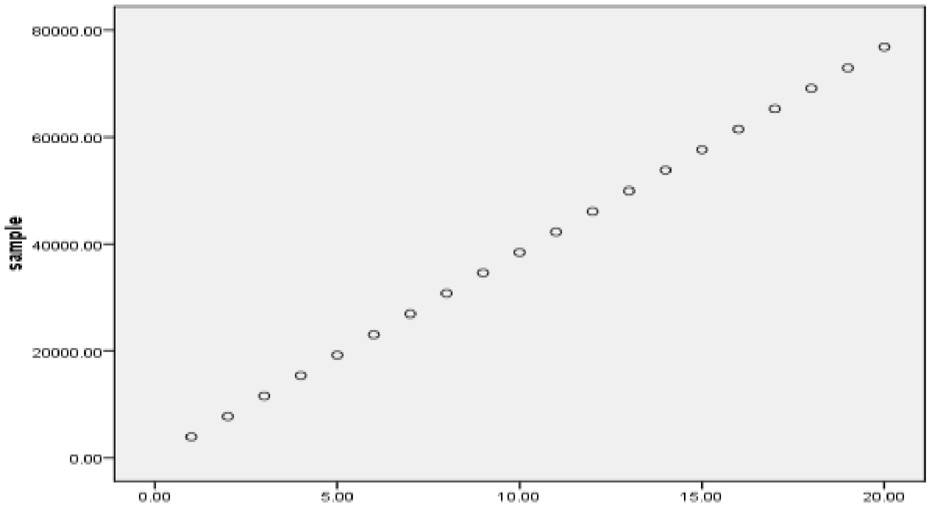

Fig (3-1): scatter diagram for different sample sizes (n)

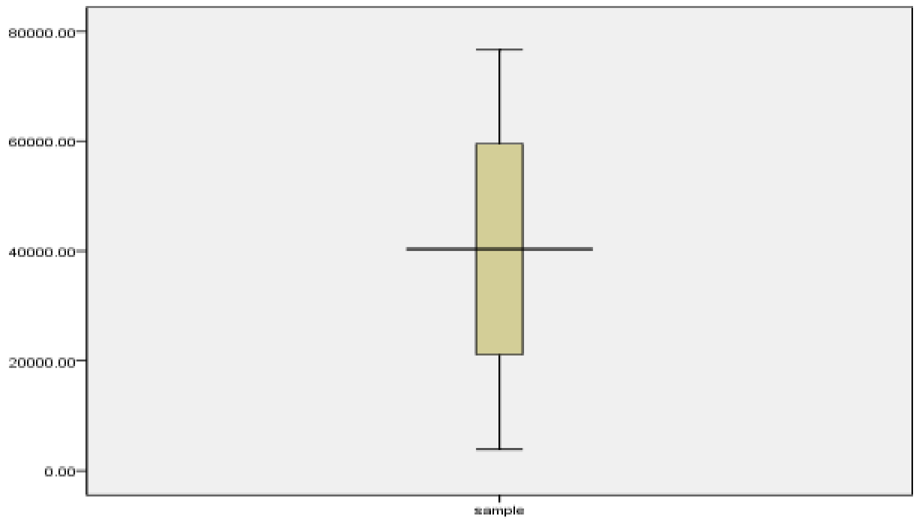

Fig (3-2): box plot for sample sizes(n)

Figure 3-1 shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-2 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails,$\propto = 0.05$ the value of $z_{\propto/2} = 1.96$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-2): sapmple size determination for variance $z_{\propto/2} = 1.96, s^2 = 0.1$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.96	0.1	0.02	960	950	1
1.96	0.1	0.019	1064	1052	1.10737
1.96	0.1	0.018	1186	1172	1.23368
1.96	0.1	0.017	1329	1311	1.38
1.96	0.1	0.016	1501	1478	1.55579
1.96	0.1	0.015	1707	1678	1.76632
1.96	0.1	0.014	1960	1922	2.02316
1.96	0.1	0.013	2273	2222	2.33895
1.96	0.1	0.012	2668	2598	2.73474
1.96	0.1	0.011	3175	3077	3.23895
1.96	0.1	0.01	3842	3699	3.89368
1.96	0.1	0.009	4743	4528	4.76632
1.96	0.1	0.008	6002	5662	5.96
1.96	0.1	0.007	7840	7270	7.65263
1.96	0.1	0.006	10671	9642	10.1495
1.96	0.1	0.005	15366	13319	14.02
1.96	0.1	0.004	24010	19361	20.38
1.96	0.1	0.003	42684	29915	31.4895
1.96	0.1	0.002	96040	48990	51.5684
1.96	0.1	0.001	384160	79345	83.5211

Source: prepared by researcher, using excel, SPSS, 2019

By using z-test value from two tails, $\propto = 0.05$ according that the value of $z_{\propto/2} = 1.96$. and variance $s^2 = 0.1$, and standard Error ranging (.001- 0.02) was used to obtain different size of samples.

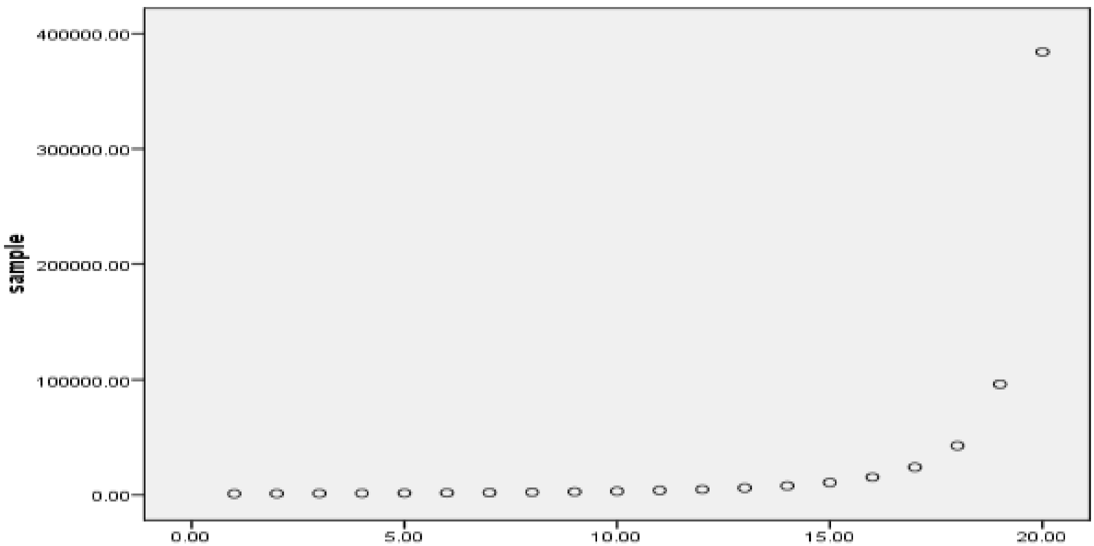

Fig (3-3): scatter diagram for different sample sizes (n)

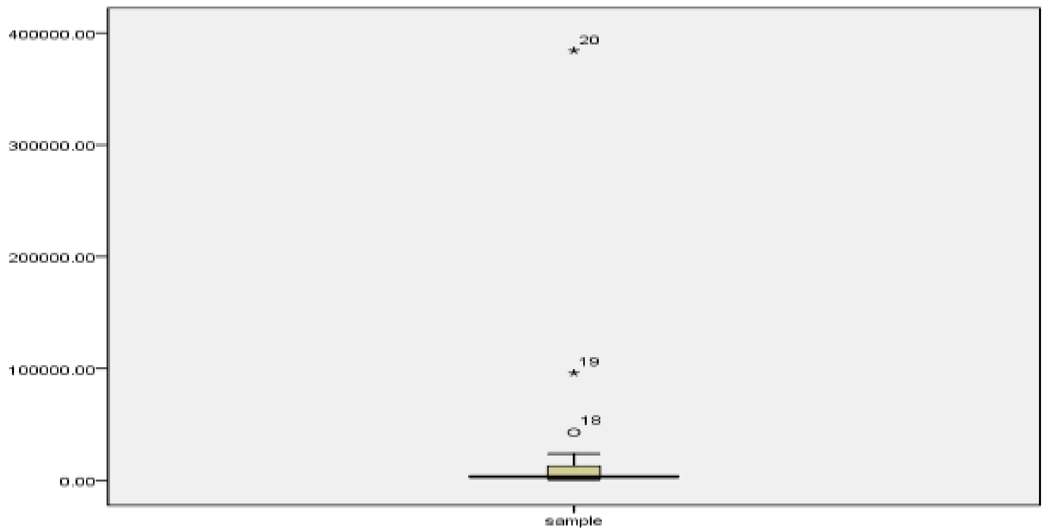

Fig (3-4): box plot for sample sizes(n)

Figure (3-3) shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-4 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-3): sapmple size determination for variance $z_{\propto} = 1.64, e = 0.01$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.64	0.1	0.01	2690	2619	1
1.64	0.2	0.01	5379	5104	1.94884
1.64	0.3	0.01	8069	7466	2.85071
1.64	0.4	0.01	10758	9713	3.70867
1.64	0.5	0.01	13448	11853	4.52577
1.64	0.6	0.01	16138	13895	5.30546
1.64	0.7	0.01	18827	15844	6.04964
1.64	0.8	0.01	21517	17706	6.7606
1.64	0.9	0.01	24206	19488	7.44101
1.64	1	0.01	26896	21195	8.09278
1.64	1.1	0.01	29587	22831	8.71745
1.64	1.2	0.01	32275	24399	9.31615
1.64	1.3	0.01	34965	25906	9.89156
1.64	1.4	0.01	37654	27354	10.4444
1.64	1.5	0.01	40344	28746	10.9759
1.64	1.6	0.01	43034	30086	11.4876
1.64	1.7	0.01	45723	31376	11.9801
1.64	1.8	0.01	48413	32620	12.4551
1.64	1.9	0.01	51102	33819	12.9129
1.64	2	0.01	53792	34977	13.3551

Source: prepared by researcher, using excel, SPSS, 2019

By using z-test value from one tail, $\propto = 0.05$, the value of $z_{\propto} = 1.64$, and variance ranging $s^2 = (0.1 - 2.0)$, and standard Error $e = 0.01$ was used to obtain different size of samples.

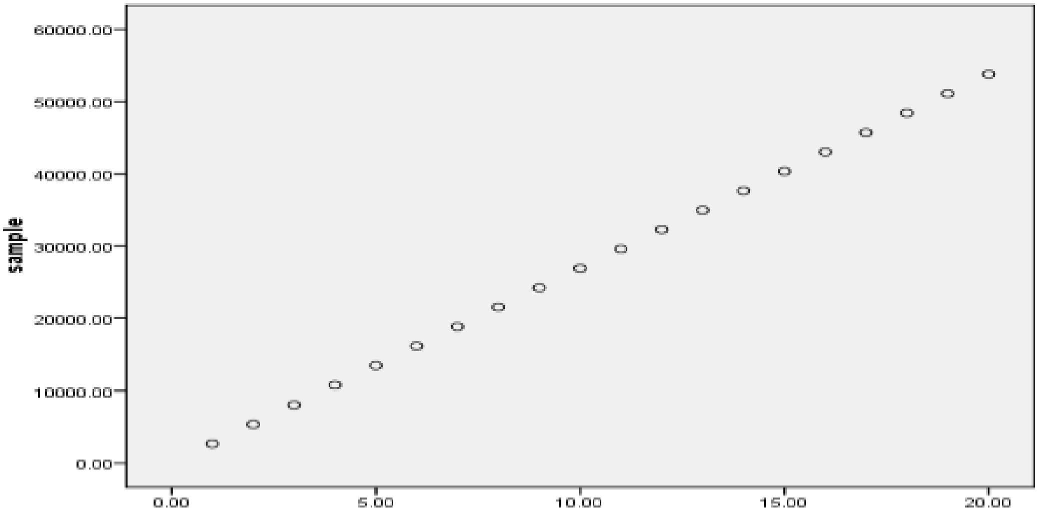

Fig (3-5): scatter diagram for different sample sizes (n)

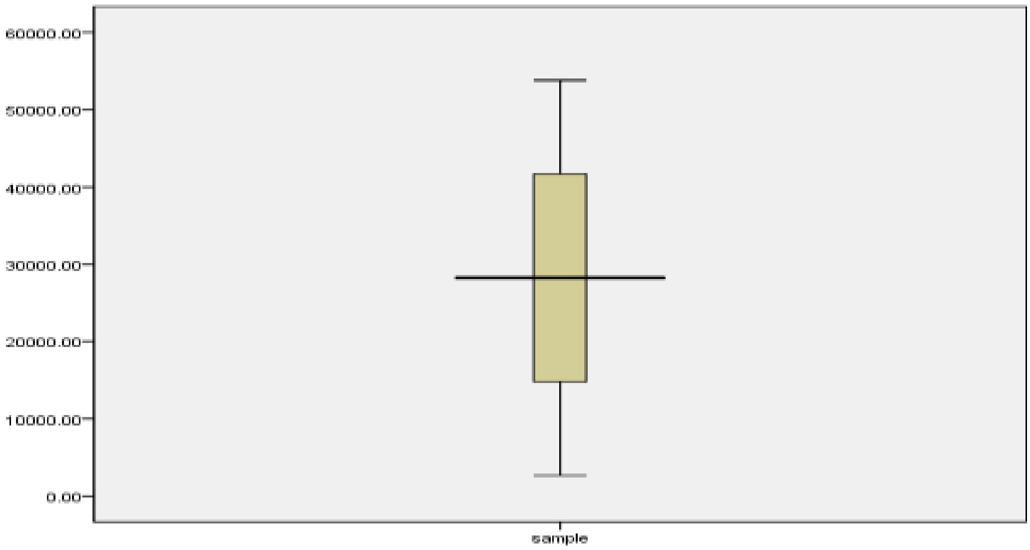

Fig (3-6): box plot for sample sizes(n)

Figure (3-5) shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-5 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails,$\propto = 0.05$ the value of $z_{\propto} = 1.64$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-4): sapmple size determination for variance $z_{\propto} = 1.64, s^2 = 0.1$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.64	0. 1	0.02	672	667.5143	1
1.64	0. 1	0.019	745	739.4908	1.10783
1.64	0. 1	0.018	830	823.1677	1.23318
1.64	0. 1	0.017	931	922.4123	1.38186
1.64	0. 1	0.016	1051	1040.069	1.55812
1.64	0. 1	0.015	1195	1180.888	1.76908
1.64	0. 1	0.014	1372	1353.431	2.02757
1.64	0. 1	0.013	1591	1566.084	2.34614
1.64	0. 1	0.012	1868	1833.746	2.74713
1.64	0. 1	0.011	2223	2174.657	3.25784
1.64	0. 1	0.01	2690	2619.535	3.92431
1.64	0. 1	0.009	3320	3213.318	4.81386
1.64	0. 1	0.008	4203	4033.473	6.04253
1.64	0. 1	0.007	5489	5203.386	7.79517
1.64	0. 1	0.006	7471	6951.643	10.4142
1.64	0. 1	0.005	10758	9713.068	14.5511
1.64	0. 1	0.004	16810	14390.89	21.5589
1.64	0. 1	0.003	29884	23008.22	34.4685
1.64	0. 1	0.002	67240	40205.69	60.232
1.64	0. 1	0.001	268960	72896.79	109.206

Source: prepared by researcher, using excel, SPSS, 2019

Z-test value for one tail $\propto = 0.05$ the value of $z_{\propto/2} = 1.64$ with variance $s^2 = 0.1$, and standard Error ranging (.001- 0.02) was used to obtain different sample sizes.

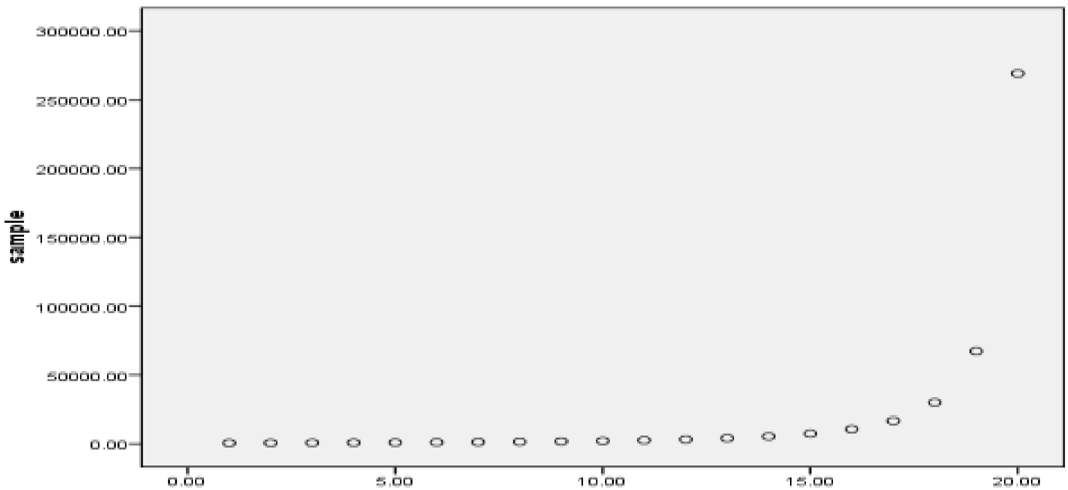

Fig (3-7): scatter diagram for different sample sizes (n)

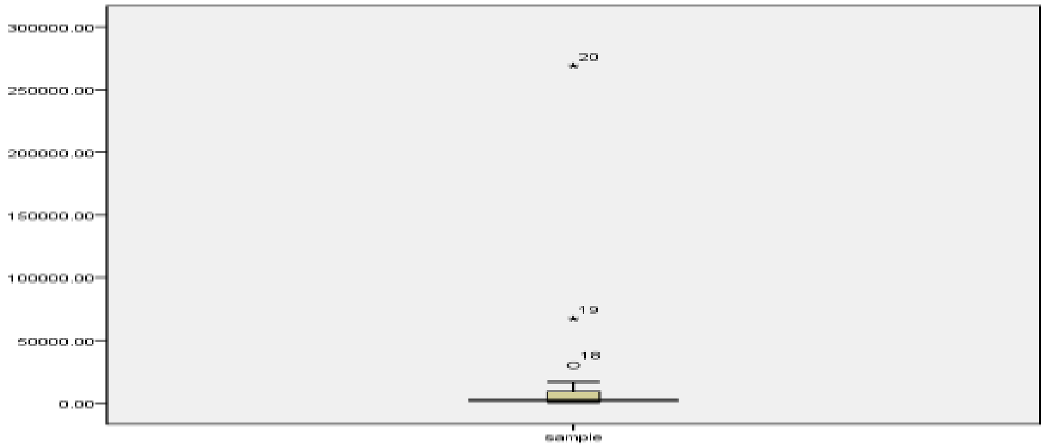

Fig (3-8): box plot for sample sizes(n)

Figure 3-7 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-8 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model

Table (3-5): sapmple size determination for variance $z_{\propto/2} = 2.58, e = 0.01$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
2.58	0.1	0.01	6656.4	6240.976	1
2.58	0.2	0.01	13312.8	11748.72	1.88251
2.58	0.3	0.01	19969.2	16645.27	2.66709
2.58	0.4	0.01	26625.6	21027.03	3.36919
2.58	0.5	0.01	33282	24971.11	4.00115
2.58	0.6	0.01	39938.4	28539.99	4.573
2.58	0.7	0.01	46594.8	31784.76	5.09291
2.58	0.8	0.01	53251.2	34747.66	5.56766
2.58	0.9	0.01	59907.6	37463.89	6.00289
2.58	1	0.01	66564	39963.02	6.40333
2.58	1.1	0.01	73220.4	42270.08	6.77299
2.58	1.2	0.01	79876.8	44406.39	7.1153
2.58	1.3	0.01	86533.2	46390.24	7.43317
2.58	1.4	0.01	93189.6	48237.38	7.72914
2.58	1.5	0.01	99846	49961.47	8.00539
2.58	1.6	0.01	106502.4	51574.41	8.26384
2.58	1.7	0.01	113158.8	53086.62	8.50614
2.58	1.8	0.01	119815.2	54507.24	8.73377
2.58	1.9	0.01	126471.6	55844.35	8.94802
2.58	2	0.01	133128	57105.11	9.15003

Source: prepared by researcher, using excel, SPSS, 2019

In table (3-5) Z-test value from two tails ($\propto = 0.01, z = 2.58$) was used, with variance (0.1 to 2), and standard error $e = 0.01$ was used to obtain different size of samples**.**

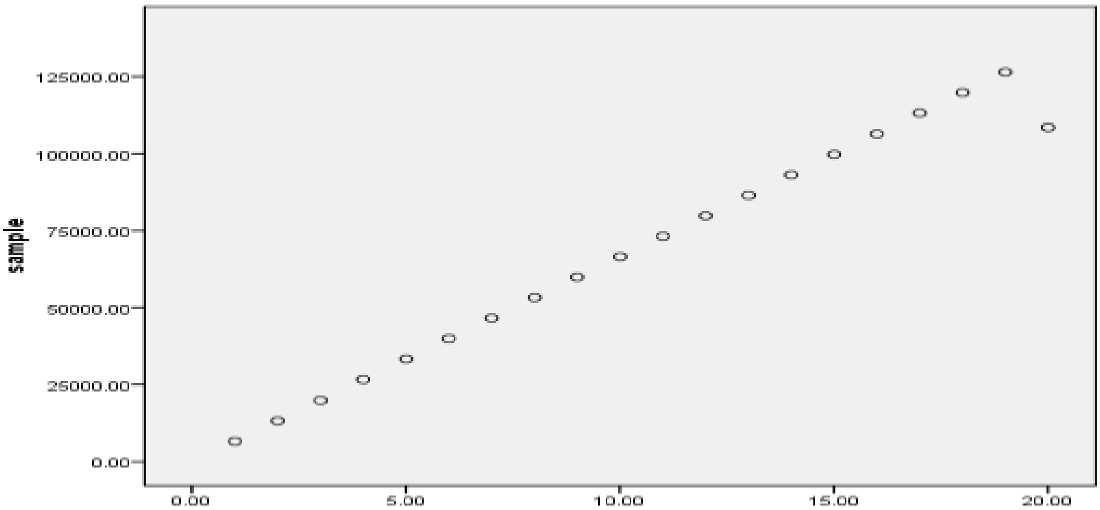

Fig (3-9): scatter diagram for sample sizes(n)

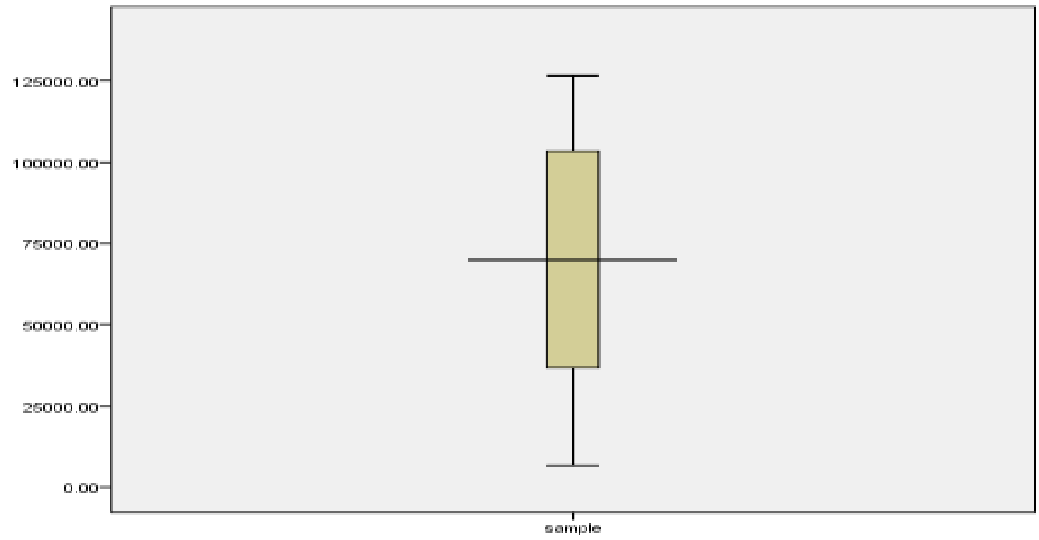

Fig (3-10): box plot for different sample sizes(n)

Figure 4-9 shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-10 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails,$\propto = 0.01$ the value of $z\propto/_2 = 2.58$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-6): sapmple size determination for variance $z_{\propto/2} = 2.58, s^2 = 0.1$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
2.58	0. 1	0.02	1664	1637	1
2.58	0. 1	0.019	1844	1811	1.10629
2.58	0. 1	0.018	2054	2013	1.22969
2.58	0. 1	0.017	2303	2251	1.37508
2.58	0. 1	0.016	2600	2534	1.54795
2.58	0. 1	0.015	2958	2873	1.75504
2.58	0. 1	0.014	3396	3284	2.00611
2.58	0. 1	0.013	3939	3790	2.31521
2.58	0. 1	0.012	4623	4419	2.69945
2.58	0. 1	0.011	5501	5214	3.18509
2.58	0. 1	0.01	6656	6240	3.81185
2.58	0. 1	0.009	8218	7594	4.63897
2.58	0. 1	0.008	10401	9421	5.75504
2.58	0. 1	0.007	13584	11959	7.30544
2.58	0. 1	0.006	18490	15605	9.53268
2.58	0. 1	0.005	26626	21027	12.8448
2.58	0. 1	0.004	41602	29379	17.9469
2.58	0. 1	0.003	73960	42515	25.9713
2.58	0. 1	0.002	166410	62463	38.157
2.58	0. 1	0.001	542890	84445	51.5852

Source: prepared by researcher, using excel, SPSS, 2019

In above table Z-test value from two tails ($\propto = 0.01, z = 2.58$) was used, with variance 0.1, and standard error ranging $e = (0.001 - 0.02$ was used to obtain different size of samples**.**

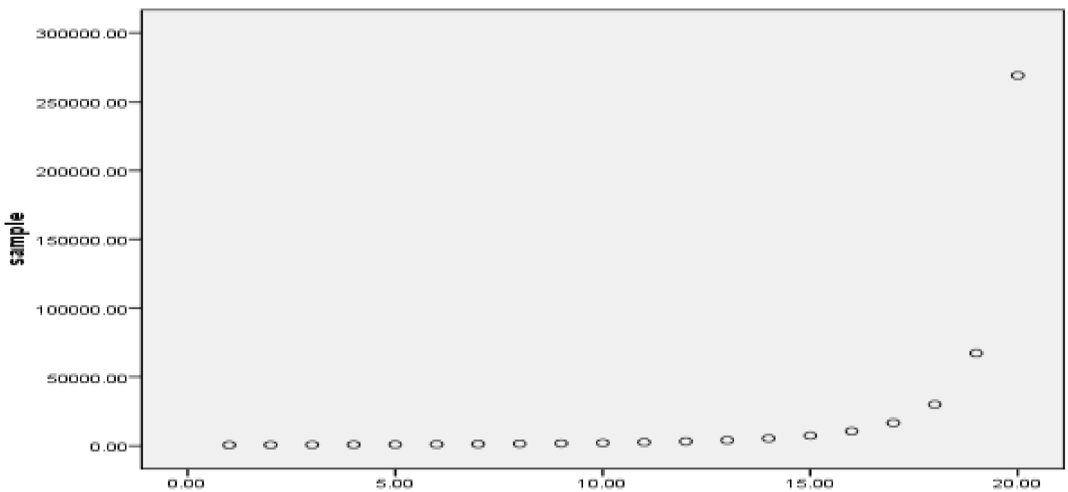

Fig (3-11): scatter diagram for sample sizes(n)

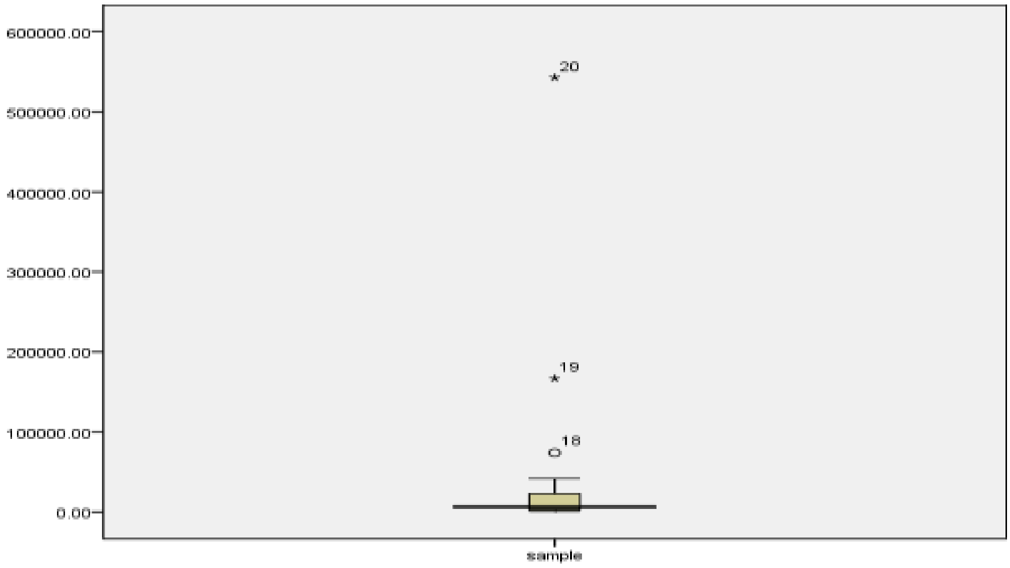

Fig (3-12): box plot for sample sizes(n)

Figure 3-11 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-12 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (4-7): sapmple size determination for variance $z_{\propto} = 2.33, e = 0.01$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
2.33	0.1	0.01	5429	5149	1
2.33	0.2	0.01	10858	9795	1.90231
2.33	0.3	0.01	16287	14006	2.72014
2.33	0.4	0.01	21716	17842	3.46514
2.33	0.5	0.01	27145	21349	4.14624
2.33	0.6	0.01	32573	24569	4.77161
2.33	0.7	0.01	38002	27537	5.34803
2.33	0.8	0.01	43431	30280	5.88075
2.33	0.9	0.01	48860	32823	6.37464
2.33	1	0.01	54289	35187	6.83375
2.33	1.1	0.01	59718	37389	7.26141
2.33	1.2	0.01	65147	39448	7.66129
2.33	1.3	0.01	70576	41375	8.03554
2.33	1.4	0.01	76006	43184	8.38687
2.33	1.5	0.01	81434	44883	8.71684
2.33	1.6	0.01	86862	46485	9.02797
2.33	1.7	0.01	92291	47995	9.32123
2.33	1.8	0.01	97720	49423	9.59856
2.33	1.9	0.01	103149	50775	9.86114
2.33	2	0.01	108578	52056	10.1099

Source: prepared by researcher, using excel, SPSS, 2019

Z-test value from one tail, $\propto = 0.01$, the value of $z_{\propto} = 2.33$, and variance ranging $s^2 = (0.1 - 2.0)$, and standard Error $e = 0.01$ was used to obtain different size of samples**.**

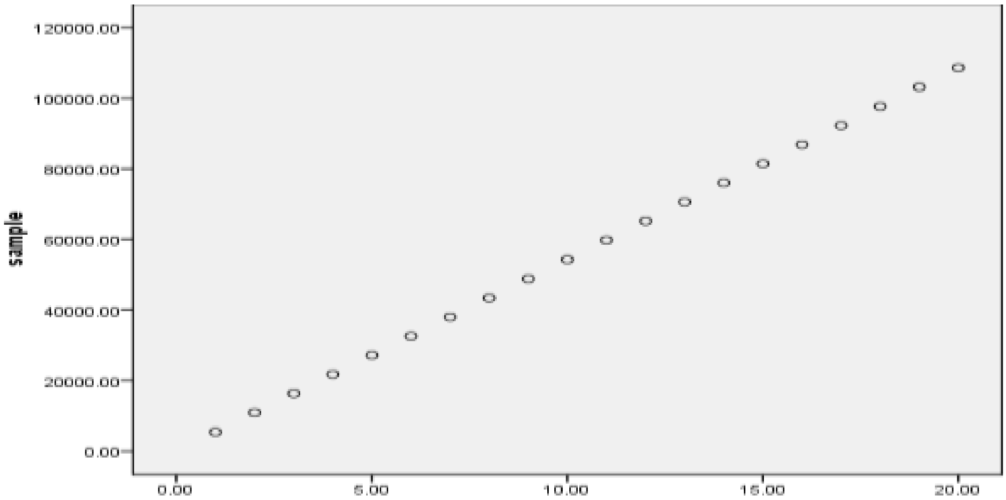

Fig (3-13): scatter diagram for different sample sizes(n)

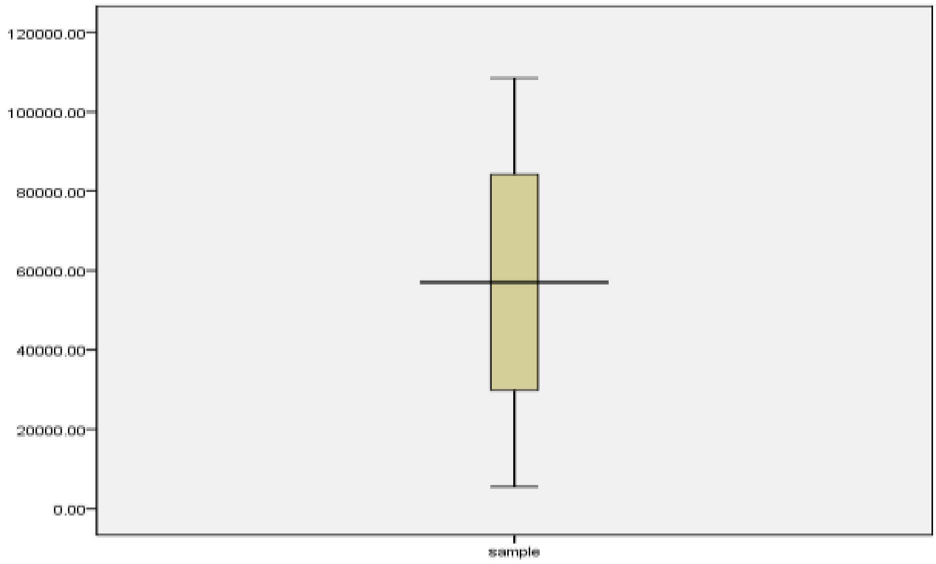

Fig (3-14): box plot for different sample sizes(n)

Figure 3-13 shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-14 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails,$\propto = 0.01$ the value of $z_{\propto/2} = 2.33$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-8): sapmple size determination for variance $z_{\propto} = 2.33, s^2 = 0.1$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
2.33	0. 1	0.02	1357	1338.832	1
2.33	0. 1	0.019	1504	1481.715	1.10672
2.33	0. 1	0.018	1676	1648.373	1.2312
2.33	0. 1	0.017	1879	1844.345	1.37758
2.33	0. 1	0.016	2121	2076.948	1.55131
2.33	0. 1	0.015	2413	2356.146	1.75985
2.33	0. 1	0.014	2769	2694.392	2.01249
2.33	0. 1	0.013	3212	3112.041	2.32444
2.33	0. 1	0.012	3770	3633.035	2.71359
2.33	0. 1	0.011	4487	4294.314	3.20751
2.33	0. 1	0.01	5429	5149.437	3.84622
2.33	0. 1	0.009	6702	6281.044	4.69144
2.33	0. 1	0.008	8483	7819.658	5.84066
2.33	0. 1	0.007	11079	9973.982	7.44976
2.33	0. 1	0.006	15080	13103.93	9.78758
2.33	0. 1	0.005	21716	17841.53	13.3262
2.33	0. 1	0.004	33931	25334.69	18.923
2.33	0. 1	0.003	60321	37625.14	28.103
2.33	0. 1	0.002	135722	57577.15	43.0055
2.33	0. 1	0.001	542890	84445.24	63.0738

Source: prepared by researcher, using excel, SPSS, 2019**.**

In table (3-8) Z-test value from one tail ($\propto = 0.01, \text{z} = 2.33$) was used, with variance 0.1, and standard error ranging $e = (0.001 - 0.02$ was used to obtain different size of samples**.**

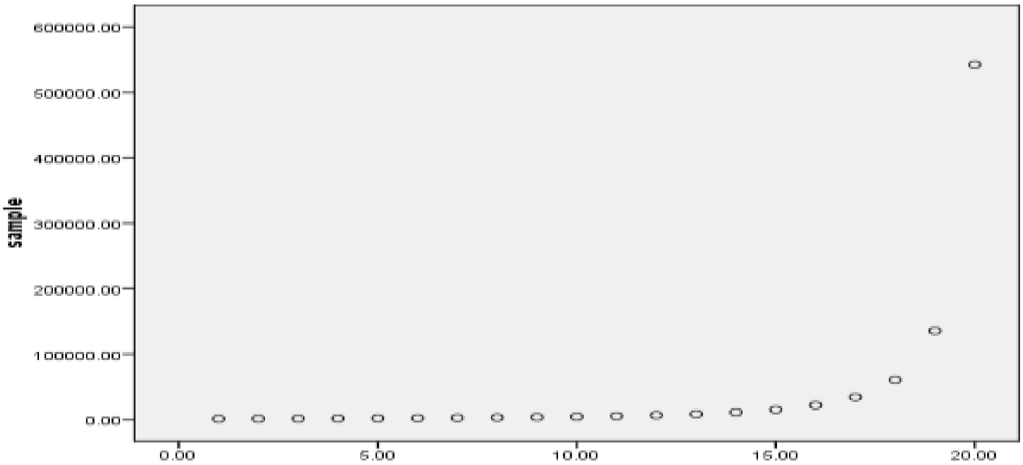

Fig (3-15): scatter diagram for different sample sizes(n)

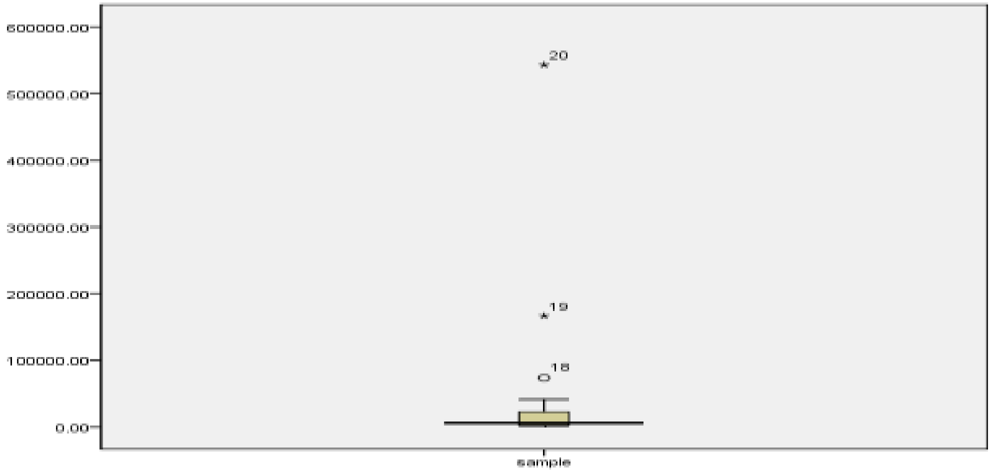

Fig (3-16): box plot for different sample different sizes(n)

Figure 3-15 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-16 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-9): sapmple size determination for variance $z_{\propto/2} = 2.17, e = 0.01$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
2.17	0.1	0.01	4709	4497	1
2.17	0.2	0.01	9418	8607	1.91394
2.17	0.3	0.01	14127	12378	2.7525
2.17	0.4	0.01	18836	15850	3.52457
2.17	0.5	0.01	23545	19058	4.23794
2.17	0.6	0.01	28253	22029	4.8986
2.17	0.7	0.01	32962	24790	5.51256
2.17	0.8	0.01	37671	27363	6.08472
2.17	0.9	0.01	42380	29765	6.61886
2.17	1	0.01	47089	32014	7.11897
2.17	1.1	0.01	51798	34123	7.58795
2.17	1.2	0.01	56507	36105	8.02869
2.17	1.3	0.01	61216	37971	8.44363
2.17	1.4	0.01	65925	39732	8.83522
2.17	1.5	0.01	70634	41395	9.20503
2.17	1.6	0.01	75342	42968	9.55481
2.17	1.7	0.01	80051	44460	9.88659
2.17	1.8	0.01	84760	45876	10.2015
2.17	1.9	0.01	89469	47220	10.5003
2.17	2	0.01	94178	48501	10.7852

Source: prepared by researcher, using excel, SPSS, 2019

Z-test value from one tail ($\propto = 0.03, z = 2.17$) was used, with variance ranging $s^2 = (0.1 - 2.0)$, and standard error $e = 0.02$ was used to obtain different size of samples.

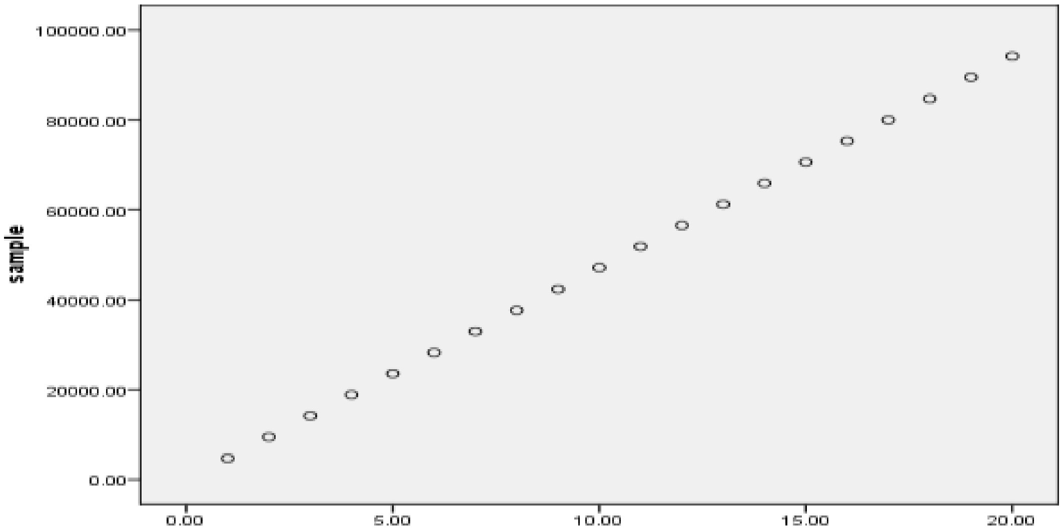

Fig (3-17): scatter diagram for different sample sizes(n)

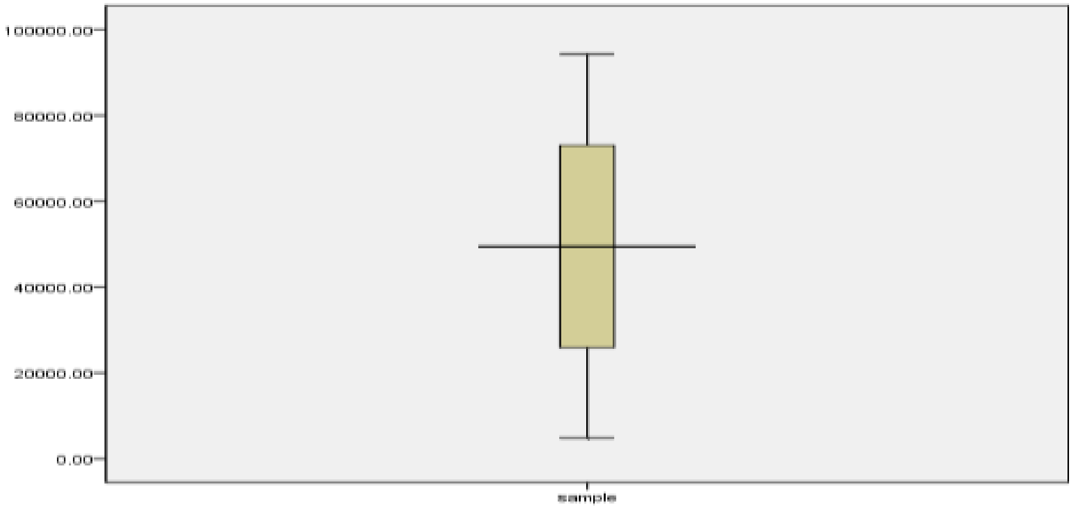

Fig (3-18): box plot for different sample sizes(n)

Figure 3-17 shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-18 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails,$\propto = 0.03$ the value of $z_{\propto/2} = 2.17$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-10): sapmple size determination for variance $z_{\propto/2} = 2.17, s^2 = 0.1$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
2.17	0.1	0.02	1177	1163	1
2.17	0.1	0.019	1304	1287	1.10662
2.17	0.1	0.018	1453	1432	1.2313
2.17	0.1	0.017	1629	1603	1.37833
2.17	0.1	0.016	1839	1806	1.55288
2.17	0.1	0.015	2093	2050	1.76268
2.17	0.1	0.014	2403	2347	2.01806
2.17	0.1	0.013	2786	2710	2.33018
2.17	0.1	0.012	3270	3166	2.72227
2.17	0.1	0.011	3892	3746	3.22098
2.17	0.1	0.01	4709	4497	3.86672
2.17	0.1	0.009	5813	5494	4.72399
2.17	0.1	0.008	7358	6854	5.89338
2.17	0.1	0.007	9610	8768	7.53912
2.17	0.1	0.006	13080	11567	9.94583
2.17	0.1	0.005	18836	15850	13.6285
2.17	0.1	0.004	29431	22738	19.5512
2.17	0.1	0.003	52321	34349	29.5348
2.17	0.1	0.002	117723	54070	46.4918
2.17	0.1	0.001	470890	82483	70.9226

Source: prepared by researcher, using excel, SPSS, 2019

In table (3-10) Z-test value from two tails ($\propto = 0.01, z = 2.17$) was used, with variance 0.1, and standard error ranging $e = (0.001 - 0.02)$ was used to obtain different size of samples.

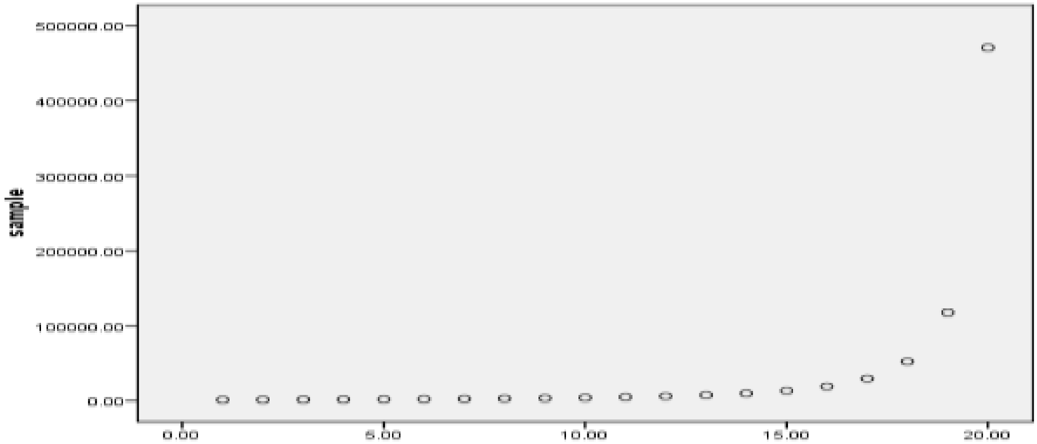

Fig (3-19): scatter diagram for different sample sizes(n)

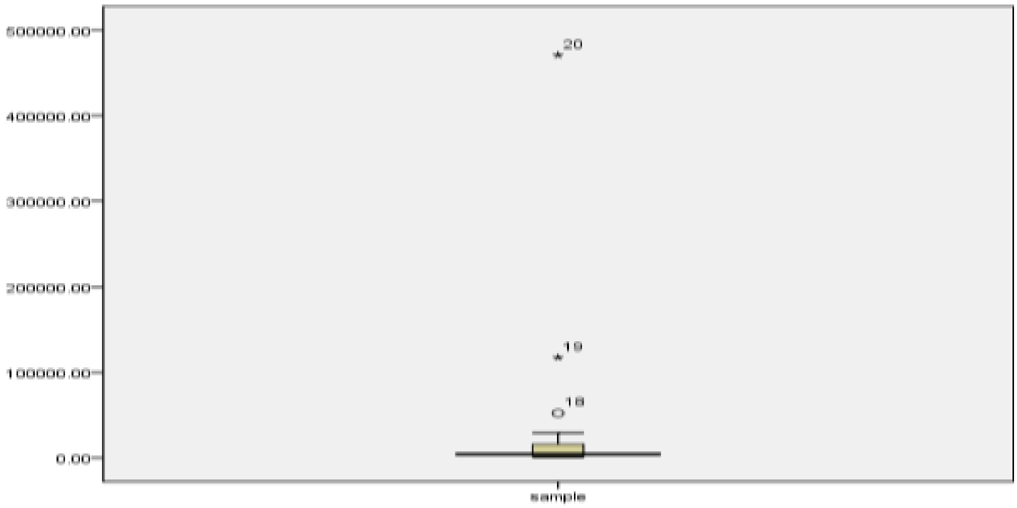

Fig (3-20): box plot for different sample sizes(n)

Figure 3-19 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-20 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-11): sapmple size determination for variance $z_{\propto} = 1.9, e = 0.01$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.9	0.1	0.01	3610	3484.22	1
1.9	0.2	0.01	7220	6733.818	1.93266
1.9	0.3	0.01	10830	9771.722	2.80457
1.9	0.4	0.01	14440	12617.97	3.62146
1.9	0.5	0.01	18050	15290.13	4.38839
1.9	0.6	0.01	21660	17803.72	5.10982
1.9	0.7	0.01	25270	20172.43	5.78965
1.9	0.8	0.01	28880	22408.44	6.43141
1.9	0.9	0.01	32490	24522.61	7.03819
1.9	1	0.01	36100	26524.61	7.61278
1.9	1.1	0.01	39710	28423.16	8.15768
1.9	1.2	0.01	43320	30226.07	8.67513
1.9	1.3	0.01	46930	31940.38	9.16715
1.9	1.4	0.01	50540	33572.47	9.63558
1.9	1.5	0.01	54150	35128.12	10.0821
1.9	1.6	0.01	57760	36612.58	10.5081
1.9	1.7	0.01	61370	38030.61	10.9151
1.9	1.8	0.01	64980	39386.59	11.3043
1.9	1.9	0.01	68590	40684.5	11.6768
1.9	2	0.01	72200	41927.99	12.0337

Source: prepared by researcher, using excel, SPSS, 2019

Z-test value from one tail $(\propto = 0.08, z = 1.9)$ was used, with variance ranging $s^2 = (0.1 - 2.0)$, and standard error $e = 0.01$ was used to obtain different size of samples.

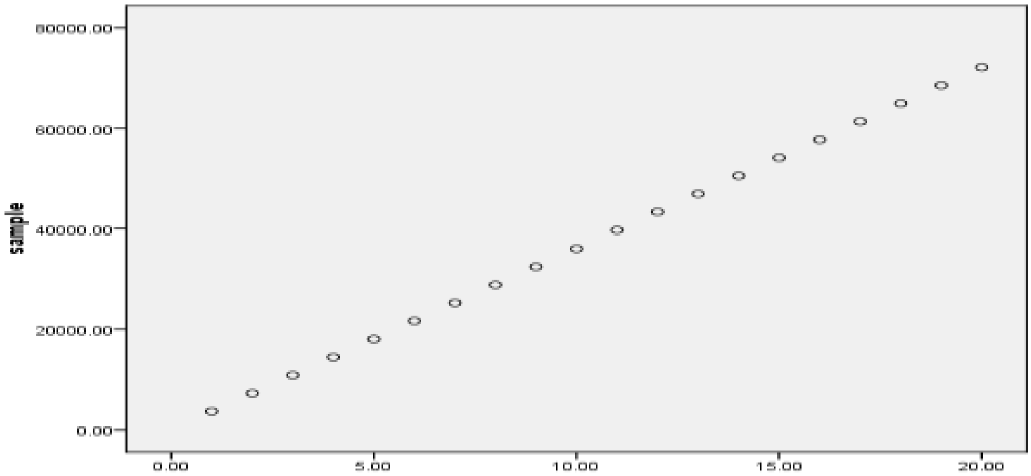

Fig (3-21): scatter diagram for different sample sizes(n)

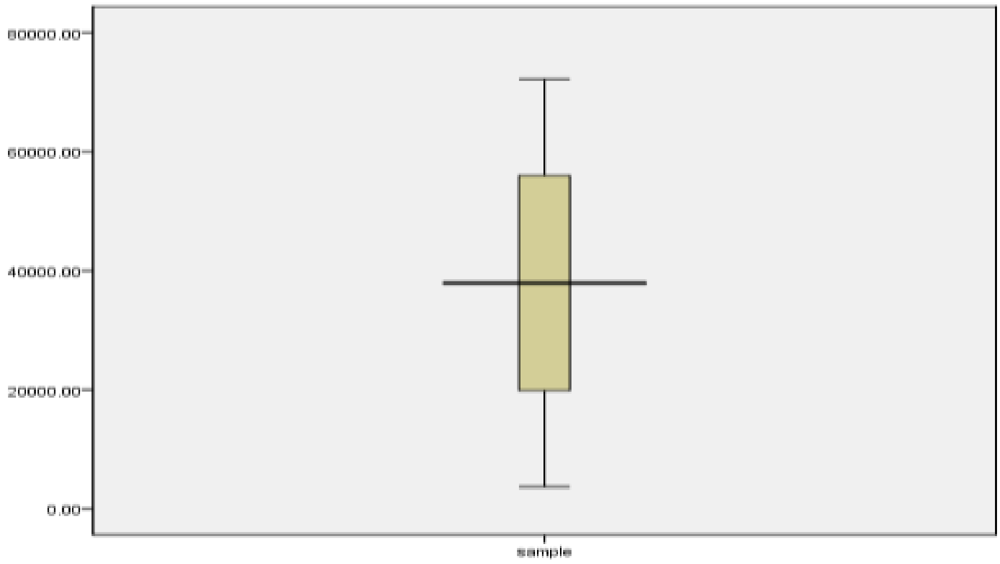

Fig (3-22): box plot for different sample sizes(n)

Figure 3-21 shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-22 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails, $\propto = 0.01$ the value of $z_{\propto} = 1.9$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-12): sapmple size determination for variance $z_{\propto} = 1.9, s^2 = 0.1$

$z_{\propto}$	s^2	E	n_0	n	Ratio
1.9	0.1	0.02	903	894.9189	1
1.9	0.1	0.019	1000	990.099	1.10636
1.9	0.1	0.018	1114	1101.727	1.23109
1.9	0.1	0.017	1249	1233.592	1.37844
1.9	0.1	0.016	1410	1390.395	1.55365
1.9	0.1	0.015	1604	1578.678	1.76405
1.9	0.1	0.014	1842	1808.684	2.02106
1.9	0.1	0.013	2136	2091.329	2.33689
1.9	0.1	0.012	2507	2445.687	2.73286
1.9	0.1	0.011	2984	2897.537	3.23776
1.9	0.1	0.01	3610	3484.22	3.89334
1.9	0.1	0.009	4457	4266.827	4.76784
1.9	0.1	0.008	5641	5339.783	5.96678
1.9	0.1	0.007	7367	6861.512	7.66719
1.9	0.1	0.006	10028	9114.044	10.1842
1.9	0.1	0.005	14440	12617.97	14.0996
1.9	0.1	0.004	22566	18411.3	20.5731
1.9	0.1	0.003	40111	28628.02	31.9895
1.9	0.1	0.002	90250	47437.58	53.0077
1.9	0.1	0.001	361000	78308.03	87.5029

In table Z-test (3-13) value from one tail ($\propto = 0.08, z = 1.9$) was used, with variance 0.1, and standard error ranging $e = (0.001 - 0.02)$ was used to obtain different size of samples

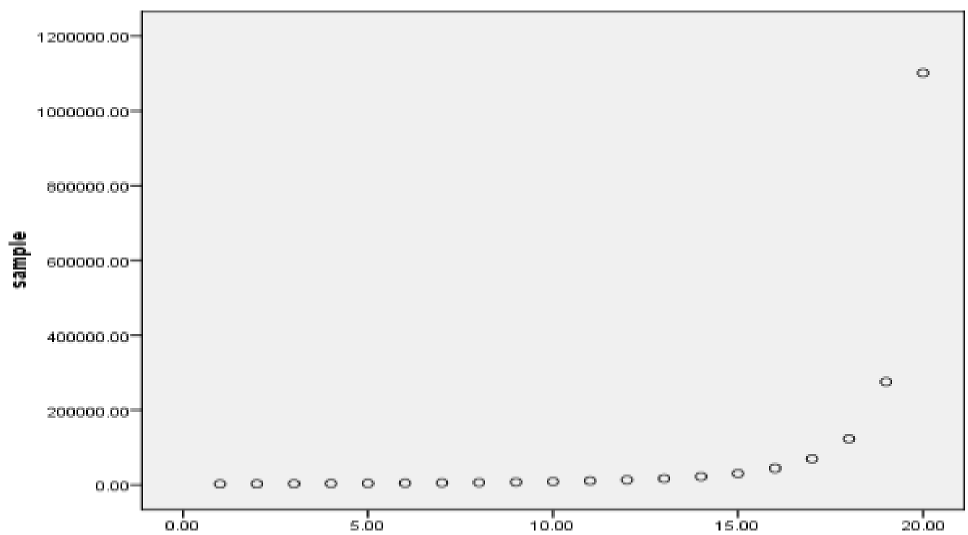

Fig (3-23): scatter diagram for different sample sizes(n)

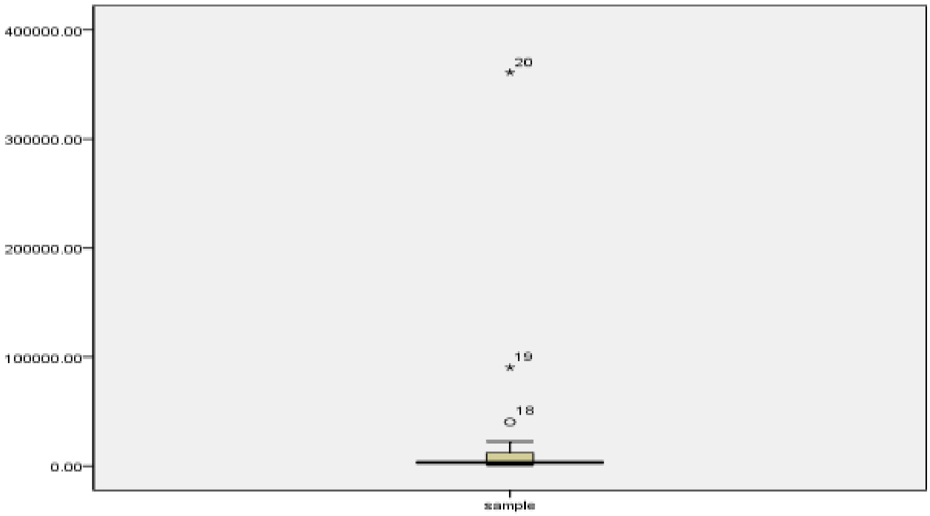

Fig (3-24): box plot for different sample sizes(n)

Figure 3-24 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-25 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (4-13): sapmple size determination for variance $z_{\propto/2} = 3.32, s^2 = 0.1$

$z_{\propto/2}$	s^2	E	n_0	n	Ratio
3.32	0.1	0.01	11022	9927.762	1
3.32	0.2	0.01	22045	18063.01	1.81944
3.32	0.3	0.01	33067	24849.89	2.50307
3.32	0.4	0.01	44090	30598.93	3.08216
3.32	0.5	0.01	55112	35530.46	3.5789
3.32	0.6	0.01	66134	39807.63	4.00973
3.32	0.7	0.01	77157	43552.89	4.38698
3.32	0.8	0.01	88179	46859.11	4.72001
3.32	0.9	0.01	99201	49799.45	5.01618
3.32	1	0.01	110224	52431.69	5.28132
3.32	1.1	0.01	121246	54801.44	5.52002
3.32	1.2	0.01	132269	56946.47	5.73608
3.32	1.3	0.01	143291	58896.96	5.93255
3.32	1.4	0.01	154314	60678.53	6.112
3.32	1.5	0.01	165336	62311.94	6.27653
3.32	1.6	0.01	176358	63815.05	6.42794
3.32	1.7	0.01	187381	65202.99	6.56774
3.32	1.8	0.01	198403	66488.27	6.69721
3.32	1.9	0.01	209426	67682.1	6.81746
3.32	2	0.01	220448	68793.69	6.92943

Source: prepared by researcher, using excel, SPSS, 2019

In table (3-14), z-test value from two tails ($\propto = 0.001, z = 3.32$) was used, with variance ranging $s^2 = (0.1 - 2.0)$, and standard error $e = 0.02$ was used to obtain different size of samples**.**

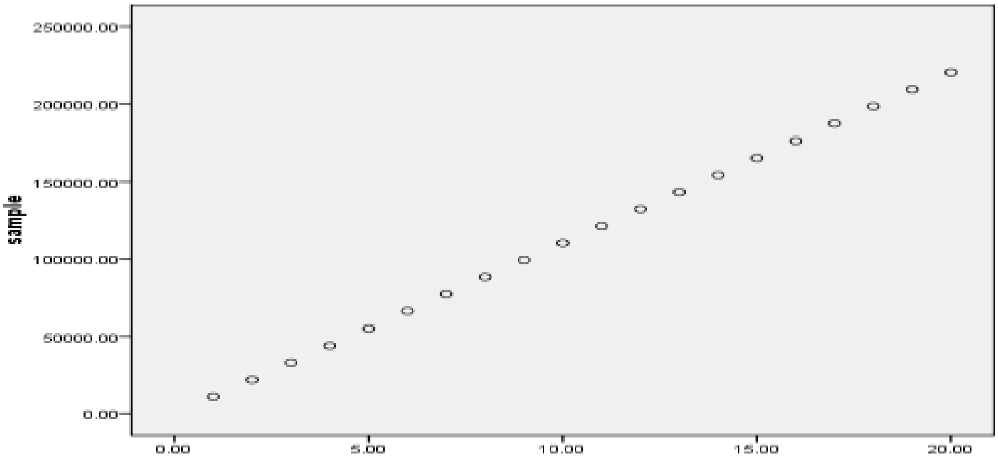

Fig (3-25): scatter diagram for different sample sizes(n)

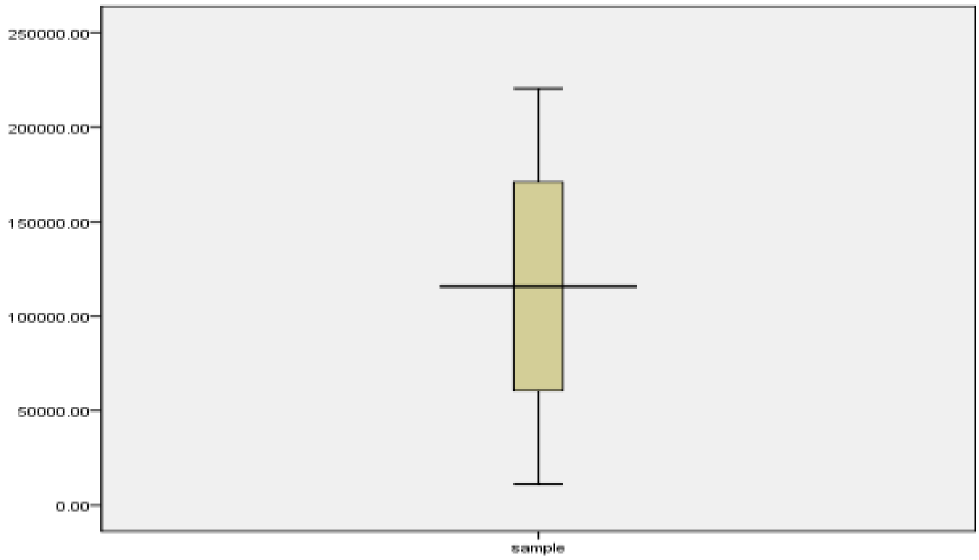

Fig (3-26): box plot for different sample sizes(n)

Figure 3-24 shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-26 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails,$\propto = 0.001$ the value of $z_{\propto/2} = 3.32$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-14): sapmple size determination for variance $z_{\propto/2} = 3.1, e = 0.01$

$z_{\propto/2}$	s^2	E	n_0	n	Ratio
3.32	0.1	0.02	2756	2682.082	1
3.32	0.1	0.019	3053	2962.553	1.10457
3.32	0.1	0.018	3402	3290.072	1.22669
3.32	0.1	0.017	3814	3673.878	1.36979
3.32	0.1	0.016	4306	4128.238	1.53919
3.32	0.1	0.015	4899	4670.207	1.74126
3.32	0.1	0.014	5624	5324.547	1.98523
3.32	0.1	0.013	6522	6122.679	2.28281
3.32	0.1	0.012	7654	7109.815	2.65086
3.32	0.1	0.011	9109	8348.532	3.11271
3.32	0.1	0.01	11022	9927.762	3.70151
3.32	0.1	0.009	13607	11977.25	4.46565
3.32	0.1	0.008	17222	14691.78	5.47775
3.32	0.1	0.007	22495	18364.01	6.84692
3.32	0.1	0.006	30618	23440.87	8.7398
3.32	0.1	0.005	44090	30598.93	11.4086
3.32	0.1	0.004	68890	40789.86	15.2083
3.32	0.1	0.003	122471	55050.32	20.5252
3.32	0.1	0.002	275560	73373.1	27.3568
3.32	0.1	0.001	1102240	91682.19	34.1832

Source: prepared by researcher, using excel, SPSS, 2019

Z-test value from two tails ($\propto= 0.001, z = 3.32$) was used, with variance 0.1, and standard error $e = (0.001 - 0.02)$ was used to obtain different size of samples.

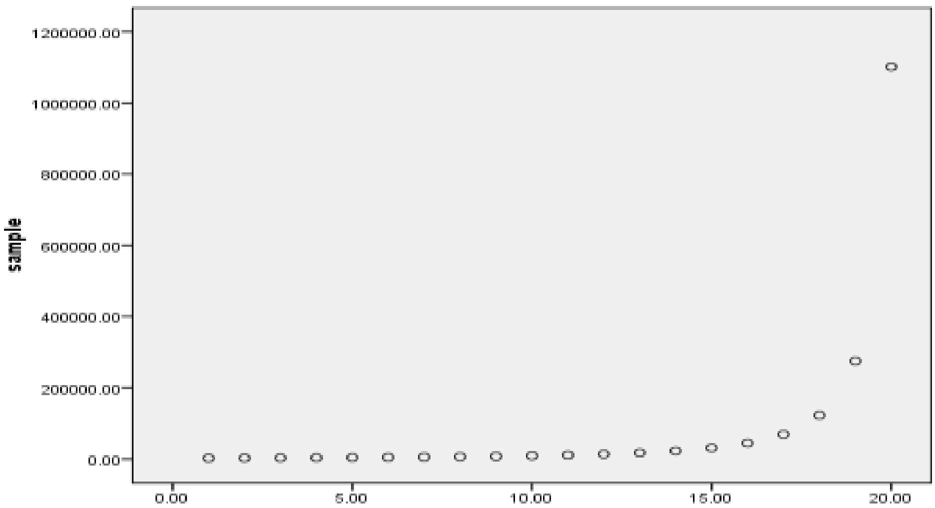

Fig (3-27): scatter diagram for different sample sizes(n)

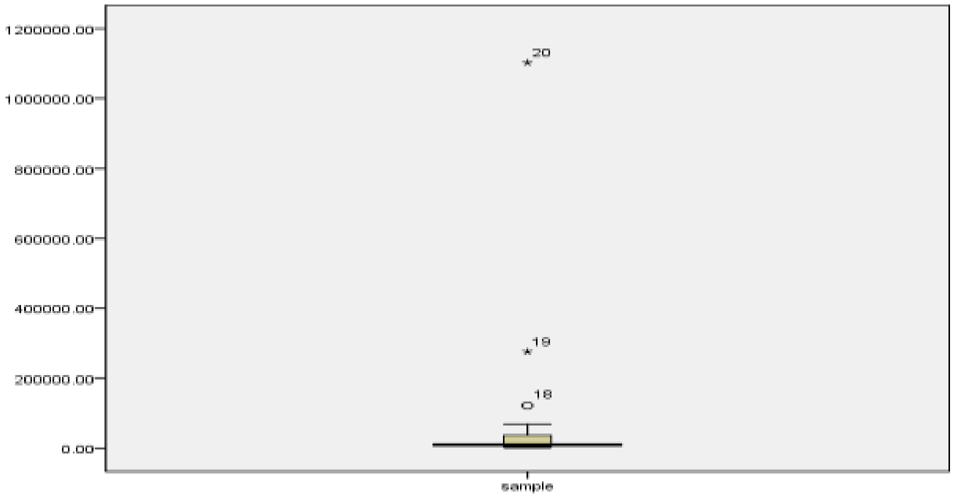

Fig (3-28): box plot for different sample sizes(n)

Figure 3-27 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-28 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-15): sapmple size determination for variance $z_{\propto} = 3.1, s^2 = 0.1$

$z_{\propto}$	s^2	E	n_0	n	Ratio
3.1	0.1	0.01	9610	8767.448	1
3.1	0.2	0.01	19220	16121.46	1.83879
3.1	0.3	0.01	28830	22378.33	2.55243
3.1	0.4	0.01	38440	27766.54	3.167
3.1	0.5	0.01	48050	32455.25	3.70179
3.1	0.6	0.01	57660	36572.37	4.17138
3.1	0.7	0.01	67270	40216.42	4.58702
3.1	0.8	0.01	76880	43464.5	4.95749
3.1	0.9	0.01	86490	46377.82	5.28977
3.1	1	0.01	96100	49005.61	5.5895
3.1	1.1	0.01	105710	51387.88	5.86121
3.1	1.2	0.01	115320	53557.5	6.10868
3.1	1.3	0.01	124930	55541.72	6.33499
3.1	1.4	0.01	134540	57363.35	6.54276
3.1	1.5	0.01	144150	59041.57	6.73418
3.1	1.6	0.01	153760	60592.69	6.9111
3.1	1.7	0.01	163370	62030.6	7.0751
3.1	1.8	0.01	172980	63367.28	7.22756
3.1	1.9	0.01	182590	64613.04	7.36965
3.1	2	0.01	192200	161214.6	18.3879

Source: prepared by researcher, using excel, SPSS, 2019

Z-test value from one tail ($\propto = 0.03, z = 3.1$) was used, with variance ranging $s^2 = (0.001 - 0.02)$, and standard error e =0.01 was used to obtain different size of samples.

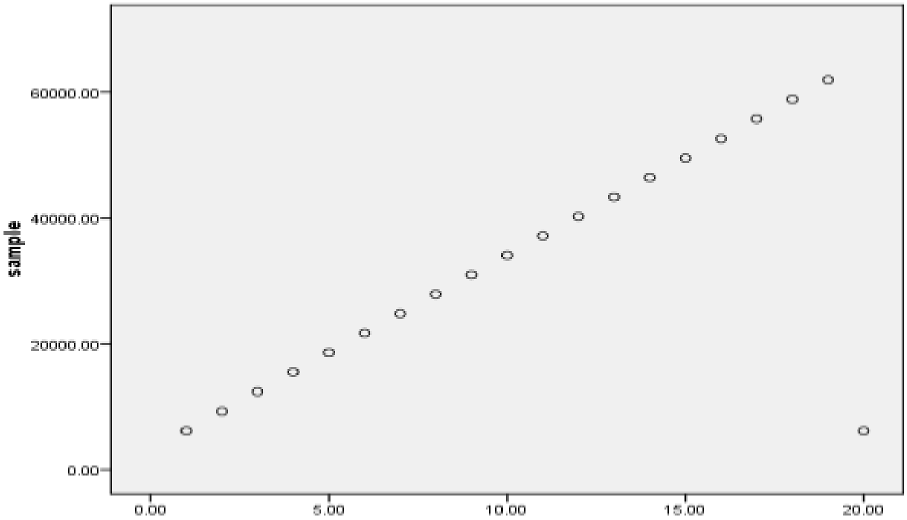

Fig (3-29): scatter diagram for different sample sizes(n)

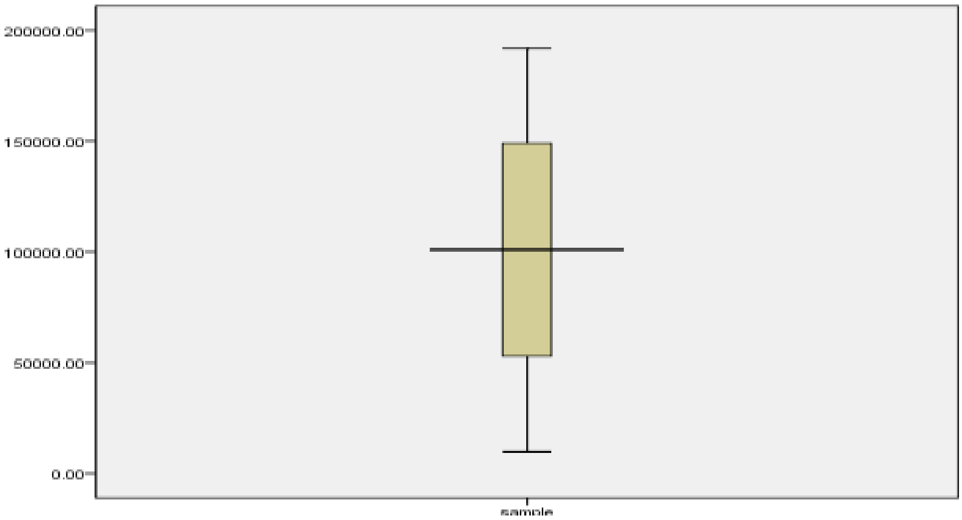

Fig (3-30): box plot for different sample sizes(n)

Figure 3-29 shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-30 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails,$\propto = 0.001$ the value of $z_{\propto} = 3.1$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-16): sapmple size determination for variance $z_{\propto} = 1.76, e = 0.01$

$z_{\propto}$	s^2	e	n_0	n	$Ratio$
3.1	0.1	0.02	2403	2346.611	1
3.1	0.1	0.019	2662	2592.975	1.10499
3.1	0.1	0.018	2966	2880.563	1.22754
3.1	0.1	0.017	3325	3218.001	1.37134
3.1	0.1	0.016	3754	3618.174	1.54187
3.1	0.1	0.015	4271	4096.057	1.74552
3.1	0.1	0.014	4903	4673.842	1.99174
3.1	0.1	0.013	5686	5380.088	2.29271
3.1	0.1	0.012	6673	6255.566	2.66579
3.1	0.1	0.011	7942	7357.655	3.13544
3.1	0.1	0.01	9610	8767.448	3.73622
3.1	0.1	0.009	11864	10605.74	4.5196
3.1	0.1	0.008	15016	13055.57	5.56359
3.1	0.1	0.007	19612	16396.35	6.98725
3.1	0.1	0.006	26694	21069.66	8.97876
3.1	0.1	0.005	38440	27766.54	11.8326
3.1	0.1	0.004	60063	37524.6	15.991
3.1	0.1	0.003	106778	51638.96	22.0058
3.1	0.1	0.002	240250	70609.85	30.0901
3.1	0.1	0.001	961000	90574.93	38.5982

Source: prepared by researcher, using excel, SPSS, 2019

Z-test value from two tails ($\propto = 0.03, z = 3.1$) was used, with variance 0.1, and standard error $e = (0.001 - 0.02)$ was used to obtain different size of samples.

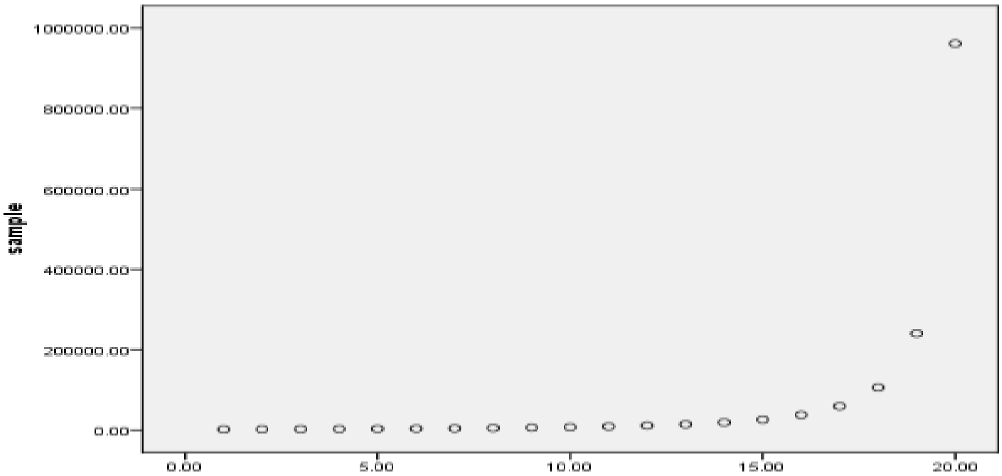

Fig (3-31): scatter diagram for different sample sizes(n)

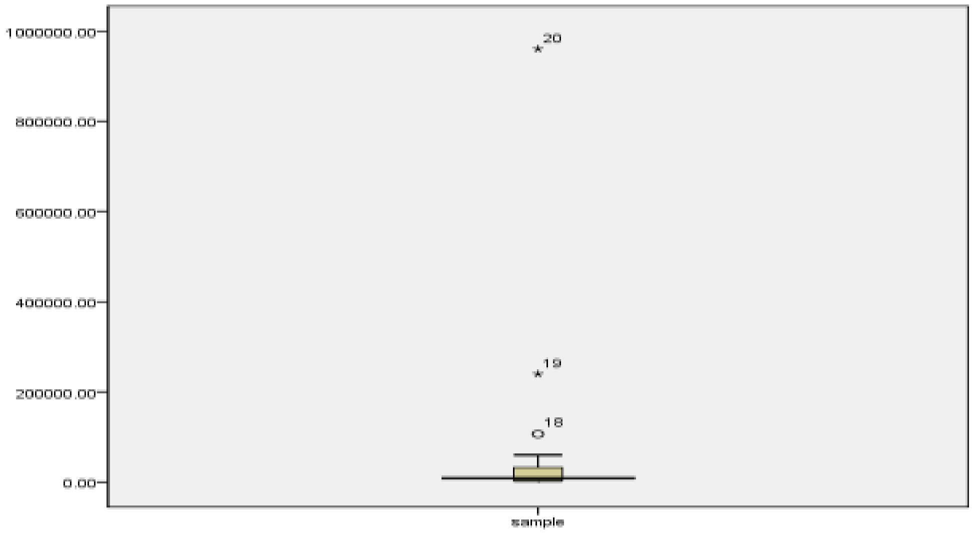

Fig (3-32): box plot for different sample sizes(n)

Figure 3-31 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-32 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-17): sapmple size determination for variance $z_{\propto/2} = 1.76, s^2 = 0.1$

$z_{\propto/2}$	s^2	E	n_0		Ratio
1.76	0.1	0.01	3097.6	3004.532	1
1.76	0.2	0.01	6195.2	5833.785	1.94166
1.76	0.3	0.01	9292.8	8502.664	2.82995
1.76	0.4	0.01	12390.4	11024.43	3.66927
1.76	0.5	0.01	15488	13410.92	4.46356
1.76	0.6	0.01	18585.6	15672.73	5.21636
1.76	0.7	0.01	21683.2	17819.39	5.93084
1.76	0.8	0.01	24780.8	19859.47	6.60984
1.76	0.9	0.01	27878.4	21800.71	7.25594
1.76	1	0.01	30976	23650.13	7.87149
1.76	1.1	0.01	34073.6	25414.1	8.45859
1.76	1.2	0.01	37171.2	27098.4	9.01918
1.76	1.3	0.01	40268.8	28708.31	9.555
1.76	1.4	0.01	43366.4	30248.65	10.0677
1.76	1.5	0.01	46464	31723.84	10.5587
1.76	1.6	0.01	49561.6	33137.92	11.0293
1.76	1.7	0.01	52659.2	34494.61	11.4809
1.76	1.8	0.01	55756.8	35797.35	11.9145
1.76	1.9	0.01	58854.4	37049.27	12.3311
1.76	2	0.01	61952	38253.31	12.7319

Source: prepared by researcher, using excel, 2019

Z-test value from two tails ($\propto = 0.001, z = 1.76$) was used, with variance ranging $s^2 = (0.001 - 0.02)$, and standard error e =0.01 was used to obtain different size of samples.

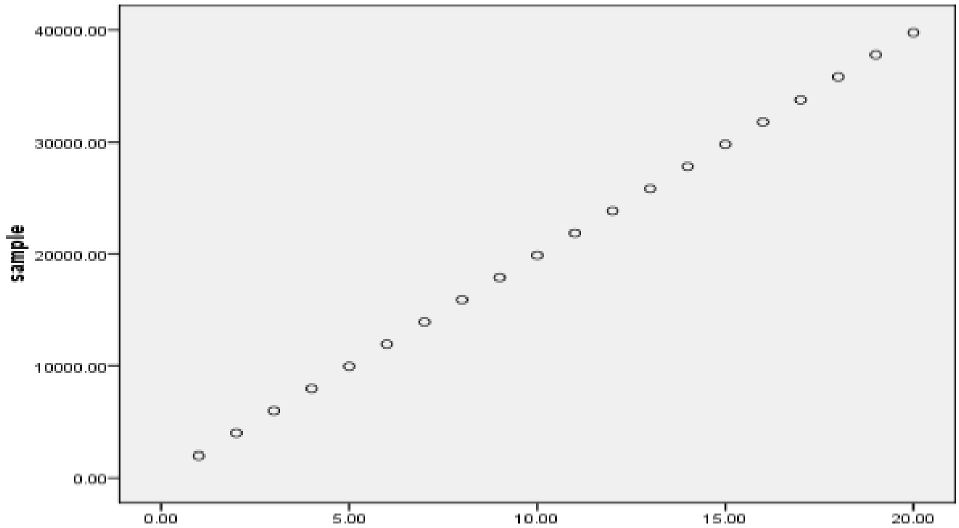

Fig (3-33): scatter diagram for different sample sizes(n)

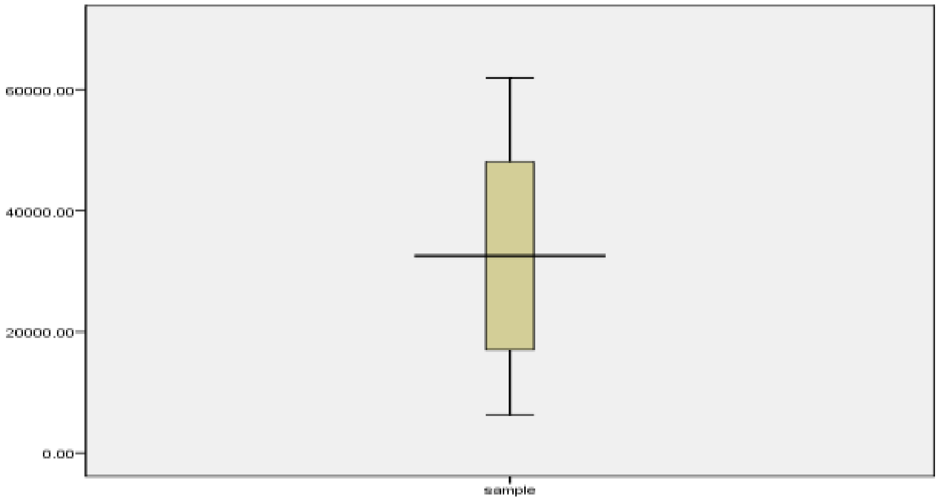

Fig (4-34): box plot for different sample sizes(n)

Figure 3-32 shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-34 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails,$\propto = 0.08$ the value of $z_{\propto/2} = 1.76$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-18): sapmple size determination for variance $z_{\propto/2} = 1.41, e = 0.01$

$z_{\propto/2}$	s^2	e	n_0	n	$Ratio$
1.76	0.1	0.02	774	768.0553	1
1.76	0.1	0.019	858	850.701	1.1076
1.76	0.1	0.018	956	946.9472	1.23292
1.76	0.1	0.017	1072	1060.63	1.38093
1.76	0.1	0.016	1210	1195.534	1.55657
1.76	0.1	0.015	1377	1358.296	1.76849
1.76	0.1	0.014	1580	1555.424	2.02515
1.76	0.1	0.013	1833	1800.006	2.34359
1.76	0.1	0.012	2151	2105.706	2.74161
1.76	0.1	0.011	2560	2496.1	3.2499
1.76	0.1	0.01	3098	3004.908	3.91236
1.76	0.1	0.009	3824	3683.156	4.79543
1.76	0.1	0.008	4840	4616.559	6.01071
1.76	0.1	0.007	6322	5946.088	7.74174
1.76	0.1	0.006	8604	7922.36	10.3148
1.76	0.1	0.005	12390	11024.11	14.3533
1.76	0.1	0.004	19360	16219.84	21.1181
1.76	0.1	0.003	34418	25605.2	33.3377
1.76	0.1	0.002	77440	43642.92	56.8226
1.76	0.1	0.001	309760	75595.47	98.4245

Source: prepared by researcher, using excel, SPSS, 2019

Z-test value from two tails ($\propto = 0.001, z = 1.76$) was used, with variance 0.1, and standard error $e = (0.001 - 0.02)$ was used to obtain different size of samples.

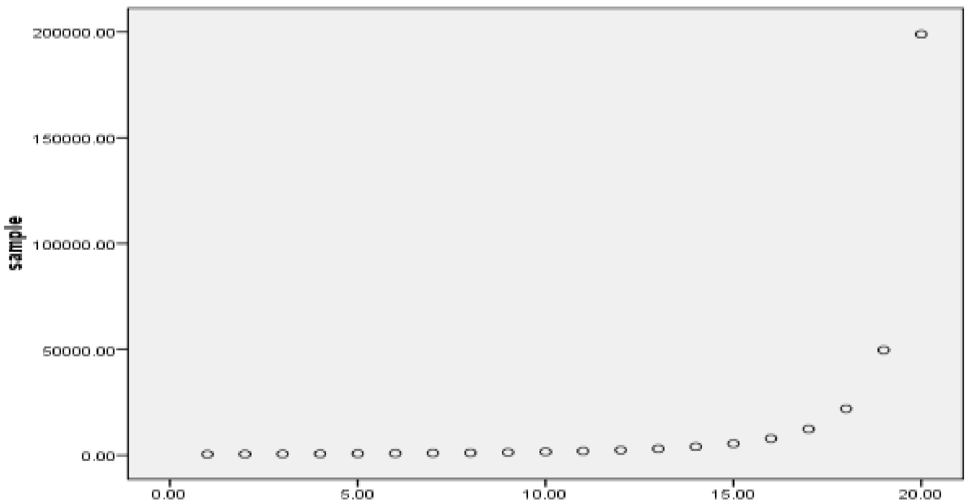

Fig (3-35): scatter diagram for different sample sizes(n)

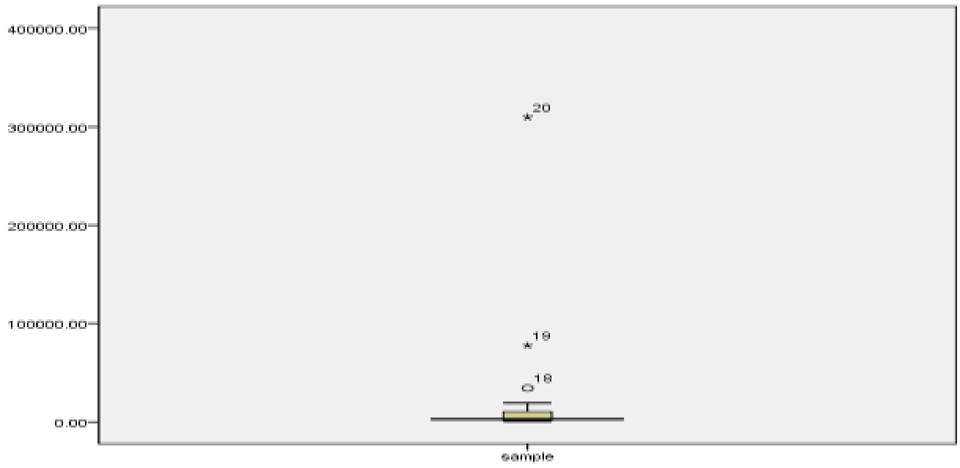

Fig (3-36): box plot for sample sizes(n)

Figure 4-35 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 4-36 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-19): sapmple size determination for variance $z_{\propto} = 1.41, e = 0.01$

$z_{\propto}$	s^2	e	n_0	n	Ratio
1.41	0.1	0.01	1988	1949.249	1
1.41	0.2	0.01	3976	3823.959	1.96176
1.41	0.3	0.01	5964	5628.327	2.88743
1.41	0.4	0.01	7952	7366.237	3.77901
1.41	0.5	0.01	9941	9042.123	4.63877
1.41	0.6	0.01	11929	10657.65	5.46757
1.41	0.7	0.01	13917	12216.79	6.26743
1.41	0.8	0.01	15905	13722.45	7.03987
1.41	0.9	0.01	17893	15177.32	7.78624
1.41	1	0.01	19881	16583.95	8.50787
1.41	1.1	0.01	21869	17944.68	9.20595
1.41	1.2	0.01	23857	19261.73	9.88162
1.41	1.3	0.01	25845	20537.17	10.5359
1.41	1.4	0.01	27833	21772.94	11.1699
1.41	1.5	0.01	29822	22971.45	11.7848
1.41	1.6	0.01	31810	24133.22	12.3808
1.41	1.7	0.01	33798	25260.47	12.9591
1.41	1.8	0.01	35786	26354.71	13.5204
1.41	1.9	0.01	37774	27417.36	14.0656
1.41	2	0.01	39762	28449.79	14.5953

Source: prepared by researcher, using excel, 2019

Z-test value from two tails ($\propto= 0.03, z = 1.41$) was used, with variance ranging $s^2 = (0.1 - 2.0)$, and standard error $e = 0.02$ was used to obtain different size of samples.

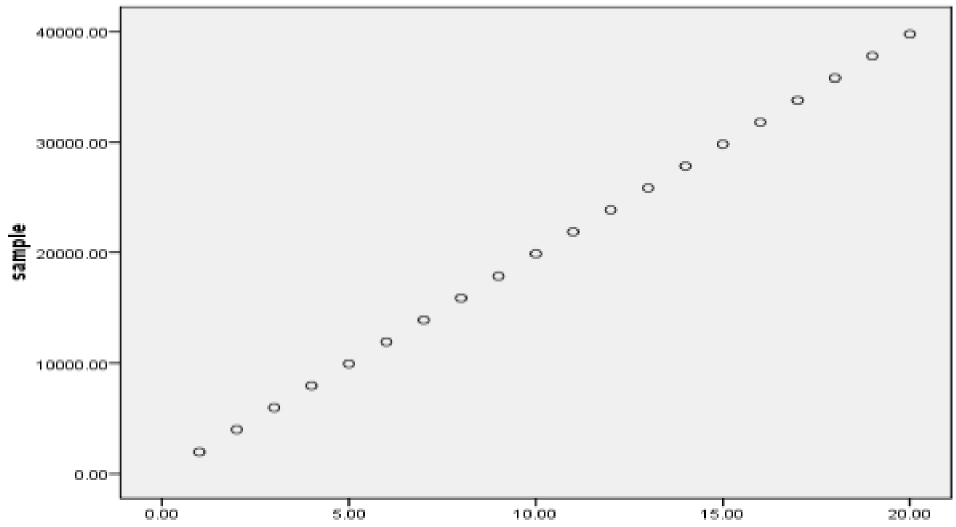

Fig (3-37): scatter diagram for different sample sizes(n)

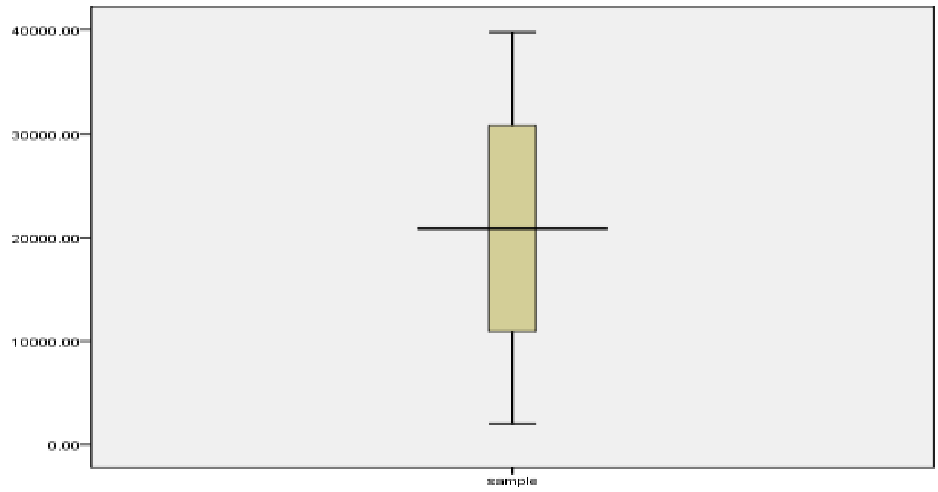

Fig (3-38): box plot for different sample sizes(n)

Figure 3-37 shows that the regression is linear and all the points lies in a straight line that means there are no other factors effecting the sample size, and figure 3-38 (Box Plot) shows the samples (n) are normally distributed and there are no outliers, therefor we think this combination (z-test value from two tails,$\propto = 0.08$ the value of $z_{\propto} = 1.41$ and variance ranging (0.1 to 2). Standard Error $e = 0.01$) is good and can be recommended for researchers to be applied in their Surveys.

Table (3-20): sapmple size determination for variance $z_{\propto} = 1.41, s^2 = 0.1$

$z_{\propto}$	s^2	E	n_0		Ratio
1.41	0.1	0.02	497	494.5421	1
1.41	0.1	0.019	551	547.9806	1.10806
1.41	0.1	0.018	614	610.253	1.23398
1.41	0.1	0.017	688	683.2989	1.38168
1.41	0.1	0.016	777	771.0093	1.55904
1.41	0.1	0.015	884	876.2539	1.77185
1.41	0.1	0.014	1014	1003.821	2.0298
1.41	0.1	0.013	1176	1162.331	2.35032
1.41	0.1	0.012	1380	1361.215	2.75248
1.41	0.1	0.011	1643	1616.442	3.26856
1.41	0.1	0.01	1988	1949.249	3.94152
1.41	0.1	0.009	2454	2395.221	4.84331
1.41	0.1	0.008	3106	3012.434	6.09136
1.41	0.1	0.007	4057	3898.825	7.88371
1.41	0.1	0.006	5523	5233.93	10.5834
1.41	0.1	0.005	7952	7366.237	14.8951
1.41	0.1	0.004	12426	11052.6	22.3492
1.41	0.1	0.003	22090	18093.21	36.5858
1.41	0.1	0.002	49702	33200.63	67.1341
1.41	0.1	0.001	198810	66533.92	134.536

Source: prepared by researcher, using excel, 2019

Z-test value from two tails ($\propto = 0.001, z = 1.41$) was used, with variance 0.1, and standard error $e = (0.001 - 0.02)$ was used to obtain different size of samples.

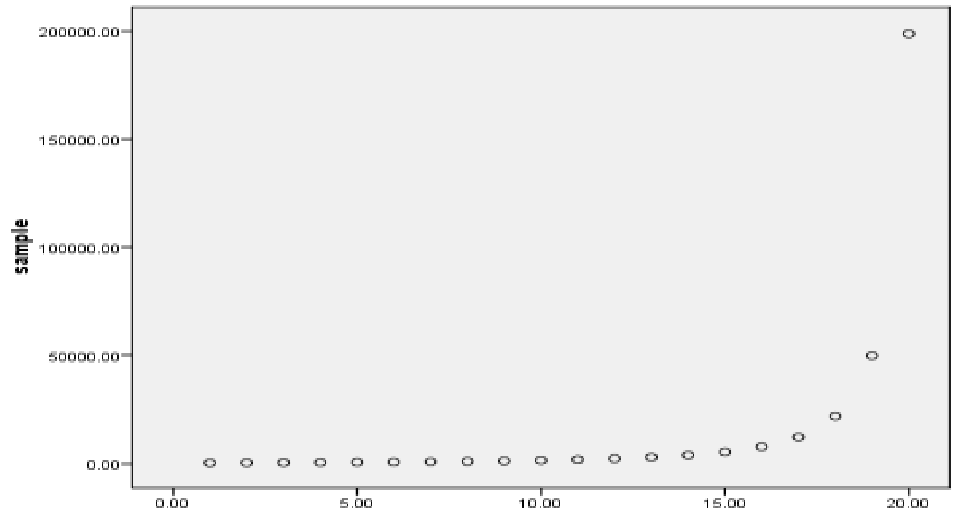

Fig (3-39): scatter diagram for different sample sizes(n)

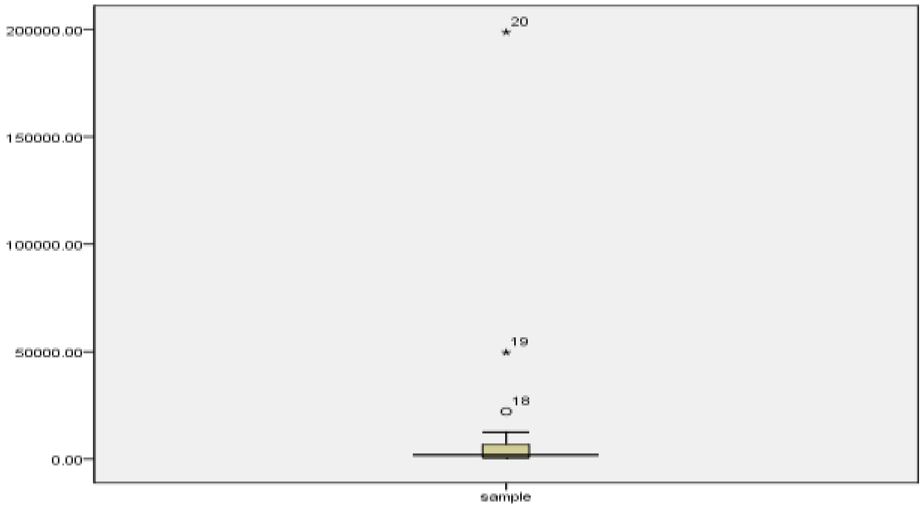

Fig (3-40): box plot for different sample sizes(n)

Figure 3-39 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-40 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-21)

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.96	0.1	0.02	960	950.8716	1
1.96	0.2	0.019	2128	2083.66	2.19132
1.96	0.3	0.018	3557	3434.823	3.61229
1.96	0.4	0.017	5317	5048.568	5.30941
1.96	0.5	0.016	7503	6979.34	7.33994
1.96	0.6	0.015	10244	9292.116	9.77221
1.96	0.7	0.014	13720	12064.72	12.6881
1.96	0.8	0.013	18185	15386.89	16.1819
1.96	0.9	0.012	24010	19361.34	20.3617
1.96	1	0.011	31749	24098.1	25.3432
1.96	1.1	0.01	42258	29705.18	31.2399
1.96	1.2	0.009	56913	36270.42	38.1444
1.96	1.3	0.008	78033	43830.64	46.0952
1.96	1.4	0.007	109760	52326.47	55.03
1.96	1.5	0.006	160067	61548.37	64.7284
1.96	1.6	0.005	245862	71086.73	74.7595
1.96	1.7	0.004	408170	80321.55	84.4715
1.96	1.8	0.003	768320	88483.51	93.0552
1.96	1.9	0.002	1824760	94804.55	99.7028
1.96	2	0.001	7683200	98715.18	103.815

Source: prepared by researcher, using excel, 2019

Z-test value was used for two tails ($\propto = 0.05, z = 1.96$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes.

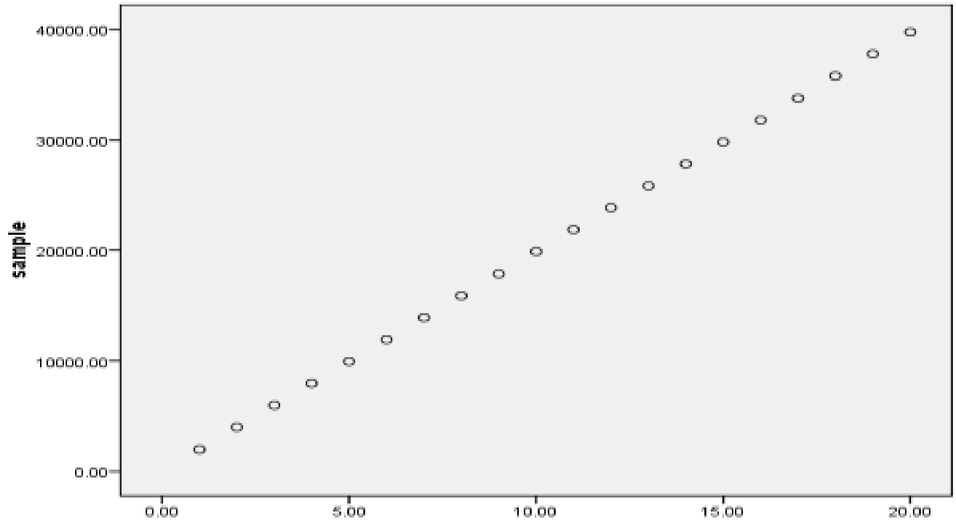

Fig (3-41): scatter diagram for different sample sizes(n)

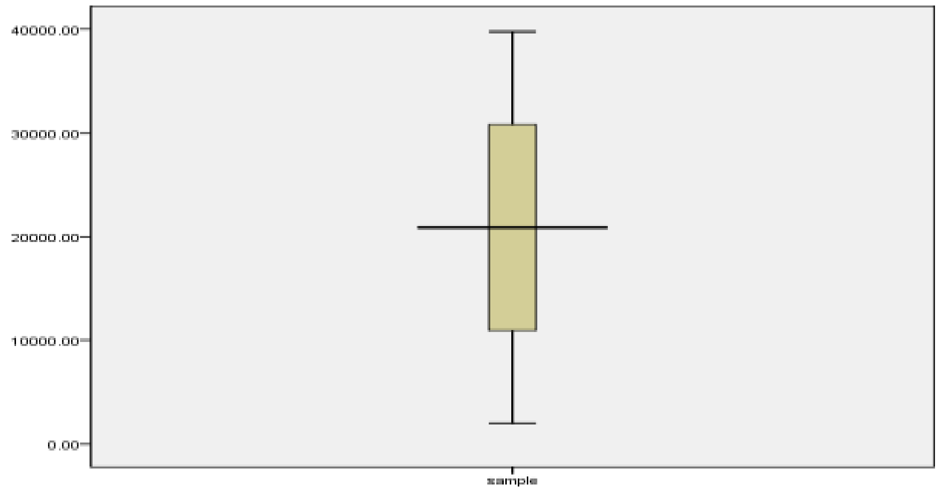

Fig (3-42): box plot for different sample sizes(n)

Table (3-22): sapmple size determination for variance $z_{\propto/2}1.96,\ s^2 = (0.1 - 2.0)$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.64	0.1	0.02	672.4	667.909	1
1.64	0.2	0.019	1490	1468.125	2.19809
1.64	0.3	0.018	2490	2429.505	3.63748
1.64	0.4	0.017	3723	3589.368	5.37404
1.64	0.5	0.016	5253	4990.832	7.47232
1.64	0.6	0.015	7172	6692.046	10.0194
1.64	0.7	0.014	9606	8764.119	13.1217
1.64	0.8	0.013	12732	11294.04	16.9095
1.64	0.9	0.012	16810	14390.89	21.5462
1.64	1	0.011	22228	18185.69	27.2278
1.64	1.1	0.01	29586	22831.17	34.1831
1.64	1.2	0.009	39846	28492.77	42.6597
1.64	1.3	0.008	54636	35332.01	52.8994
1.64	1.4	0.007	76846	43453.63	65.0592
1.64	1.5	0.006	112067	52845.09	79.1202
1.64	1.6	0.005	172134	63253.4	94.7036
1.64	1.7	0.004	285770	74077.82	110.91
1.64	1.8	0.003	537920	84324.05	126.251
1.64	1.9	0.002	1277560	92740.79	138.852
1.64	2	0.001	5379200	98174.92	146.988

Source: prepared by researcher, using excel, 2019

Z-test value was used for one tail ($\propto = 0.05, z = 1.64$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes**.**

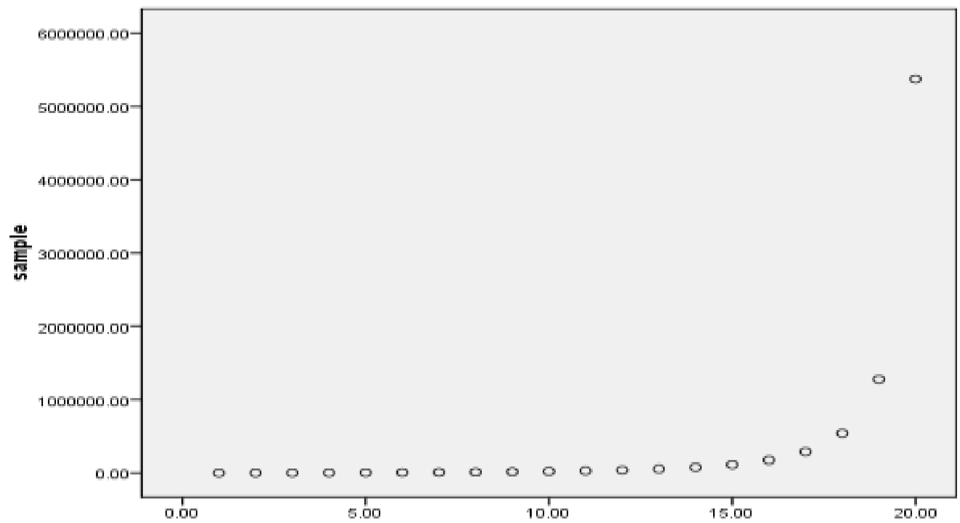

Fig (3-43): scatter diagram for different sample sizes(n)

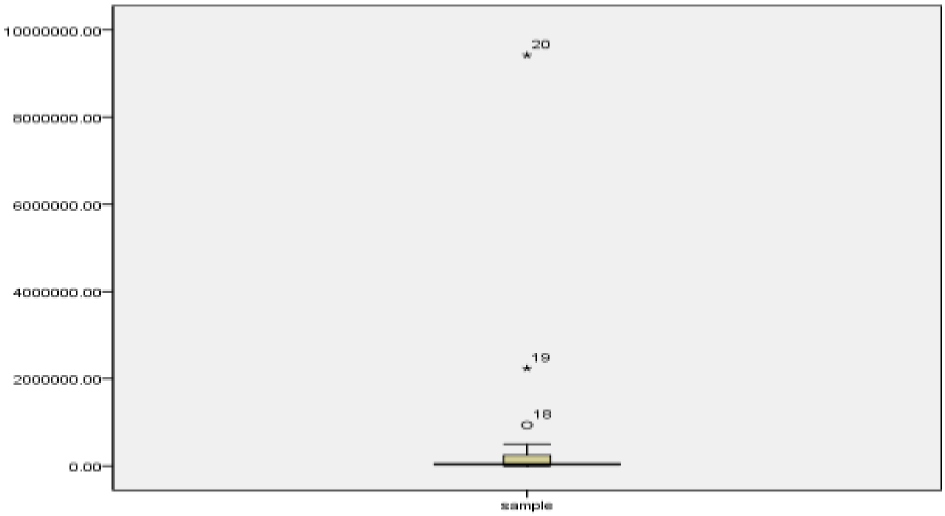

Fig (3-44): box plot for sample sizes(n)

Figure 3-43 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-44 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-23): sapmple size determination for variance $z_{\propto/2} = 2.58, s^2 = (0.1 - 2.0)$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
2.58	0.1	0.02	1664	1637	1
2.58	0.2	0.019	3688	3557	2.173
2.58	0.3	0.018	6163	5805	3.546
2.58	0.4	0.017	9213	8436	5.153
2.58	0.5	0.016	13001	11505	7.028
2.58	0.6	0.015	17750	15074	9.208
2.58	0.7	0.014	23773	19207	11.73
2.58	0.8	0.013	31509	23959	14.64
2.58	0.9	0.012	41603	29380	17.95
2.58	1	0.011	55012	35489	21.68
2.58	1.1	0.01	73220	42270	25.82
2.58	1.2	0.009	98613	49651	30.33
2.58	1.3	0.008	135208	57484	35.12
2.58	1.4	0.007	190183	65539	40.04
2.58	1.5	0.006	277350	73499	44.9
2.58	1.6	0.005	426009	80989	49.47
2.58	1.7	0.004	707242	87612	53.52
2.58	1.8	0.003	1331280	93013	56.82
2.58	1.9	0.002	3161790	96934	59.21
2.58	2	0.001	13312800	99254	60.63

Source: prepared by researcher, using excel, 2019

Z-test value was used for two tails ($\propto = 0.01, z = 2.58$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes

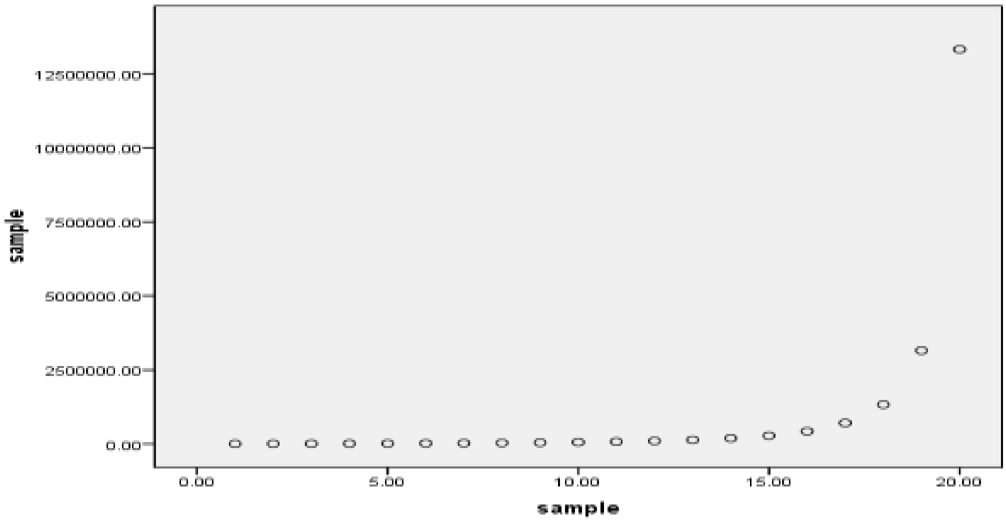

Fig (3-45): scatter diagram for sample sizes(n)

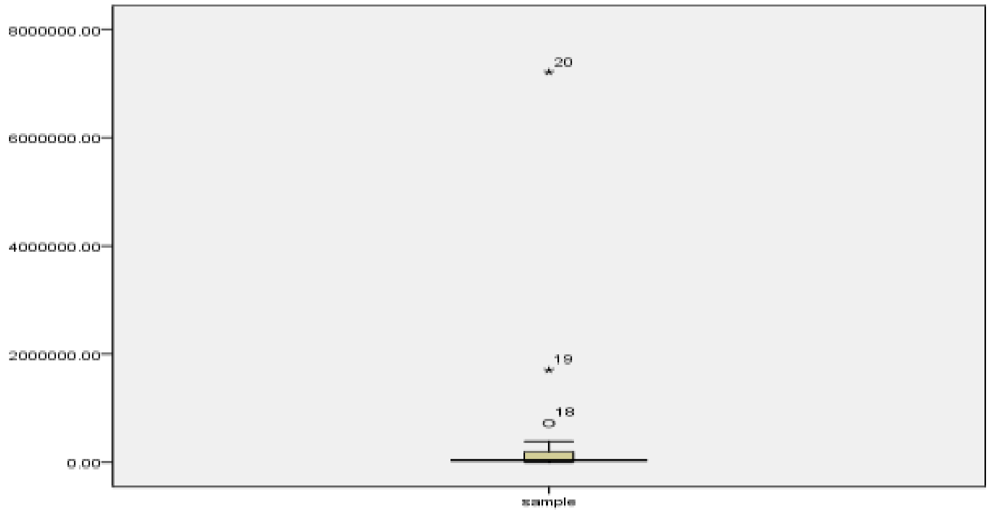

Fig (3-46): box plot for sample sizes(n)

Figure (3-45) shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure (4-46) (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-24): sapmple size determination for variance $z_{\propto} = 2.33, s^2 = (0.1 - 2.0)$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
2.33	0.1	0.02	1357.225	1339.051	1
2.33	0.2	0.019	3007.701	2919.88	2.180559
2.33	0.3	0.018	5026.759	4786.17	3.5743
2.33	0.4	0.017	7514.048	6988.899	5.219293
2.33	0.5	0.016	10603.32	9586.801	7.159399
2.33	0.6	0.015	14477.07	12646.26	9.444196
2.33	0.7	0.014	19388.93	16240.14	12.1281
2.33	0.8	0.013	25698.93	20444.83	15.26815
2.33	0.9	0.012	33930.63	25334.48	18.91973
2.33	1	0.011	44866.94	30971.14	23.12917
2.33	1.1	0.01	59717.9	37389.61	27.92247
2.33	1.2	0.009	80428.15	44576.28	33.28946
2.33	1.3	0.008	110274.5	52443.12	39.16439
2.33	1.4	0.007	155111.4	60801.44	45.40637
2.33	1.5	0.006	226204.2	69344.36	51.7862
2.33	1.6	0.005	347449.6	77651.11	57.98966
2.33	1.7	0.004	576820.6	85225.04	63.64585
2.33	1.8	0.003	1085780	91566.73	68.38181
2.33	1.9	0.002	2578728	96266.88	71.89187
2.33	2	0.001	10857800	99087.41	73.99823

Source: prepared by researcher, using excel, 2019

Z-test value was used for one tail ($\propto = 0.01, z = 2.33$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes.

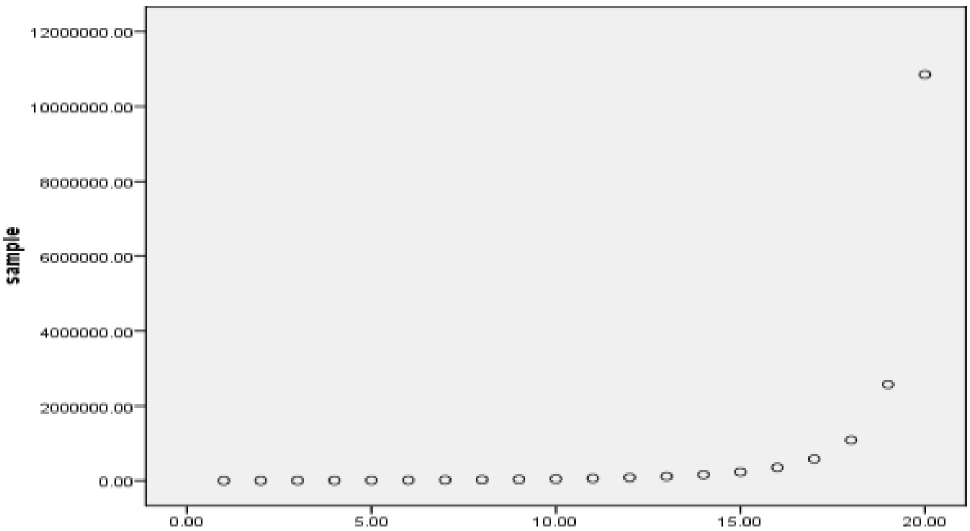

Fig (3-47): scatter diagram for sample sizes(n)

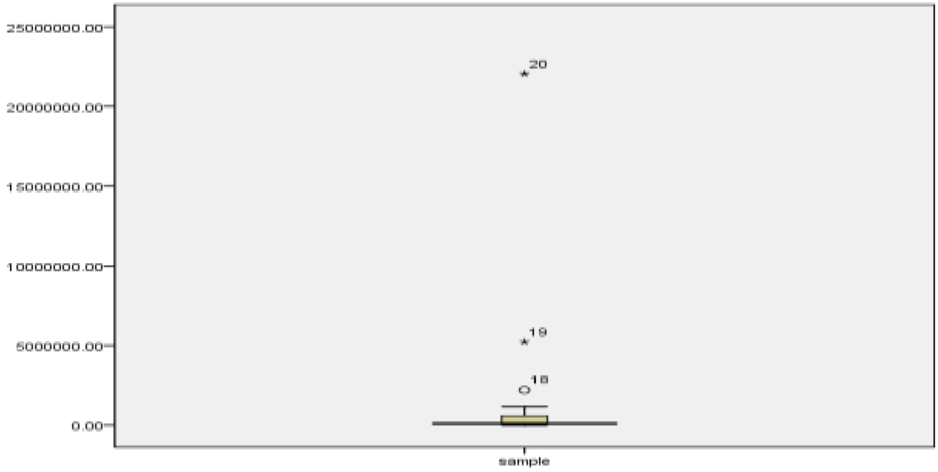

Fig (3-48): box plot for sample sizes(n)

Figure (3-47) shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure (3-48) (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-25): sapmple size determination for variance $z_{\propto/2} = 2.17, s^2 = (0.1 - 2.0)$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
2.17	0.1	0.02	1177.225	1163.528	1
2.17	0.2	0.019	2608.809	2542.481	2.185148
2.17	0.3	0.018	4360.093	4177.931	3.590744
2.17	0.4	0.017	6517.509	6118.721	5.258766
2.17	0.5	0.016	9197.07	8422.451	7.238718
2.17	0.6	0.015	12557.07	11156.18	9.588235
2.17	0.7	0.014	16817.5	14396.39	12.37305
2.17	0.8	0.013	22290.65	18227.6	15.6658
2.17	0.9	0.012	29430.63	22738.54	19.54275
2.17	1	0.011	38916.53	28014.33	24.07706
2.17	1.1	0.01	51797.9	34122.94	29.32713
2.17	1.2	0.009	69761.48	41093.82	35.31829
2.17	1.3	0.008	95649.53	48888.2	42.01721
2.17	1.4	0.007	134540	57363.35	49.30122
2.17	1.5	0.006	196204.2	66239.51	56.92988
2.17	1.6	0.005	301369.6	75085.31	64.53245
2.17	1.7	0.004	500320.6	83342.23	71.6289
2.17	1.8	0.003	941780	90401.04	77.69563
2.17	1.9	0.002	2236728	95720.51	82.26747
2.17	2	0.001	9417800	98949.34	85.04251

Source: prepared by researcher, using SPSS, 2019

Z-test value was used for two tails ($\propto = 0.08, z = 2.17$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes**.**

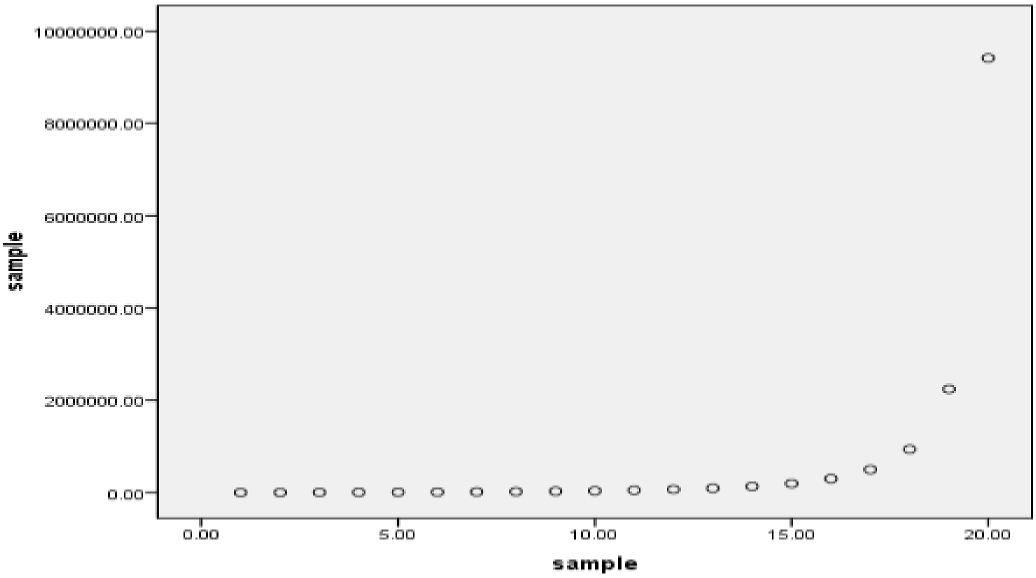

Fig (3-49): scatter diagram for sample sizes(n)

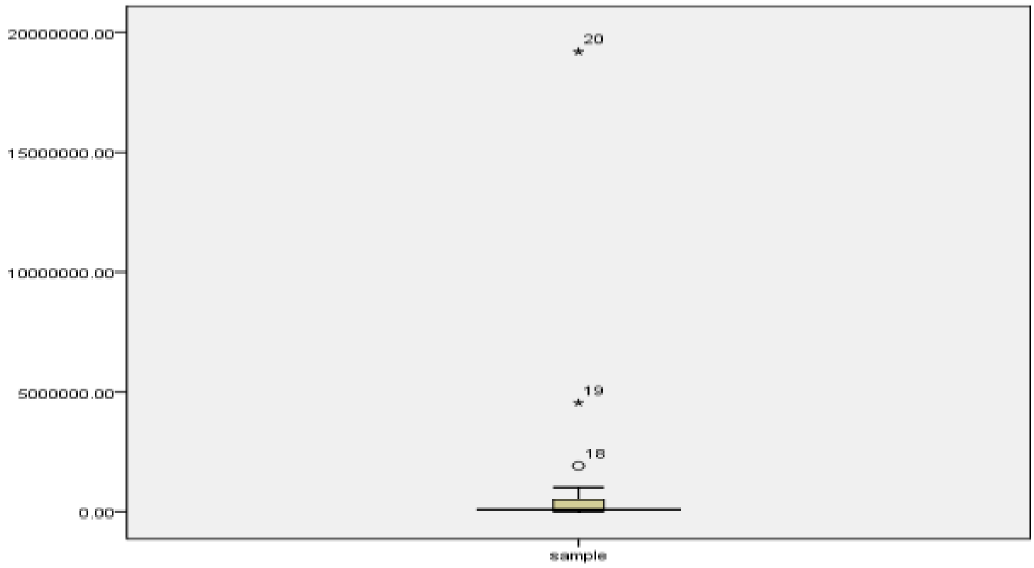

Fig (3-50): box plot for sample sizes(n)

Figure (3-49) shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure (4-50) (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-26): sapmple size determination for variance $z_{\propto} = 1.9, s^2 = (0.1 - 2.0)$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.9	0.1	0.02	902.5	894	1
1.9	0.2	0.019	2000	1961	2.193512
1.9	0.3	0.018	3342.593	3235	3.618568
1.9	0.4	0.017	4996.54	4759	5.323266
1.9	0.5	0.016	7050.781	6586	7.36689
1.9	0.6	0.015	9626.667	8781	9.822148
1.9	0.7	0.014	12892.86	11420	12.77405
1.9	0.8	0.013	17088.76	14595	16.3255
1.9	0.9	0.012	22562.5	18409	20.59172
1.9	1	0.011	29834.71	22979	25.70358
1.9	1.1	0.01	39710	28423	31.79306
1.9	1.2	0.009	53481.48	34845	38.97651
1.9	1.3	0.008	73328.13	42306	47.32215
1.9	1.4	0.007	103142.9	50773	56.79306
1.9	1.5	0.006	150416.7	60067	67.18904
1.9	1.6	0.005	231040	69792	78.06711
1.9	1.7	0.004	383562.5	79320	88.72483
1.9	1.8	0.003	722000	87835	98.24944
1.9	1.9	0.002	1714750	94489	105.6924
1.9	2	0.001	7220000	98634	110.3289

Source: prepared by researcher, using SPSS, 2019

Z-test value was used for one tail ($\propto = 0.08, z = 1.9$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes**.**

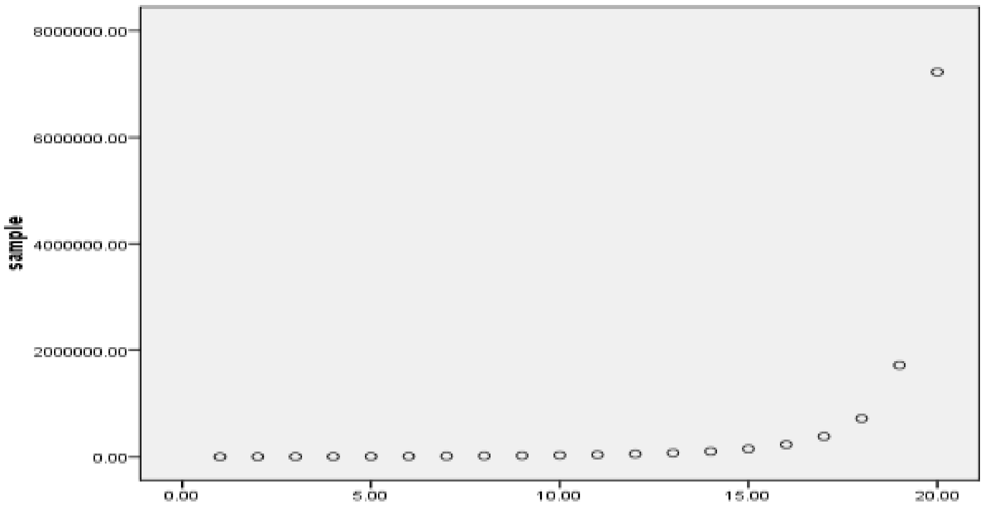

Fig (4-51): scatter diagram for sample sizes(n)

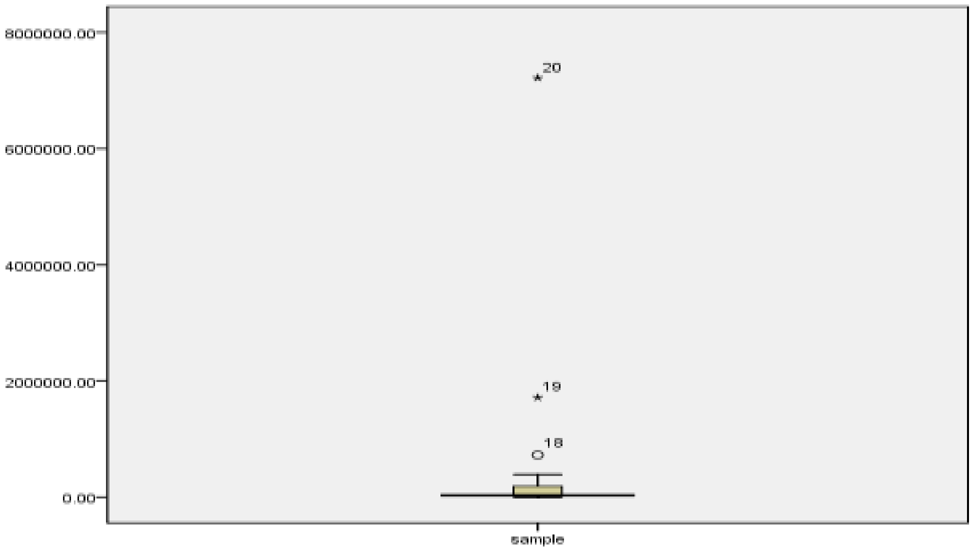

Fig (4-52): box plot for sample sizes(n)

Figure 3-51 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 3-52 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (4-27): sapmple size determination for variance $z_{\propto/2} = 3.32, s^2 = (0.1 - 2.0)$

$z_{\propto/2}$	s^2	e	n_0	n	*Ratio*
3.32	0.1	0.02	2756	2682	1
3.32	0.2	0.019	6107	5755	2.145787
3.32	0.3	0.018	10206	9260	3.452647
3.32	0.4	0.017	15256	13236	4.935123
3.32	0.5	0.016	21528	17714	6.604773
3.32	0.6	0.015	29393	22716	8.469799
3.32	0.7	0.014	39366	28246	10.53169
3.32	0.8	0.013	52177	34287	12.78412
3.32	0.9	0.012	68890	40789	15.20843
3.32	1	0.011	91094	47669	17.77368
3.32	1.1	0.01	121246	54801	20.43289
3.32	1.2	0.009	163295	62019	23.12416
3.32	1.3	0.008	223893	69125	25.77368
3.32	1.4	0.007	314926	75899	28.2994
3.32	1.5	0.006	459267	82119	30.61857
3.32	1.6	0.005	705434	87584	32.65623
3.32	1.7	0.004	1171130	92132	34.35198
3.32	1.8	0.003	2204480	95660	35.66741
3.32	1.9	0.002	5235640	98126	36.58688
3.32	2	0.001	22044800	99548	37.11708

Source: prepared by researcher, using SPSS, 2019

Z-test value was used for two tails ($\propto = 0.03, z = 3.32$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes**.**

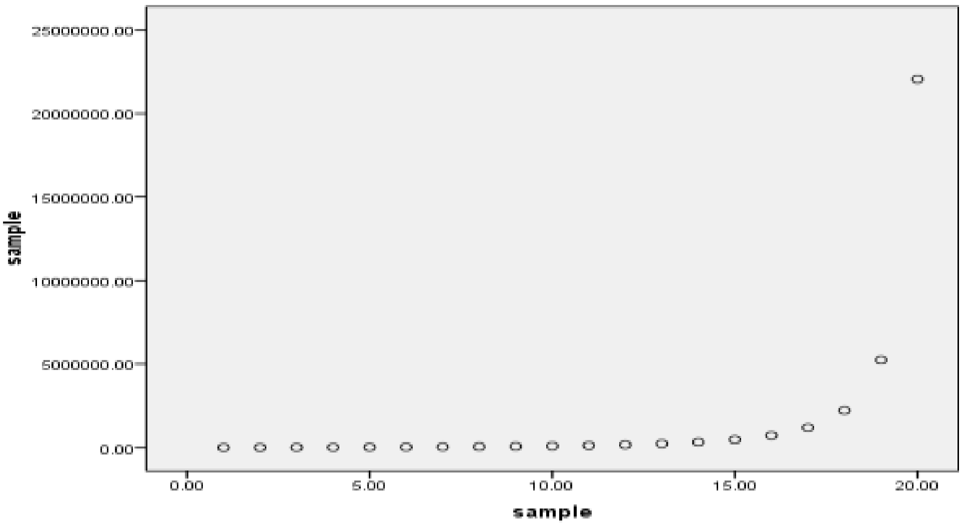

Fig (3-53): scatter diagram for sample sizes(n)

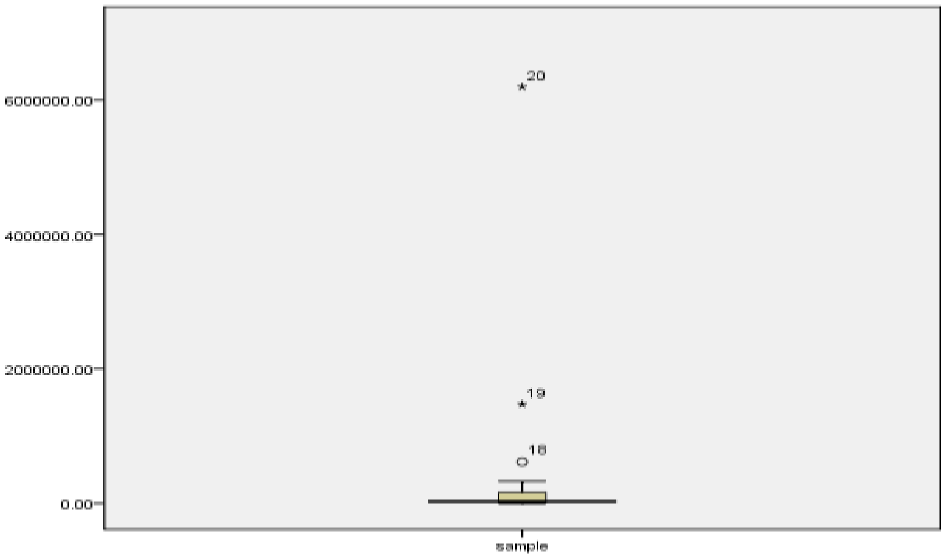

Fig (3-54): box plot for sample sizes(n)

Figure (3-53) shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure (3-54) (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-28): sapmple size determination for variance $z_{\propto} = 3.1, s^2 = (0.1 - 2.0)$

$z_{\propto}$	s^2	e	n_0	n	Ratio
3.1	0.1	0.02	2402	2346	1
3.1	0.2	0.019	5324	5055	2.154731
3.1	0.3	0.018	8898	8171	3.48295
3.1	0.4	0.017	13301.04	11739	5.003836
3.1	0.5	0.016	18769.53	15803	6.736147
3.1	0.6	0.015	25626.67	20399	8.695226
3.1	0.7	0.014	34321.43	25551	10.8913
3.1	0.8	0.013	45491.12	31267	13.32779
3.1	0.9	0.012	60062.5	37524	15.99488
3.1	1	0.011	79421.49	44265	18.86829
3.1	1.1	0.01	105710	51389	21.90494
3.1	1.2	0.009	142370.4	58741	25.03879
3.1	1.3	0.008	195203.1	66125	28.18627
3.1	1.4	0.007	274571.4	73303	31.24595
3.1	1.5	0.006	400416.7	80017	34.10784
3.1	1.6	0.005	615040	86015	36.66454
3.1	1.7	0.004	1021063	91080	38.82353
3.1	1.8	0.003	1922000	95054	40.51748
3.1	1.9	0.002	4564750	97856	41.71185
3.1	2	0.001	19220000	99482	42.40494

Source: prepared by researcher, using SPSS, 2019

Z-test value was used for one tail ($\propto = 0.03, z = 3.1$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes**.**

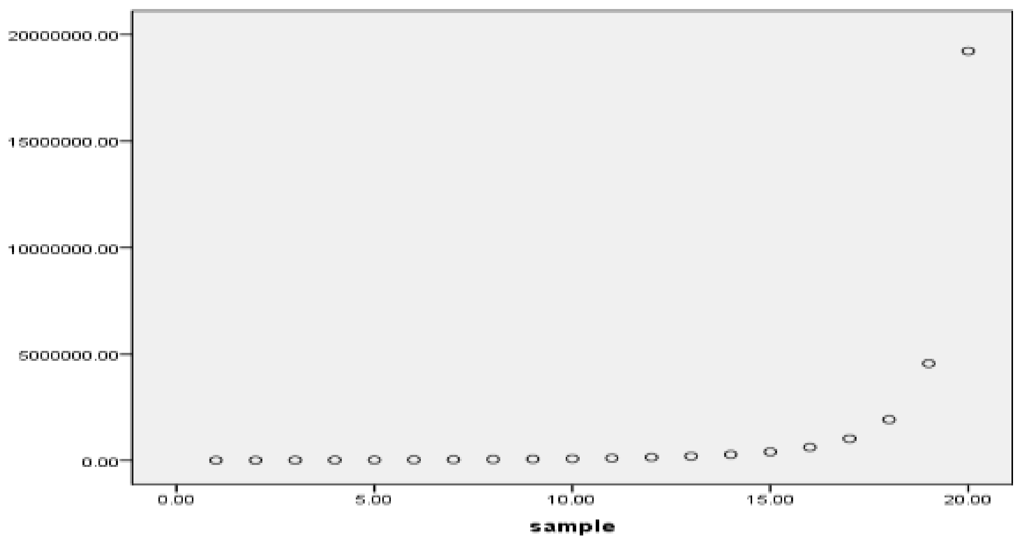

Fig (3-55): scatter diagram for sample sizes(n)

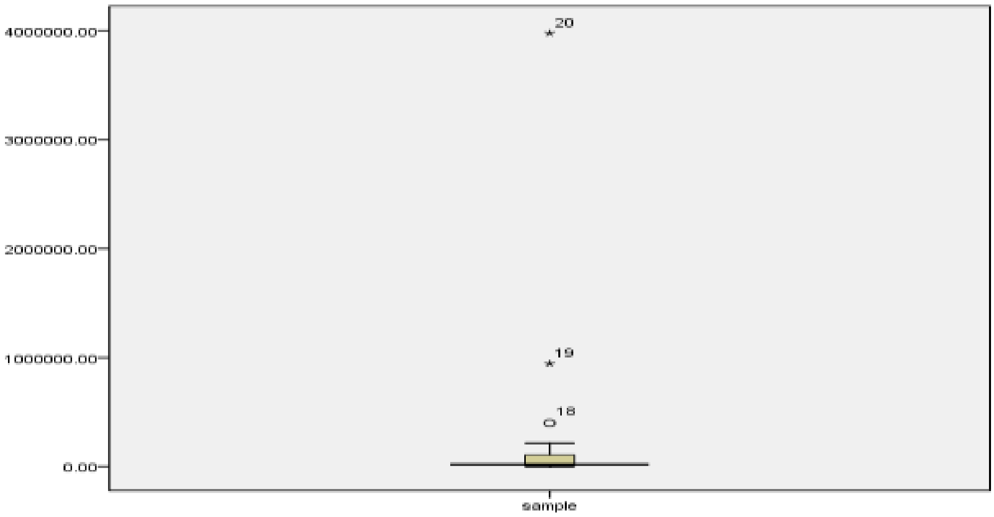

Fig (3-56): box plot for sample sizes(n)

Figure 4-55 shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure 4-56 (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-29): sapmple size determination for variance $z_{\propto/2} = 1.76, s^2 = (0.1 - 2.0)$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.76	0.1	0.02	774.4	768	1
1.76	0.2	0.019	1716.122	1687	2.196615
1.76	0.3	0.018	2868.148	2788	3.630208
1.76	0.4	0.017	4287.336	4111	5.352865
1.76	0.5	0.016	6050	5705	7.428385
1.76	0.6	0.015	8260.267	7630	9.934896
1.76	0.7	0.014	11062.86	9961	12.97005
1.76	0.8	0.013	14663.2	12788	16.65104
1.76	0.9	0.012	19360	16219	21.11849
1.76	1	0.011	25600	20382	26.53906
1.76	1.1	0.01	34073.6	25414	33.09115
1.76	1.2	0.009	45890.37	31455	40.95703
1.76	1.3	0.008	62920	38620	50.28646
1.76	1.4	0.007	88502.86	46950	61.13281
1.76	1.5	0.006	129066.7	56344	73.36458
1.76	1.6	0.005	198246.4	66471	86.55078
1.76	1.7	0.004	329120	76696	99.86458
1.76	1.8	0.003	619520	86102	112.112
1.76	1.9	0.002	1471360	93636	121.9219
1.76	2	0.001	6195200	98411	128.1393

Source: prepared by researcher, using SPSS, 2019

Z-test value was used for two tails ($\propto = 0.001, z = 1.76$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes**.**

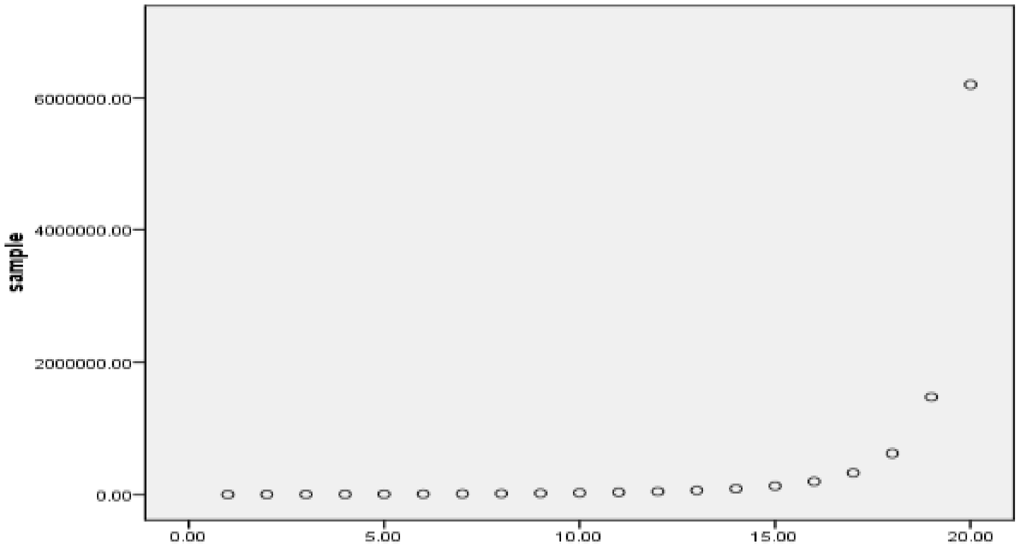

Fig (3-57): scatter diagram for sample sizes(n)

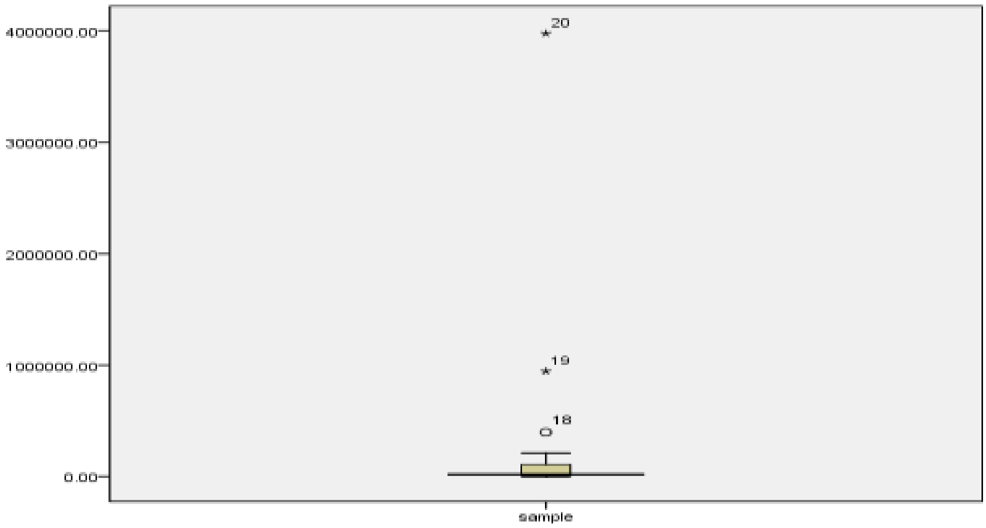

Fig (3-58): box plot for sample sizes(n)

Figure (3-57) shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure (3-58) (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (3-30): sapmple size determination for variance $z_{\propto} = 1.41, s^2 = (0.1 - 2.0)$

$z_{\propto/2}$	s^2	e	n_0	n	Ratio
1.41	0.1	0.02	497.025	495	1
1.41	0.2	0.019	1101.44	1089	2.2
1.41	0.3	0.018	1840.833	1808	3.652525
1.41	0.4	0.017	2751.696	2678	5.410101
1.41	0.5	0.016	3883.008	3738	7.551515
1.41	0.6	0.015	5301.6	5035	10.17172
1.41	0.7	0.014	7100.357	6630	13.39394
1.41	0.8	0.013	9411.124	8602	17.37778
1.41	0.9	0.012	12425.63	11052	22.32727
1.41	1	0.011	16430.58	14112	28.50909
1.41	1.1	0.01	21869.1	17945	36.25253
1.41	1.2	0.009	29453.33	22752	45.96364
1.41	1.3	0.008	40383.28	28766	58.11313
1.41	1.4	0.007	56802.86	36226	73.18384
1.41	1.5	0.006	82837.5	45307	91.52929
1.41	1.6	0.005	127238.4	55993	113.1172
1.41	1.7	0.004	211235.6	67870	137.1111
1.41	1.8	0.003	397620	79904	161.4222
1.41	1.9	0.002	944347.5	90425	182.6768
1.41	2	0.001	3976200	97547	197.0646

Source: prepared by researcher, using SPSS, 2019

Z-test value was used for one tail ($\propto = 0.001, z = 1.41$) with variance ranging between (0.1 and 2). Standard Error, ranging from (0.001 to 0.02) was used to obtain different sample sizes.

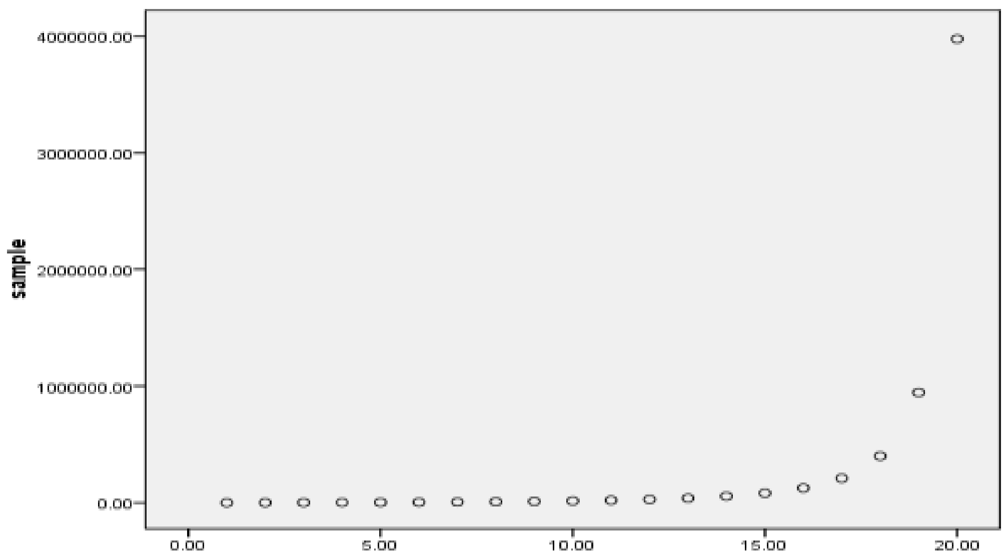

Fig (3-59): scatter diagram for sample sizes(n)

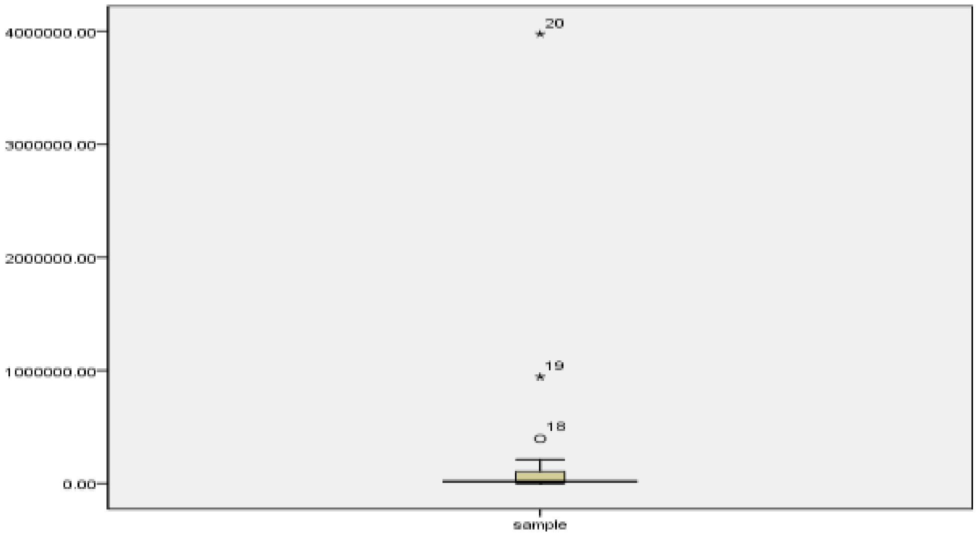

Fig (3-60): box plot for sample sizes(n)

Figure (3-59) shows that the regression is nonlinear and all the points lies in a curve line that means there are other factors effecting the sample size, and figure (3-60) (Box Plot) shows the samples (n) are exponential distributed and there are three outliers, therefor we must review the enter modalities in the model.

Table (4-31): The goodness of fit testing

By using the goodness of fit testing to know the distribution of sample sizes generating in above tables, we are obtained the blow table results:

					Exponential		Poisson	
Tables Number	$z_{\propto/2}$, $z_{\propto}$	$\propto$	e	s^2	Chi square	p-value	Chi square	p-value
(3-1)	1.96	0.05	0.01	(0.1-2)	0.834	0.489	2.236	0.000
(3-2)	1.96	0.05	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-3)	1.64	0.05	0.01	(0.1-2)	0.834	0.489	2.236	0.000
(3-4)	1.64	0.05	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-5)	2.58	0.01	0.01	(0.1-2)	0.834	0.489	2.236	0.000
(3-6)	2.58	0.01	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-7)	2.33	0.01	0.01	(0.1-2)	0.834	0.489	2.236	0.000
(3-8)	2.33	0.01	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-9)	2.17	0.03	0.01	(0.1-2)	0.834	0.489	2.236	0.000
(3-10)	2.17	0.03	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-11)	1.9	0.03	0.01	(0.1-2)	0.834	0.489	2.236	0.000

(3-12)	1.9	0.03	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-13)	3.32	0.001	0.01	(0.1-2)	0.834	0.489	2.236	0.000
(3-14)	3.32	0.001	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-15)	3.1	0.001	0.01	(0.1-2)	0.834	0.489	2.236	0.000
(3-16)	3.1	0.001	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-17)	1.76	0.08	0.01	(0.1-2)	0.834	0.489	2.236	0.000
(3-18)	1.76	0.08	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-19)	1.41	0.08	0.01	(0.1-2)	0.834	0.489	2.236	0.000
(3-20)	1.41	0.08	.001-0.02	0.1	2.121	0.000	3.801	0.000
(3-21)	1.96	0.05	.001-0.02	(0.1-2)	0.834	0.489	2.236	0.000
(3-22)	1.64	0.05	.001-0.02	(0.1-2)	2.121	0.000	3.801	0.000
(3-23)	2.58	0.01	.001-0.02	(0.1-2)	0.834	0.489	2.236	0.000
(3-24)	2.33	0.01	.001-0.02	(0.1-2)	2.121	0.000	3.801	0.000
(3-25)	2.17	0.03	.001-0.02	(0.1-2)	0.834	0.489	2.236	0.000
(3-26)	1.9	0.03	.001-0.02	(0.1-2)	2.121	0.000	3.801	0.000
(3-27)	3.32	0.001	.001-0.02	(0.1-2)	0.834	0.489	2.236	0.000
(3-28)	3.1	0.001	.001-0.02	(0.1-2)	2.121	0.000	3.801	0.000
(3-29)	1.76	0.08	.001-0.02	(0.1-2)	0.834	0.489	2.236	0.000
(3-30)	1.41	0.08	.001-0.02	(0.1-2)	2.121	0.000	3.801	0.000

Source: prepared by researcher, using SPSS, 2019

<u>From the table (4-31) : we showed that:</u>

- The value of chi-square for the first part in first row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in second row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in third row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.

- The value of chi-square for the first part in fourth row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in fifth row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in sixth row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 7th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 8th row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 9th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution
- The value of chi-square for the first part in tenth row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 11th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 12th row is (2.121) with (p-value=0.000<0.05), and depending on the table (1), this indicates that, the sample

sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.

- The value of chi-square for the first part in 13th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 14th row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 15th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 16th row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 17th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 18th row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 19th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution
- The value of chi-square for the first part in 20th row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of

chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.

- The value of chi-square for the first part in 21th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 22th row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 23th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 24th row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 25th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 26th row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 27th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 28th row is (2.121) with (p-value=0.000> 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.

- The value of chi-square for the first part in 29th row is (0.834) with (p-value=0.489 >0.05), and depending to indicates that, the sample sizes is not following the exponential distribution. While in second part the value of chi-square is (2.236) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the Poisson distribution.
- The value of chi-square for the first part in 30th row is (2.121) with (p-value=0.000< 0.05), and depending on the table (1), this indicates that, the sample sizes is following the exponential distribution. While in second part the value of chi-square is (3.801) with (p-value=0.000<0.05), and depending that, the sample sizes is following the Poisson distribution.

Table (4-32): The Correlations between n and e

Correlations		n_0
e	Pearson Correlation	-.522
	Sig	.018

Source: prepared by researcher, using SPSS, 2019.

From the table (4-32): the value of Pearson Correlation is (-0.522) with (p-value= 0.018< 0.05), and depending on that, there is significant Correlation between value of e (standard error) and n_0 (sample size) at the level 0.05.

Table (4-33): The Correlations between n and s^2

Correlations		n
s^2	Pearson Correlation	1.00
	Sig	0.000

Source: prepared by researcher, using SPSS, 2019.

From the table (4-33) the value of Pearson Correlation is (-0.522) with (p-value= 0.000< 0.05), and depending on that, there is significant Correlation between value of s^2 (variance) and n_0 (sample size) at the level 0.05.

Table (4-34): Independent sample t- test

	t-test for Equality of Means	
	T-value	Sig
Table (4-1) and (4-3)	1.950	0.059
Table (4-2) and (4-4)	0.391	0.698
Table (4-5) and (4-7)	1.054	0.299
Table (4-6) and (4-8)	0.095	0.925
Table (4-9) and (4-11)	1.470	0.150
Table (4-10) and (4-12)	0.295	0.770
Table (4-13) and (4-15)	0.767	0.448
Table (4-14) and (4-16)	0.154	0.879
Table (4-17) and (4-19)	2.393	0.022
Table (4-18) and (4-20)	0.480	0.634
Table (4-21) and (4-22)	0.366	0.717
Table (4-23) and (4-24)	0.213	0.833
Table (4-25) and (4-26)	0.276	0.784
Table (4-27) and (4-28)	0.144	0.886
Table (4-29) and (4-30)	0.449	0.656

Source: prepared by researcher, using SPSS, 2019

From the table (4-34): we showed that:

- The value of t test in first row is (1.950) with (p-value=0.059> 0.05), and depending on this indicates there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in second row is (0.391) with (p-value=0.698> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in third row is (1.054) with (p-value=0.299> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.

- The value of t test in fourth row is (0.095) with (p-value=0.925> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in fifth row is (1.470) with (p-value=0.150> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in sixth row is (0.295) with (p-value=0.770> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in seventh row is (0.767) with (p-value=0.448> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 8th row is (0.154) with (p-value=0.879> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 9th row is (2.393) with (p-value=0.022< 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 10th row is (0.480) with (p-value=0.634> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 11th row is (0.366) with (p-value=0.717> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 12th row is (0.213) with (p-value=0.833> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 13th row is (0.276) with (p-value=0.784> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 14th row is (0.144) with (p-value=0.886> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 15th row is (0.449) with (p-value=0.657> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.

3-2 Sample size for proportions

To find sample size for proportion the formula below was used

In z-test from two tails:

$$n = \frac{\left(z_{\frac{\propto}{2}}\right)^2 p(1-p)}{e^2}$$

In z-test from one tail:

$$n = \frac{(z_{\propto})^2 p(1-p)}{e^2}$$

Z-test value was then used depending on level significant and test type (one tail, two tails). Proportion value ranging (0.5), the value of the standard error is between (0.001 and 0.02) were used.

Table (3-35): sapmple size determination for proportion $z_{\propto/2} = 1.96, p = 0.5$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.96	0.5	0.02	2401	2345	1
1.96	0.5	0.019	2660	2591	1.1049
1.96	0.5	0.018	2964	2879	1.22772
1.96	0.5	0.017	3323.	3216	1.37143
1.96	0.5	0.016	3752	3616	1.542
1.96	0.5	0.015	4268	4093	1.74542
1.96	0.5	0.014	4900	4671	1.9919
1.96	0.5	0.013	5683	5377	2.29296
1.96	0.5	0.012	6669	6252	2.6661
1.96	0.5	0.011	7937	7353	3.13561
1.96	0.5	0.01	9604	8762	3.73646
1.96	0.5	0.009	11857	10600	4.52026
1.96	0.5	0.008	15006	13048	5.56418
1.96	0.5	0.007	19600	16388	6.98849
1.96	0.5	0.006	26678	21060	8.98081
1.96	0.5	0.005	38416	27754	11.8354
1.96	0.5	0.004	60025	37510	15.9957
1.96	0.5	0.003	106711	51623	22.0141
1.96	0.5	0.002	240100	70597	30.1053
1.96	0.5	0.001	960400	90570	38.6226

Source: prepared by researcher, using SPSS, 2019.

Z-test value was used on level significant from two tails $\propto = 0.01$, $z_{\propto/2} = 1.96$. Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

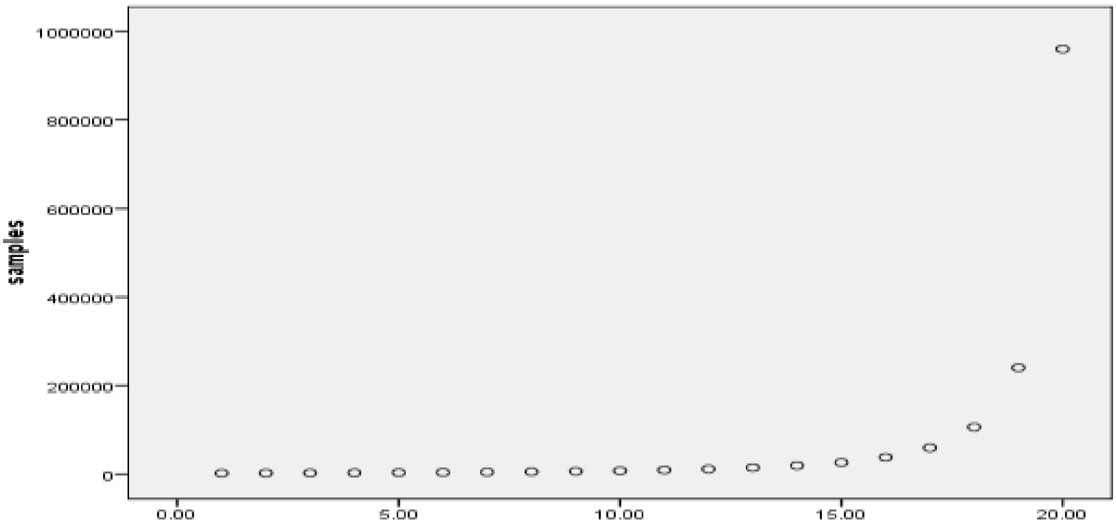

Fig (3-61): scatter diagram for sample sizes(n)

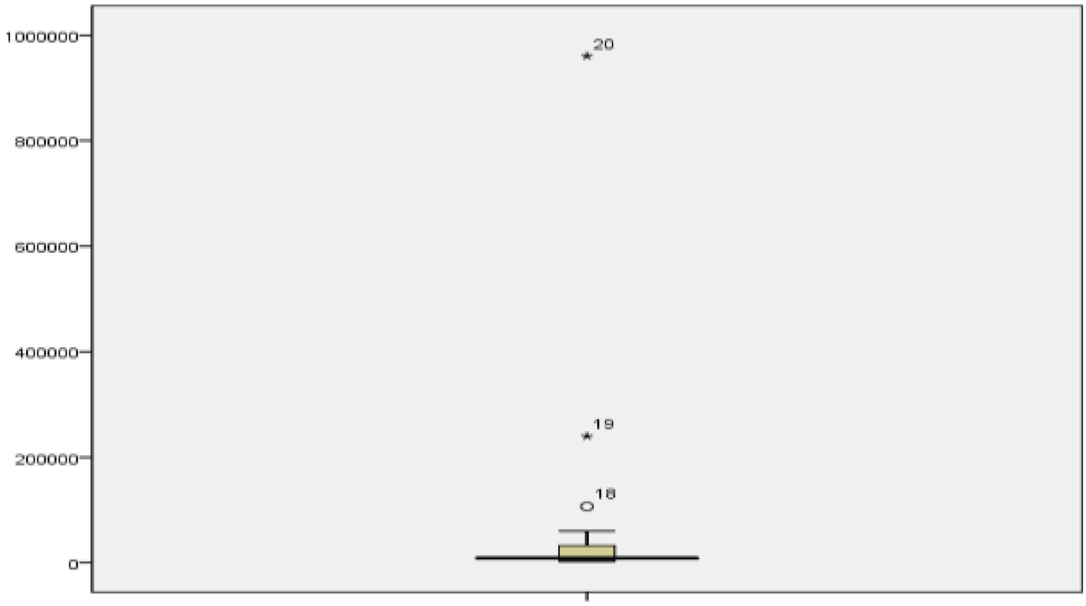

Fig (3-62): box plot for sample sizes(n)

Table (3-36): sapmple size determination for proportion $z_{\propto} = 1.64, p = 0.5$

$z_{\propto}$	p	e	n_0	n	Ratio
1.64	0.5	0.02	1681	2033	1
1.64	0.5	0.019	1863	2274	1.11
1.64	0.5	0.018	2075	2560	1.23
1.64	0.5	0.017	2327	2901	1.38
1.64	0.5	0.016	2627	3317	1.56
1.64	0.5	0.015	2988	3827	1.78
1.64	0.5	0.014	3431	4461	2.04
1.64	0.5	0.013	3979	5264	2.37
1.64	0.5	0.012	4669	6300	2.78
1.64	0.5	0.011	5557	7665	3.30
1.64	0.5	0.01	6724	9507	4
1.64	0.5	0.009	8301	12066	4.94
1.64	0.5	0.008	10506	15738	6.25
1.64	0.5	0.007	13722	21195	8.16
1.64	0.5	0.006	18678	29590	11.11
1.64	0.5	0.005	26896	42763	16
1.64	0.5	0.004	42025	62700	25
1.64	0.5	0.003	74711	87053	44.44
1.64	0.5	0.002	168100	2033	100
1.64	0.5	0.001	672400	2274	400

Source: prepared by researcher, using SPSS, 2019.

Z-test value was used on level significant from one tail $\propto = 0.05$, $z_{\propto} = 1.64$. Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

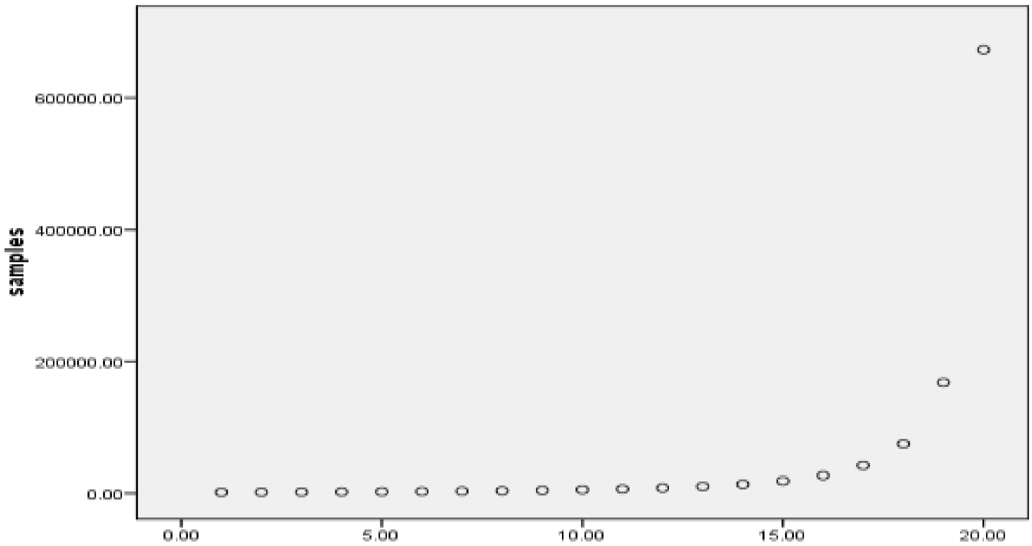

Fig (4-63): scatter diagram for sample sizes(n)

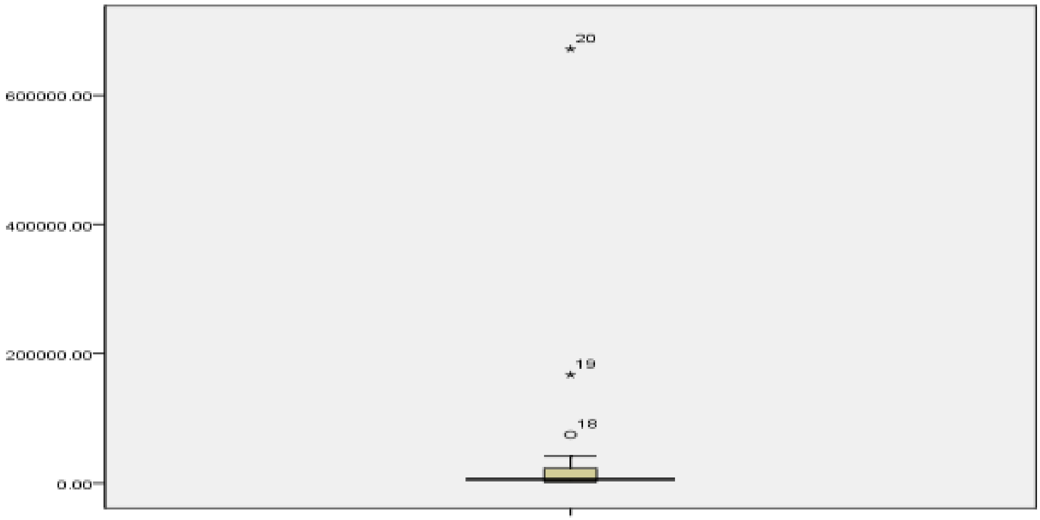

Fig (4-64): box plot for sample sizes(n)

From the tables (3-35, 3-36) we observe that, the sample sizes increases, as the standard error decrease.

From figures (3-61, 3-62, 3-63 and 3-64) we showed the scatter diagram and box plot is escalated ratio in all values of sample sizes with three out layer value, when the values of standard error is equal (0.001, 0.002, 0.003). The sample sizes obtained from test of two tails is greater than it from one tail**.**

Table (3-37): sapmple size determination for proportion $z_{\propto/2} = 2.58, p = 0.5$

$z_{\propto/2}$	p	e	n_0	n	Ratio
2.58	0.5	0.02	4160	3994	1
2.58	0.5	0.019	4610	4407	1.10341
2.58	0.5	0.018	5136	4885	1.22308
2.58	0.5	0.017	5758	5445	1.36329
2.58	0.5	0.016	6500	6103	1.52804
2.58	0.5	0.015	7396	6887	1.72434
2.58	0.5	0.014	8490	7826	1.95944
2.58	0.5	0.013	9847	8964	2.24437
2.58	0.5	0.012	11556	10359	2.59364
2.58	0.5	0.011	13753	12090	3.02704
2.58	0.5	0.01	16641	14267	3.57211
2.58	0.5	0.009	20544	17042	4.2669
2.58	0.5	0.008	26002	20636	5.16675
2.58	0.5	0.007	33961	25351	6.34727
2.58	0.5	0.006	46225	31612	7.91487
2.58	0.5	0.005	66564	39963	10.0058
2.58	0.5	0.004	104006	50982	12.7646
2.58	0.5	0.003	184900	648100	162.268
2.58	0.5	0.002	416025	80621	20.1855
2.58	0.5	0.001	1664100	94331	23.6182

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from two tails $\propto = 0.01$, $z_{\propto/2} = 2.58$. Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

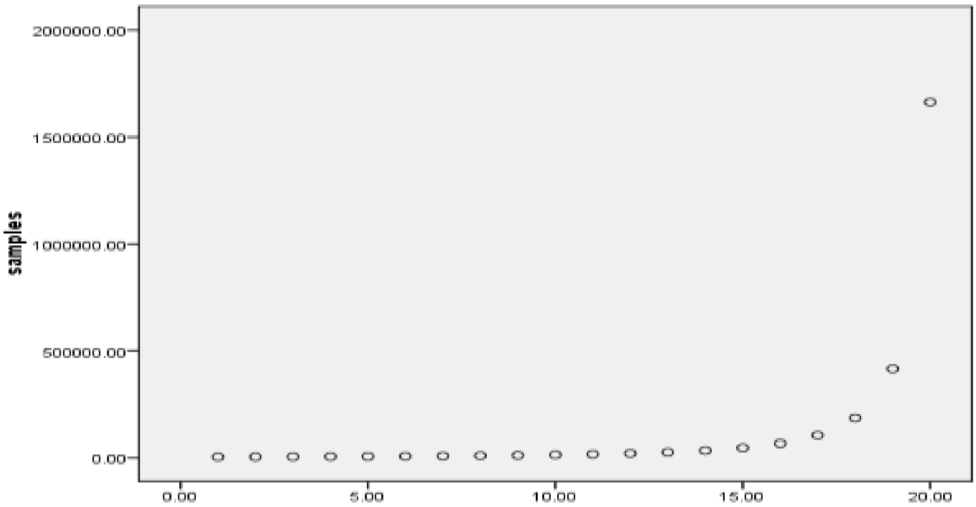

Fig (3-65): scatter diagram for sample sizes(n)

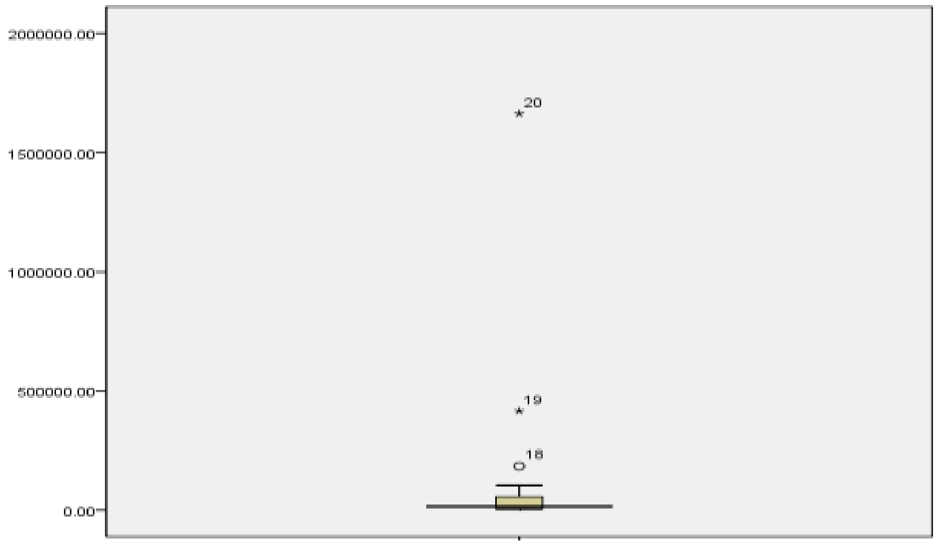

Fig (3-66): box plot for sample sizes(n)

Table (3-38): sapmple size determination for proportion $z_{\propto} = 2.33, p = 0.5$

$z_{\propto}$	p	e	n_0	n	Ratio
2.33	0.5	0.02	3393.063	3282	1
2.33	0.5	0.019	3759.626	3623	1.1039
2.33	0.5	0.018	4188.966	4021	1.22517
2.33	0.5	0.017	4696.28	4486	1.36685
2.33	0.5	0.016	5301.66	5035	1.53413
2.33	0.5	0.015	6032.111	5689	1.73339
2.33	0.5	0.014	6924.617	6476	1.97319
2.33	0.5	0.013	8030.917	7433	2.26478
2.33	0.5	0.012	9425.174	8613	2.62431
2.33	0.5	0.011	11216.74	10085	3.07282
2.33	0.5	0.01	13572.25	11950	3.64107
2.33	0.5	0.009	16755.86	14351	4.37264
2.33	0.5	0.008	21206.64	17496	5.3309
2.33	0.5	0.007	27698.47	21691	6.60908
2.33	0.5	0.006	37700.69	27378	8.34186
2.33	0.5	0.005	54289	35187	10.7212
2.33	0.5	0.004	84826.56	4589	1.39823
2.33	0.5	0.003	150802.8	60128	18.3205
2.33	0.5	0.002	339306.3	77237	23.5335
2.33	0.5	0.001	1357225	93138	28.3784

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.01$, $z_{\propto} = 2.33$. Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

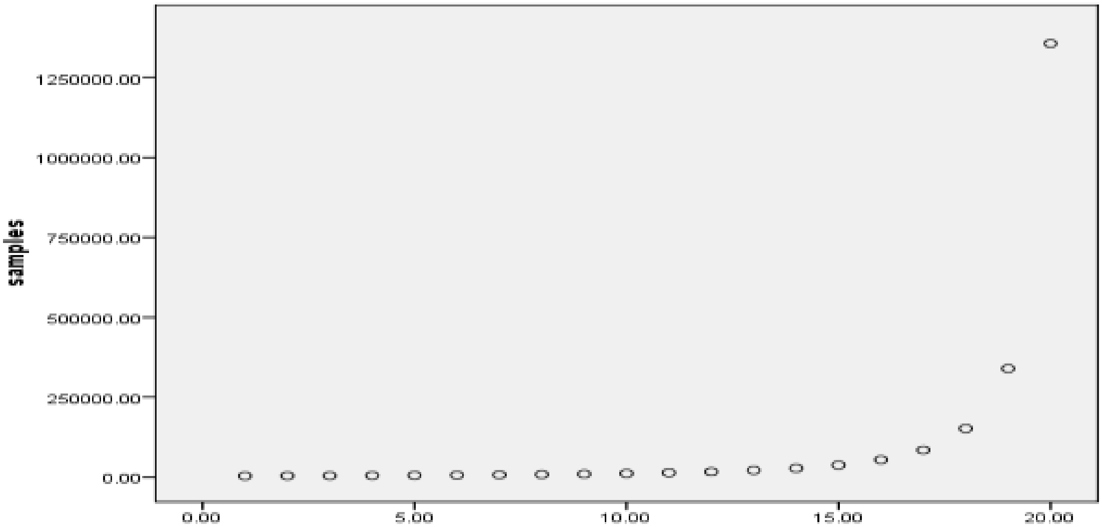

Fig (3-67): scatter diagram for sample sizes(n)

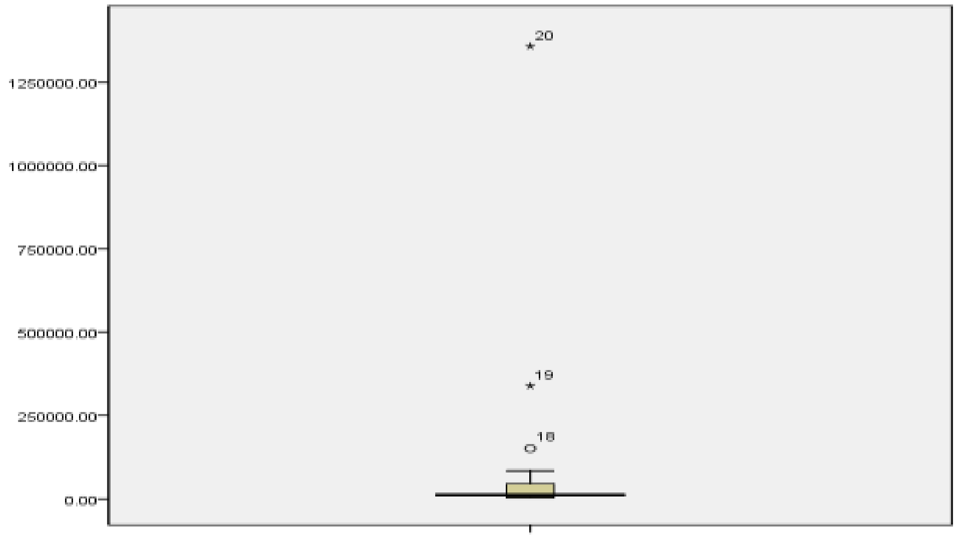

Fig (3-68): box plot for sample sizes(n)

From the tables (3-37, 3-38) we observe that, the sample sizes increases, as the standard error decrease.

From figures (3-65, 3-66, 3-67 and 3-68) we showed the scatter diagram and box plot is escalated ratio in all sample sizes generations with three out layer value, when the values of standard error is equal (0.001, 0.002, 0.003). The sample sizes obtained from test of two tails is greater than it from one tail.

Table (3-39): sapmple size determination for proportion $z\propto/_2 = 2.17, p = 0.5$

$z\propto/_2$	p	e	n_0	n	Ratio
2.17	0.5	0.02	2943.063	2859	1
2.17	0.5	0.019	3261.011	3158	1.10458
2.17	0.5	0.018	3633.41	3506	1.2263
2.17	0.5	0.017	4073.443	3914	1.36901
2.17	0.5	0.016	4598.535	4396	1.5376
2.17	0.5	0.015	5232.111	4972	1.73907
2.17	0.5	0.014	6006.25	5666	1.98181
2.17	0.5	0.013	6965.828	6512	2.27772
2.17	0.5	0.012	8175.174	7557	2.64323
2.17	0.5	0.011	9729.132	8866	3.10108
2.17	0.5	0.01	11772.25	10532	3.68381
2.17	0.5	0.009	14533.64	12689	4.43827
2.17	0.5	0.008	18394.14	15536	5.43407
2.17	0.5	0.007	24025	19371	6.77545
2.17	0.5	0.006	32700.69	24642	8.6191
2.17	0.5	0.005	47089	32014	11.1976
2.17	0.5	0.004	73576.56	42389	14.8265
2.17	0.5	0.003	130802.8	56673	19.8227
2.17	0.5	0.002	294306.3	74639	26.1067
2.17	0.5	0.001	1177225	92171	32.2389

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from two tails $\propto = 0.03$, $z_{\propto/2} = 2.33$. Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

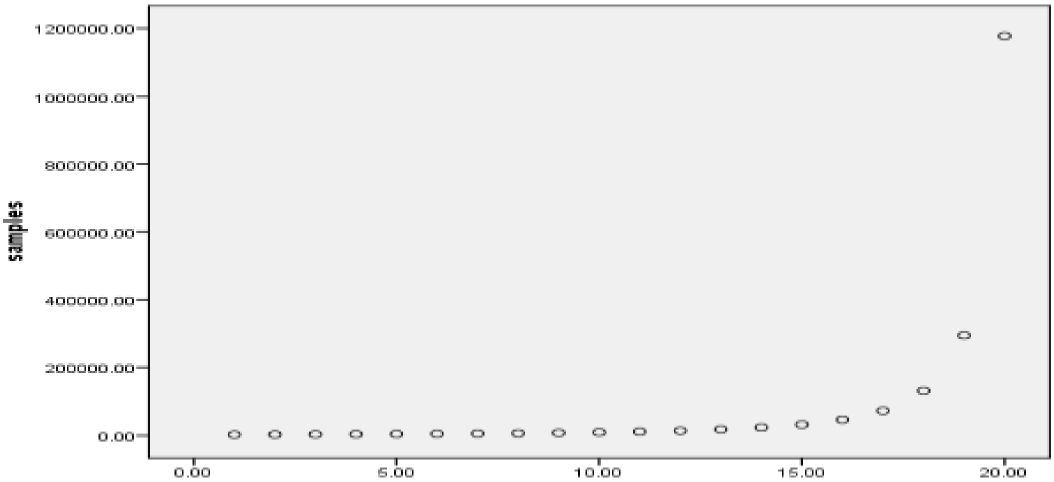

Fig (4-69): scatter diagram for sample sizes(n)

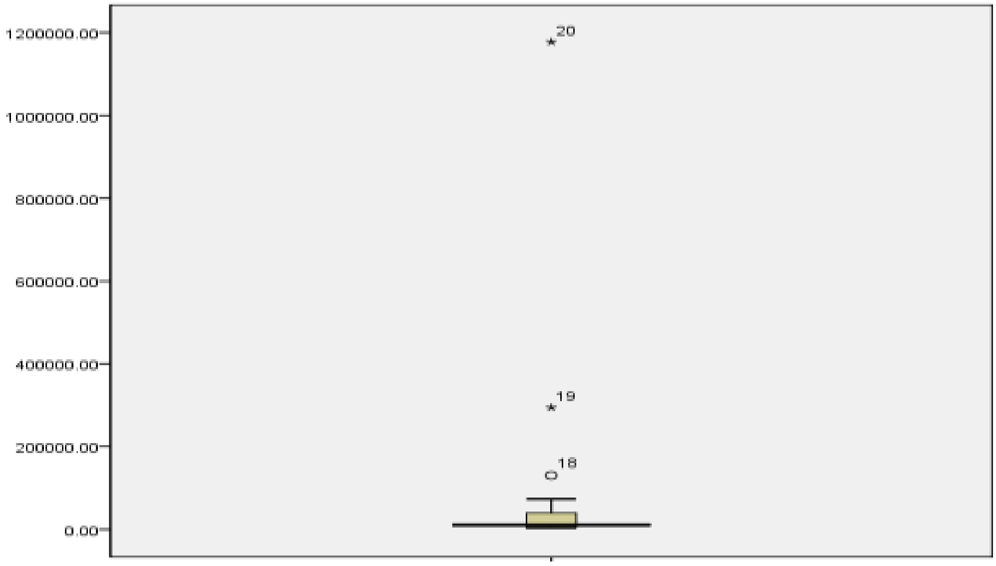

Fig (4-70): box plot for sample sizes(n)

Table (4-40): sapmple size determination for proportion $z_{\propto} = 1.9, p = 0.5$

$z_{\propto}$	p	e	n_0	n	Ratio
1.9	0.5	0.02	2256.25	2206	1
1.9	0.5	0.019	2500	2439	1.10562
1.9	0.5	0.018	2785.494	2710	1.22847
1.9	0.5	0.017	3122.837	3028	1.37262
1.9	0.5	0.016	3525.391	3405	1.54352
1.9	0.5	0.015	4011.111	3856	1.74796
1.9	0.5	0.014	4604.592	4402	1.99547
1.9	0.5	0.013	5340.237	5069	2.29782
1.9	0.5	0.012	6267.361	5898	2.67362
1.9	0.5	0.011	7458.678	6941	3.14642
1.9	0.5	0.01	9025	8278	3.75249
1.9	0.5	0.009	11141.98	10025	4.54442
1.9	0.5	0.008	14101.56	12359	5.60245
1.9	0.5	0.007	18418.37	15554	7.05077
1.9	0.5	0.006	25069.44	20044	9.08613
1.9	0.5	0.005	36100	26525	12.024
1.9	0.5	0.004	56406.25	36064	16.3481
1.9	0.5	0.003	100277.8	50069	22.6967
1.9	0.5	0.002	225625	69290	31.4098
1.9	0.5	0.001	902500	90025	40.8092

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.03$, $z_{\propto} = 1.9$ Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

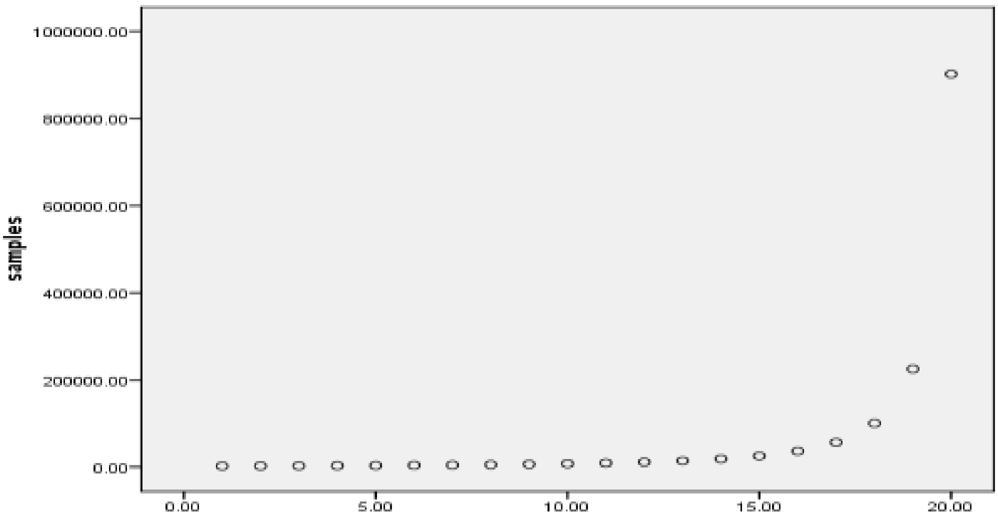

Fig (4-71): scatter diagram for sample sizes(n)

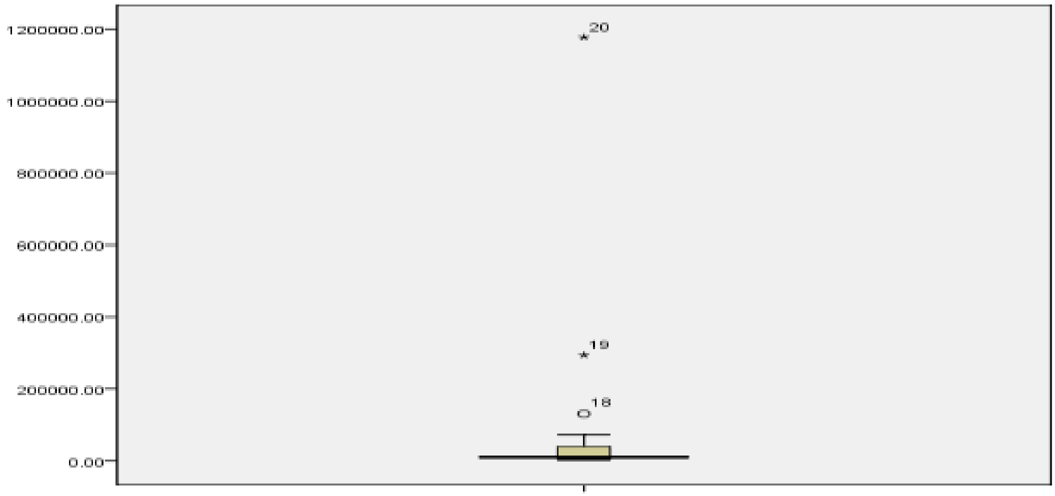

Fig (4-72): box plot for sample sizes(n)

From the tables (3-39, 3-40) we observe that, the sample sizes increases, as the standard error decrease.

From figures (3-69, 3-70, 3-71 and 3-72) we showed the scatter diagram and box plot is escalated ratio in all sample sizes generations with three out layer value, when the values of standard error is equal (0.001, 0.002, 0.003). The sample sizes obtained from test of two tails is greater than it from one tail**.**

Table (3-41): sapmple size determination for proportion $z_{\propto/2} = 3.32, p = 0.5$

$z_{\propto/2}$	p	e	n_0	n	Ratio
3.32	0.5	0.02	6889	6445	1
3.32	0.5	0.019	7633.241	7092	1.10039
3.32	0.5	0.018	8504.938	7838	1.21614
3.32	0.5	0.017	9534.948	8705	1.35066
3.32	0.5	0.016	10764.06	9718	1.50784
3.32	0.5	0.015	12247.11	10910	1.69279
3.32	0.5	0.014	14059.18	12326	1.91249
3.32	0.5	0.013	16305.33	14019	2.17517
3.32	0.5	0.012	19136.11	16062	2.49216
3.32	0.5	0.011	22773.55	18549	2.87804
3.32	0.5	0.01	27556	21603	3.3519
3.32	0.5	0.009	34019.75	25384	3.93856
3.32	0.5	0.008	43056.25	30097	4.66982
3.32	0.5	0.007	56236.73	35994	5.58479
3.32	0.5	0.006	76544.44	43357	6.72723
3.32	0.5	0.005	110224	52432	8.1353
3.32	0.5	0.004	172225	63266	9.81629
3.32	0.5	0.003	306177.8	75380	11.6959
3.32	0.5	0.002	688900	87324	13.5491
3.32	0.5	0.001	2755600	96498	14.9725

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from two tails $\propto = 0.03$, $z_{\propto/2} = 3.1$ Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

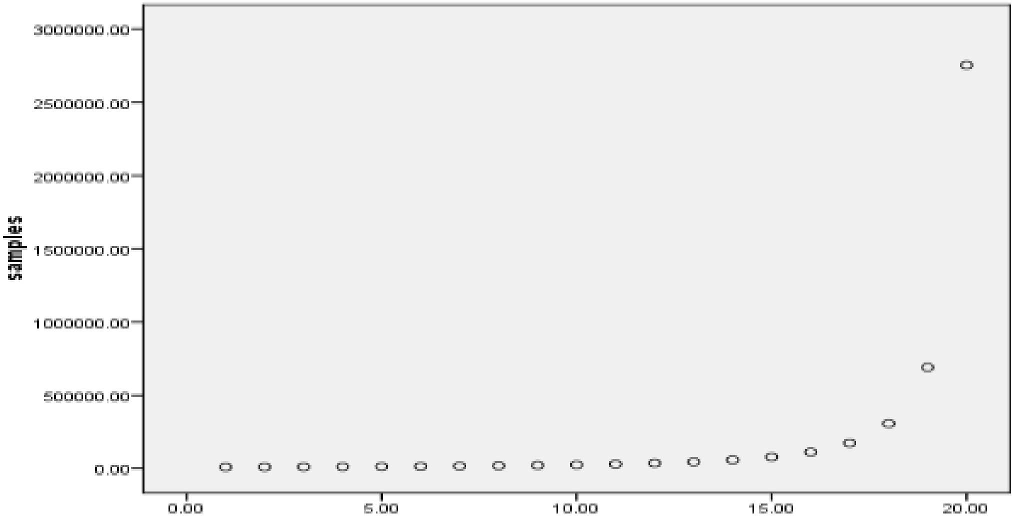

Fig (3-73): scatter diagram for sample sizes(n)

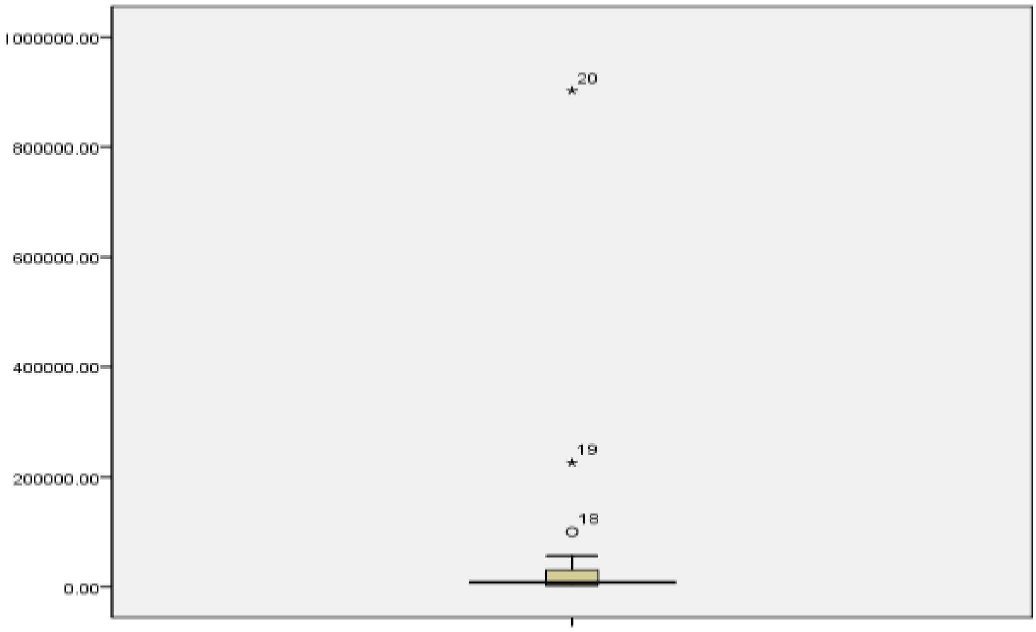

Fig (3-74): box plot for sample sizes(n)

Table (3-42): sapmple size determination for proportion $z_{\propto} = 3.1, p = 0.5$

$z_{\propto}$	p	e	n_0	n	Ratio
3.1	0.5	0.02	6006.25	5665.94	1
3.1	0.5	0.019	6655.125	6239.855	1.10129
3.1	0.5	0.018	7415.123	6903.239	1.21837
3.1	0.5	0.017	8313.149	7675.106	1.3546
3.1	0.5	0.016	9384.766	8579.591	1.51424
3.1	0.5	0.015	10677.78	9647.628	1.70274
3.1	0.5	0.014	12257.65	10919.21	1.92717
3.1	0.5	0.013	14215.98	12446.58	2.19674
3.1	0.5	0.012	16684.03	14298.47	2.52358
3.1	0.5	0.011	19855.37	16566.11	2.92381
3.1	0.5	0.01	24025	19371.09	3.41887
3.1	0.5	0.009	29660.49	22875.5	4.03737
3.1	0.5	0.008	37539.06	27293.38	4.8171
3.1	0.5	0.007	49030.61	32899.69	5.80657
3.1	0.5	0.006	66736.11	40024.99	7.06414
3.1	0.5	0.005	96100	49005.61	8.64916
3.1	0.5	0.004	150156.3	60024.99	10.594
3.1	0.5	0.003	266944.4	72747.91	12.8395
3.1	0.5	0.002	600625	85727.03	15.1302
3.1	0.5	0.001	2402500	96004	16.9441

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.03$, $z_{\propto} = 1.76$ Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

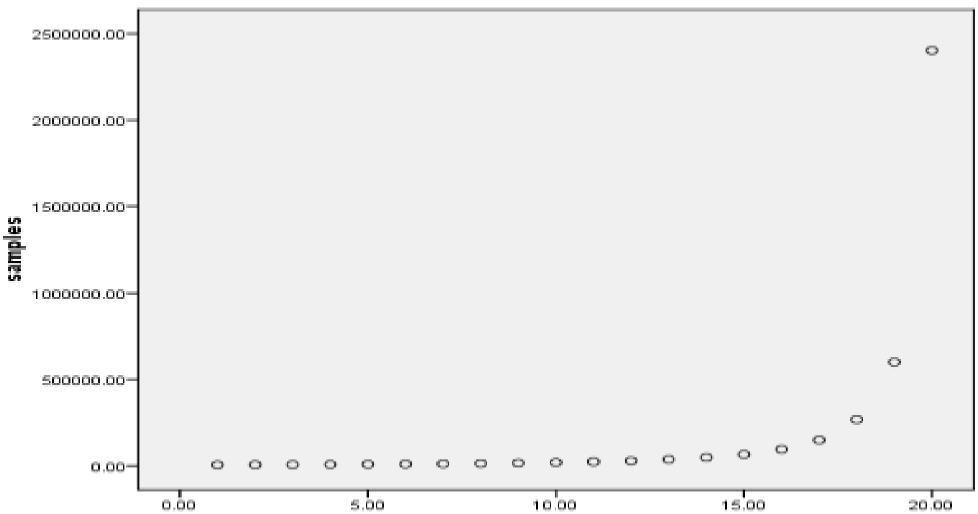

Fig (3-75): scatter diagram for sample sizes(n)

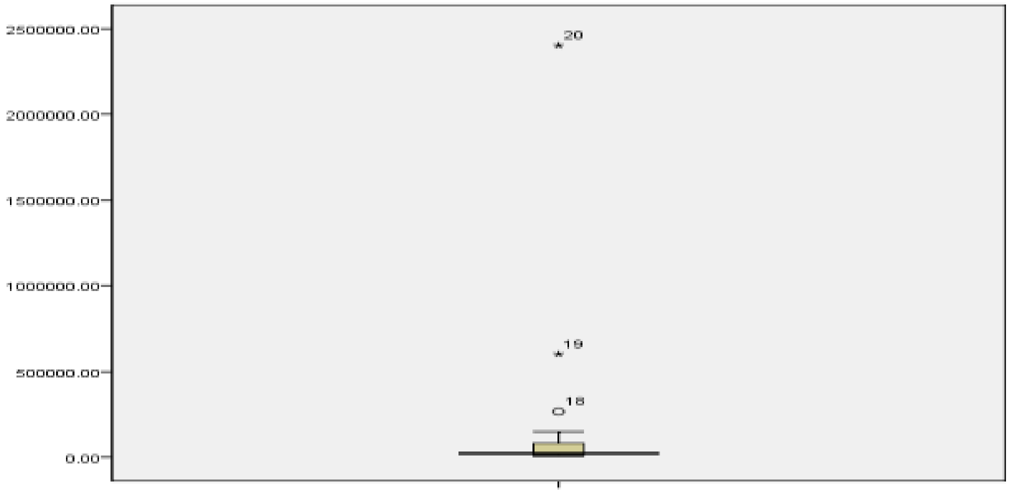

Fig (3-76): box plot for sample sizes(n)

From the tables (3-41, 3-42) we observe that, the sample sizes increases, as the standard error decrease.

From figures (3-73, 3-74, 3-75 and 3-76) we showed the scatter diagram and box plot is escalated ratio in all sample sizes generations with three out layer value, when the values of standard error is equal (0.001, 0.002, 0.003). The sample sizes obtained from test of two tails is greater than it from one tail**.**

Table (3-43): sapmple size determination for proportion $z_{\propto/2} = 1.76, p = 0.5$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.76	0.5	0.02	1936	1899.231	1
1.76	0.5	0.019	2145.152	2100.102	1.10576
1.76	0.5	0.018	2390.123	2334.33	1.22909
1.76	0.5	0.017	2679.585	2609.657	1.37406
1.76	0.5	0.016	3025	2936.181	1.54598
1.76	0.5	0.015	3441.778	3327.261	1.7519
1.76	0.5	0.014	3951.02	3800.848	2.00126
1.76	0.5	0.013	4582.249	4381.479	2.30698
1.76	0.5	0.012	5377.778	5103.332	2.68705
1.76	0.5	0.011	6400	6015.038	3.16709
1.76	0.5	0.01	7744	7187.407	3.78438
1.76	0.5	0.009	9560.494	8726.224	4.59461
1.76	0.5	0.008	12100	10793.93	5.68332
1.76	0.5	0.007	15804.08	13647.26	7.18568
1.76	0.5	0.006	21511.11	17703	9.32114
1.76	0.5	0.005	30976	23650.13	12.4525
1.76	0.5	0.004	48400	32614.56	17.1725
1.76	0.5	0.003	86044.44	46249.4	24.3516
1.76	0.5	0.002	193600	65940.05	34.7193
1.76	0.5	0.001	774400	88563.59	46.6313

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.08$, $z_{\propto/2} = 1.41$ Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

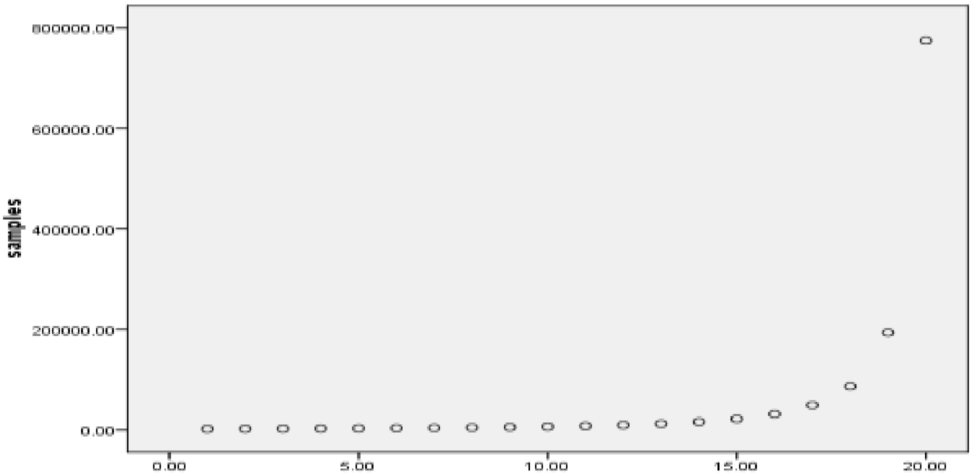

Fig (3-77): scatter diagram for sample sizes(n)

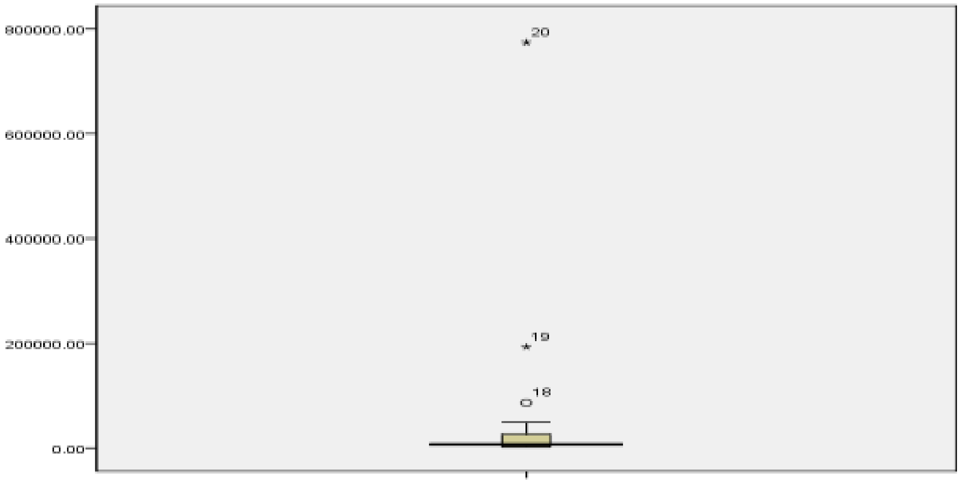

Fig (3-78): box plot for sample sizes(n)

Table (3-44): sapmple size determination for proportion $z_{\propto} = 1.41, p = 0.5$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.41	0.5	0.02	1242.563	1227.313	1
1.41	0.5	0.019	1376.801	1358.103	1.10657
1.41	0.5	0.018	1534.028	1510.851	1.23102
1.41	0.5	0.017	1719.81	1690.733	1.37759
1.41	0.5	0.016	1941.504	1904.528	1.55179
1.41	0.5	0.015	2209	2161.258	1.76097
1.41	0.5	0.014	2535.842	2473.127	2.01507
1.41	0.5	0.013	2940.976	2856.954	2.32781
1.41	0.5	0.012	3451.563	3336.405	2.71846
1.41	0.5	0.011	4107.645	3945.575	3.21481
1.41	0.5	0.01	4970.25	4734.913	3.85795
1.41	0.5	0.009	6136.111	5781.36	4.71058
1.41	0.5	0.008	7766.016	7206.368	5.87166
1.41	0.5	0.007	10143.37	9209.242	7.50358
1.41	0.5	0.006	13806.25	12131.36	9.88449
1.41	0.5	0.005	19881	16583.95	13.5124
1.41	0.5	0.004	31064.06	23701.43	19.3116
1.41	0.5	0.003	55225	35577.39	28.988
1.41	0.5	0.002	124256.3	55408.16	45.1459
1.41	0.5	0.001	497025	83250.28	67.8313

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.08$, $z_{\propto/2} = 3.32$ Proportion population (0.5), the value of the standard error is between (0.001 and 0.02) were used.

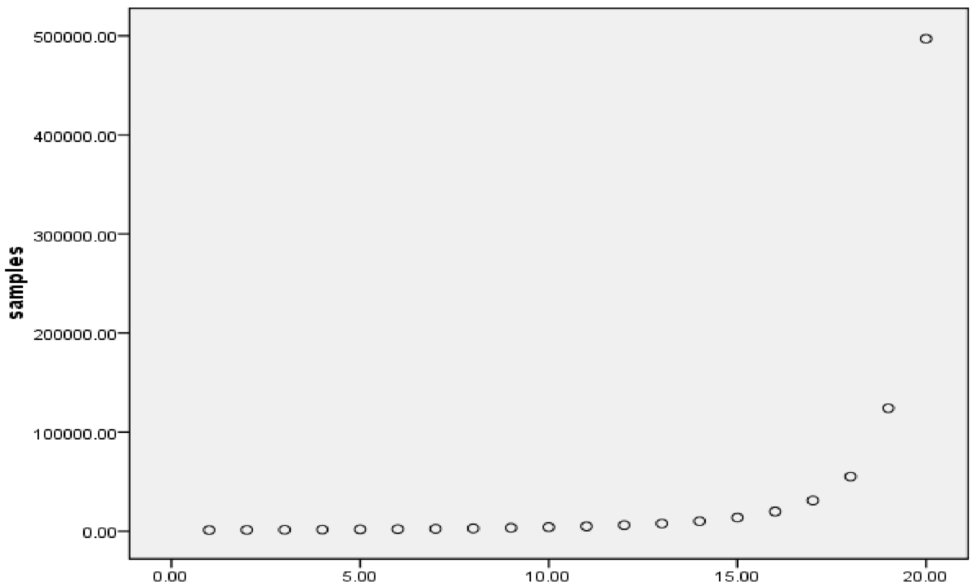

Fig (3-79): scatter diagram for sample sizes(n)

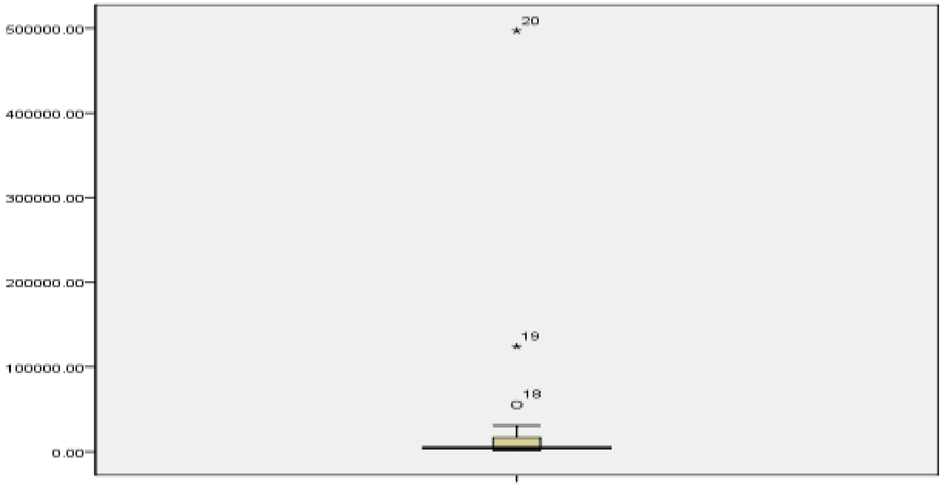

Fig (3-80): box plot for sample sizes(n)

From the tables (3-43, 3-44) we observe that, the sample sizes increases, as the standard error decrease.

From figures (3-77, 3-78, 3-79 and 3-80) we showed the scatter diagram and box plot is escalated ratio in all sample sizes generations with three out layer value, when the values of standard error is equal (0.001, 0.002, 0.003). The sample sizes obtained from test of two tails is greater than it from one tail**.**

Table (3-45): sapmple size determination for proportion $z_{\propto/2} = 1.96, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.96	0.5	0.02	2401.0	2344.704	1
1.96	0.48	0.02	2397.16	2341.041	0.9984
1.96	0.46	0.02	2385.63	2330.044	0.9936
1.96	0.44	0.02	2366.43	2311.725	0.9856
1.96	0.42	0.02	2339.53	2286.047	0.9744
1.96	0.4	0.02	2305	2253.067	0.96
1.96	0.38	0.02	2262.70	2212.635	0.9424
1.96	0.36	0.02	2212.76	2164.857	0.9216
1.96	0.34	0.02	2155.14	2109.674	0.8976
1.96	0.32	0.02	2089.83	2047.05	0.8704
1.96	0.3	0.02	2016.84	1976.968	0.84
1.96	0.28	0.02	1936.17	1899.394	0.8064
1.96	0.26	0.02	1847.80	1814.276	0.7696
1.96	0.24	0.02	1751.77	1721.611	0.7296
1.96	0.22	0.02	1648.05	1621.33	0.6864
1.96	0.2	0.02	1536.64	1513.385	0.64
1.96	0.18	0.02	1417.55	1397.736	0.5904
1.96	0.16	0.02	1290.75	1274.302	0.5376
1.96	0.14	0.02	1156.32	1143.102	0.4816
1.96	0.12	0.02	1014.2	1004.017	0.4224

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto= 0.05$, $z_{\propto/2} = 1.96$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

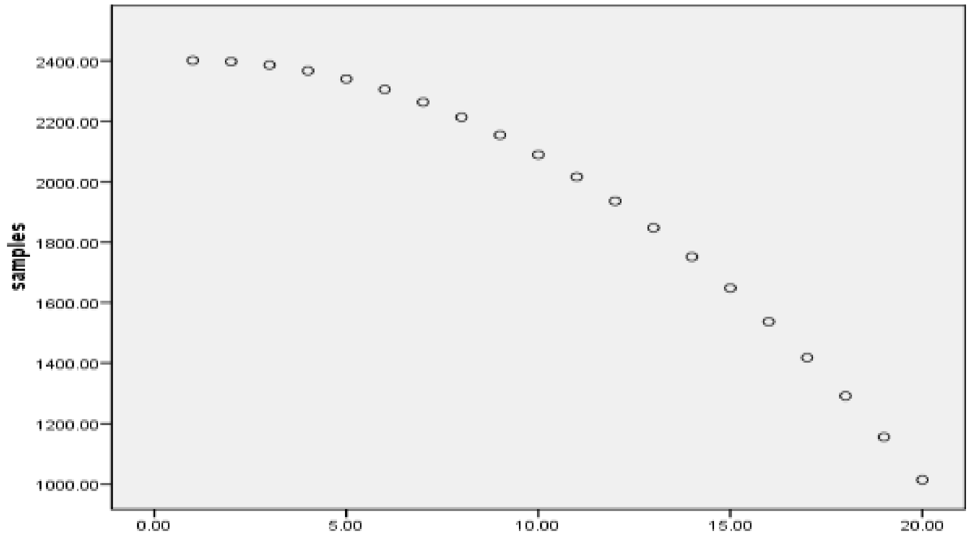

Fig (3-81): scatter diagram for sample sizes(n)

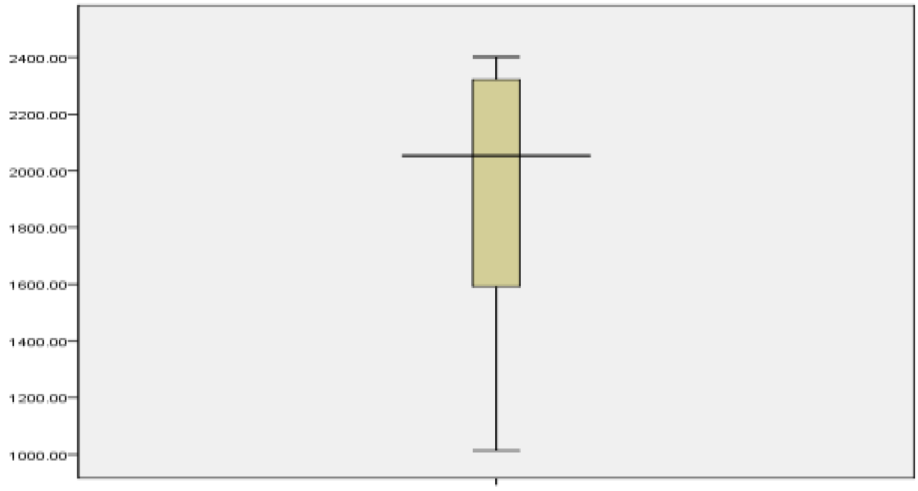

Fig (3-82): box plot for sample sizes(n)

Table (3-46): sapmple size determination for proportion $z_{\propto} = 1.64, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.64	0.5	0.02	1681	1653.21	1
1.64	0.48	0.02	1678.31	1650.608	0.99843
1.64	0.46	0.02	1670.242	1642.803	0.9937
1.64	0.44	0.02	1656.794	1629.792	0.98583
1.64	0.42	0.02	1637.966	1611.569	0.97481
1.64	0.4	0.02	1613.76	1588.131	0.96063
1.64	0.38	0.02	1584.174	1559.469	0.9433
1.64	0.36	0.02	1549.21	1525.576	0.9228
1.64	0.34	0.02	1508.866	1486.438	0.89912
1.64	0.32	0.02	1463.142	1442.043	0.87227
1.64	0.3	0.02	1412.04	1392.379	0.84223
1.64	0.28	0.02	1355.57	1337.44	0.809
1.64	0.26	0.02	1293.7	1277.177	0.77254
1.64	0.24	0.02	1226.46	1211.6	0.73288
1.64	0.22	0.02	1153.84	1140.678	0.68998
1.64	0.2	0.02	1075.84	1064.389	0.64383
1.64	0.18	0.02	992.46	982.707	0.59442
1.64	0.16	0.02	903.70	895.6064	0.54174
1.64	0.14	0.02	809.57	803.0686	0.48576
1.64	0.12	0.02	710.05	705.0438	0.42647

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.05$, $z_{\propto} = 1.64$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

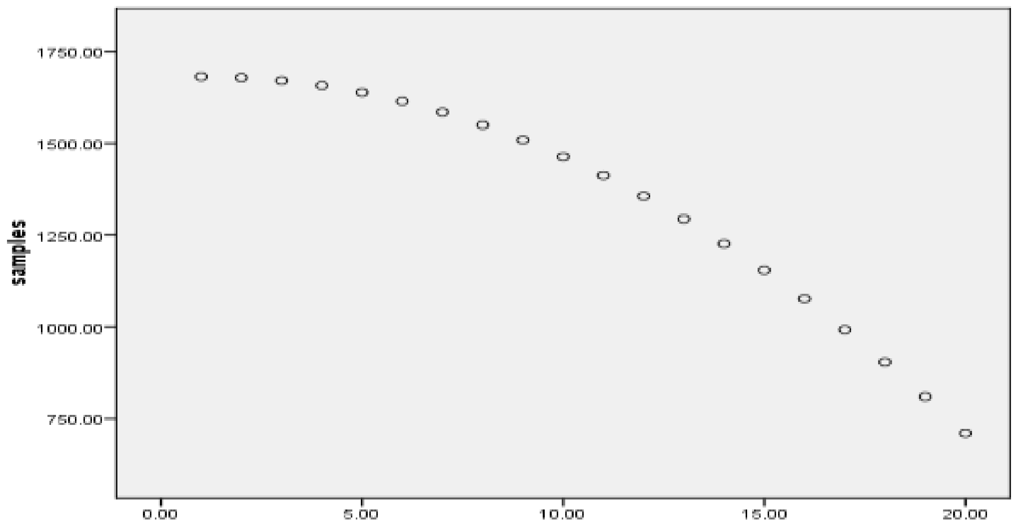

Fig (3-83): scatter diagram for sample sizes(n)

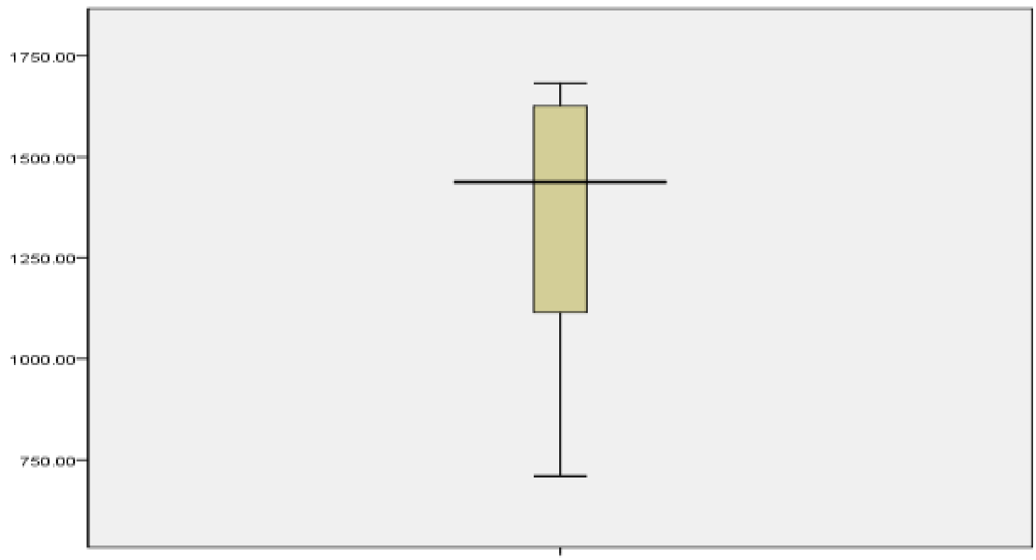

Fig (3-84): box plot for sample sizes(n)

From the tables (3-45, 3-46) we observe that, the sample sizes decreases, as the population proportion decrease.

From figures (3-81, 3-82, 3-83 and 3-84) we showed the scatter diagram and box plot is descending ratio in all sample sizes generation values. The sample sizes obtained from test of two tails is greater than it from one tail**.**

Table (3-47): sapmple size determination for proportion $z_{\propto/2} = 2.58, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
2.58	0.5	0.02	4160.25	3994.086	1
2.58	0.48	0.02	4153.594	3987.951	0.99846
2.58	0.46	0.02	4133.624	3969.538	0.99385
2.58	0.44	0.02	4100.342	3938.836	0.98617
2.58	0.42	0.02	4053.748	3895.821	0.9754
2.58	0.4	0.02	3993.84	3840.458	0.96154
2.58	0.38	0.02	3920.62	3772.707	0.94457
2.58	0.36	0.02	3834.086	3692.512	0.92449
2.58	0.34	0.02	3734.24	3599.814	0.90129
2.58	0.32	0.02	3621.082	3494.542	0.87493
2.58	0.3	0.02	3494.61	3376.611	0.8454
2.58	0.28	0.02	3354.826	3245.931	0.81268
2.58	0.26	0.02	3201.73	3102.4	0.77675
2.58	0.24	0.02	3035.32	2945.902	0.73757
2.58	0.22	0.02	2855.60	2776.319	0.69511
2.58	0.2	0.02	2662.56	2593.506	0.64934
2.58	0.18	0.02	2456.212	2397.329	0.60022
2.58	0.16	0.02	2236.55	2187.623	0.54772
2.58	0.14	0.02	2003.58	1964.225	0.49178
2.58	0.12	0.02	1757.30	1726.952	0.43238

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.01$, $z_{\propto/2} = 2.58$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

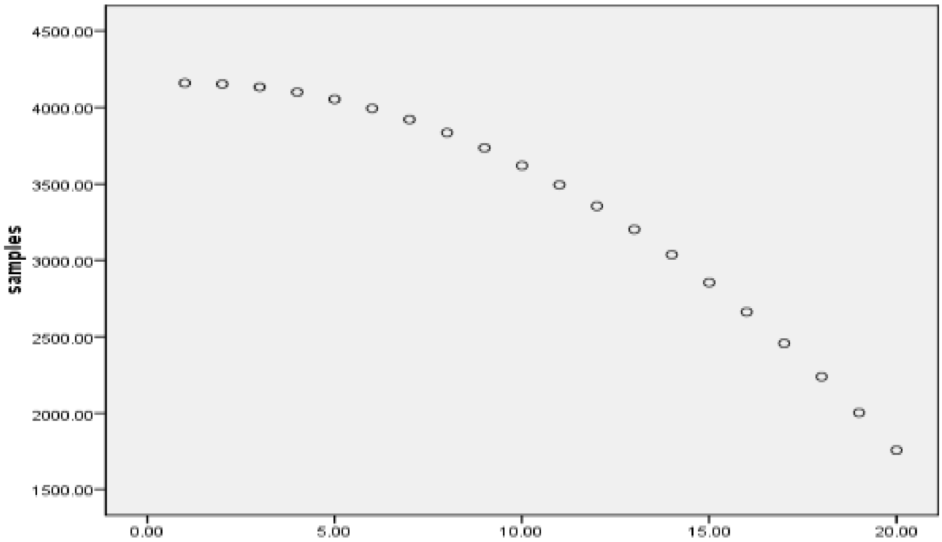

Fig (3-85): scatter diagram for sample sizes(n)

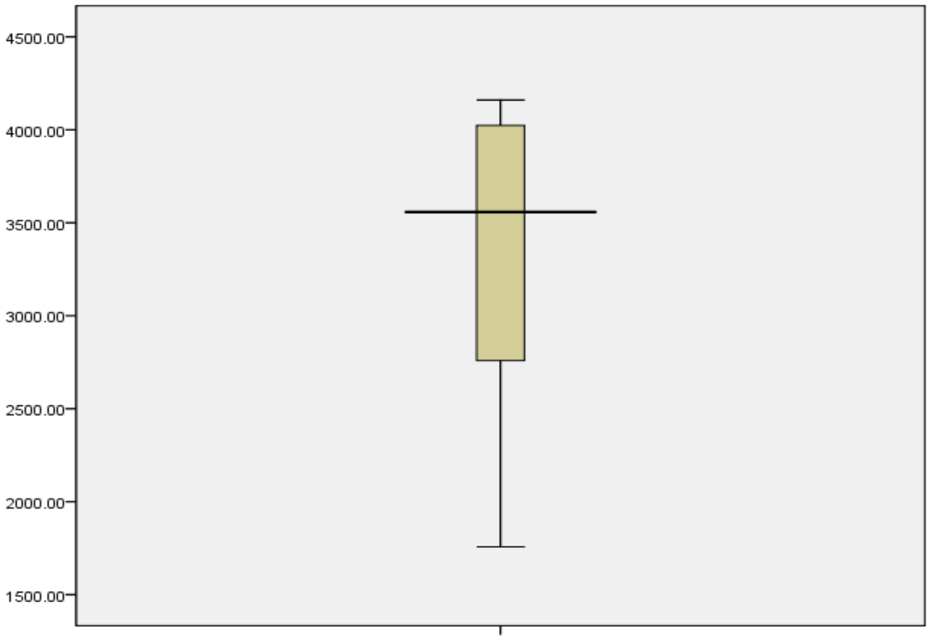

Fig (3-86): box plot for sample sizes(n)

Table (3-48): sapmple size determination for proportion $z_{\propto} = 2.33, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
2.33	0.5	0.02	3393.06	3281.71	1
2.33	0.48	0.02	3387.64	3276.639	0.99845
2.33	0.46	0.02	3371.35	3261.397	0.99381
2.33	0.44	0.02	3344.20	3235.982	0.98607
2.33	0.42	0.02	3306.2	3200.389	0.97522
2.33	0.4	0.02	3257.34	3154.584	0.96126
2.33	0.38	0.02	3197.622	3098.542	0.94419
2.33	0.36	0.02	3127.046	3032.227	0.92398
2.33	0.34	0.02	3045.613	2955.597	0.90063
2.33	0.32	0.02	2953.322	2868.603	0.87412
2.33	0.3	0.02	2850.173	2771.189	0.84443
2.33	0.28	0.02	2736.166	2663.294	0.81156
2.33	0.26	0.02	2611.301	2544.847	0.77546
2.33	0.24	0.02	2475.58	2415.776	0.73613
2.33	0.22	0.02	2328.99	2275.983	0.69354
2.33	0.2	0.02	2171.56	2125.406	0.64765
2.33	0.18	0.02	2003.26	1963.918	0.59844
2.33	0.16	0.02	1824.11	1791.432	0.54588
2.33	0.14	0.02	1634.099	1607.826	0.48994
2.33	0.12	0.02	1433.23	1412.979	0.43056

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.01$, $z_{\propto} = 2.33$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

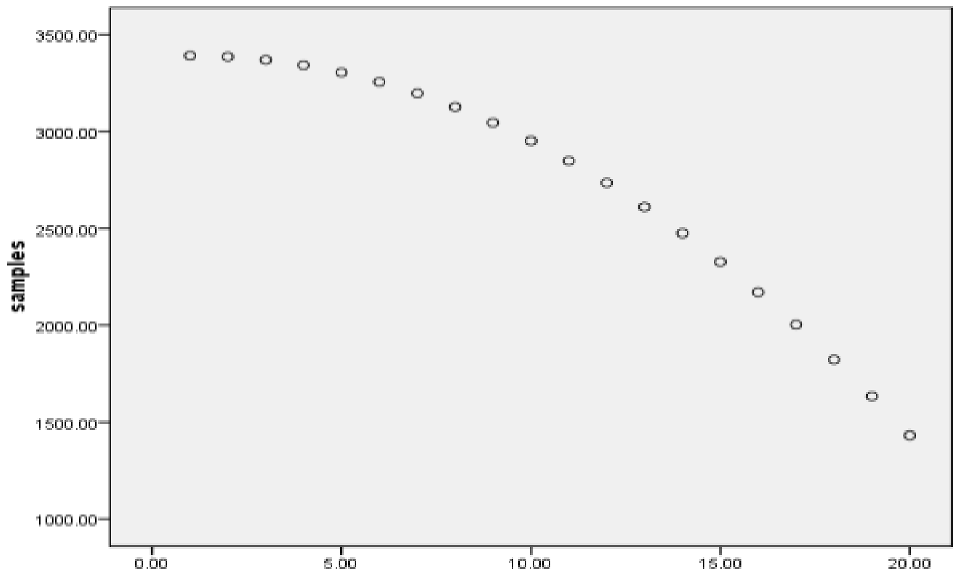

Fig (3-87): scatter diagram for sample sizes(n)

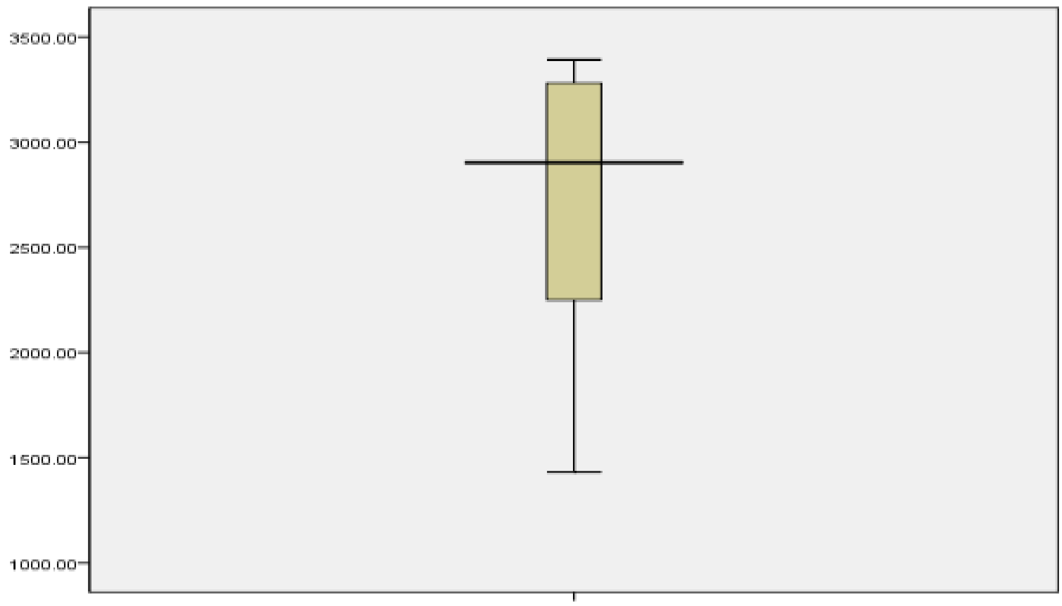

Fig (3-88): box plot for sample sizes(n)

From the tables (3-47, 3-48) we observe that, the sample sizes decreases, as the population proportion decrease. The sample sizes obtained from test of two tails is greater than it from one tail**.**

From figures (3-85, 3-86, 3-87 and 3-88) we showed the scatter diagram and box plot is descending ratio in all sample sizes generation values

Table (3-49): sapmple size determination for proportion $z_{\propto/2} = 2.17, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
2.17	0.5	0.02	2943.063	2858.92	1
2.17	0.48	0.02	2938.354	2854.48	0.99845
2.17	0.46	0.02	2924.227	2841.15	0.99378
2.17	0.44	0.02	2900.682	2818.91	0.98601
2.17	0.42	0.02	2867.72	2787.77	0.97511
2.17	0.4	0.02	2825.34	2747.71	0.9611
2.17	0.38	0.02	2773.542	2698.69	0.94395
2.17	0.36	0.02	2712.326	2640.7	0.92367
2.17	0.34	0.02	2641.693	2573.7	0.90024
2.17	0.32	0.02	2561.642	2497.66	0.87364
2.17	0.3	0.02	2472.173	2412.53	0.84386
2.17	0.28	0.02	2373.286	2318.27	0.81089
2.17	0.26	0.02	2264.981	2214.82	0.77471
2.17	0.24	0.02	2147.258	2102.12	0.73528
2.17	0.22	0.02	2020.118	1980.12	0.69261
2.17	0.2	0.02	1883.56	1848.74	0.64666
2.17	0.18	0.02	1737.584	1707.91	0.5974
2.17	0.16	0.02	1582.19	1557.55	0.5448
2.17	0.14	0.02	1417.379	1397.57	0.48885
2.17	0.12	0.02	1243.15	1227.89	0.42949

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.08$, $z_{\propto/2} = 2.17$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

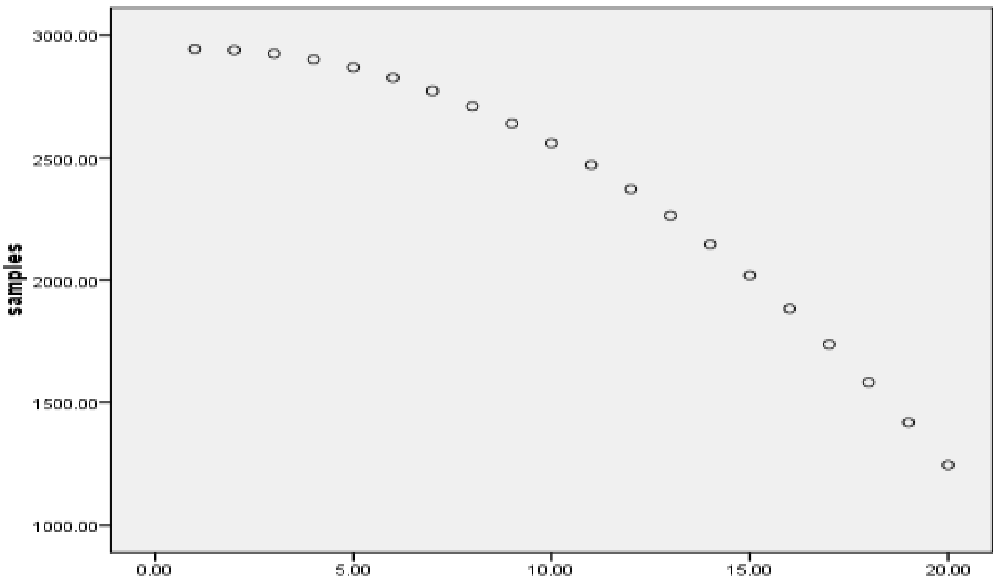

Fig (3-89): scatter diagram for sample sizes(n)

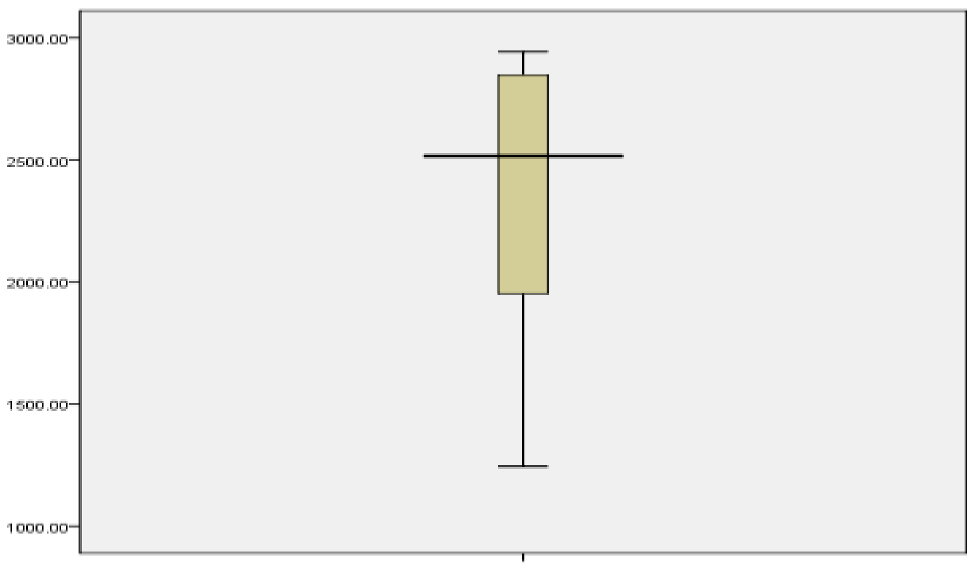

Fig (3-90): box plot for sample sizes(n)

Table (3-50): sapmple size determination for proportion $z_{\propto} = 1.9, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.9	0.5	0.02	2256.25	2206.47	1
1.9	0.48	0.02	2252.64	2203.01	0.9984
1.9	0.46	0.02	2241.81	2192.65	0.9936
1.9	0.44	0.02	2223.76	2175.38	0.9856
1.9	0.42	0.02	2198.49	2151.2	0.9744
1.9	0.4	0.02	2166	2120.08	0.96
1.9	0.38	0.02	2126.29	2082.02	0.9424
1.9	0.36	0.02	2079.36	2037	0.9216
1.9	0.34	0.02	2025.21	1985.01	0.8976
1.9	0.32	0.02	1963.84	1926.02	0.8704
1.9	0.3	0.02	1895.25	1860	0.84
1.9	0.28	0.02	1819.44	1786.93	0.8064
1.9	0.26	0.02	1736.41	1706.77	0.7696
1.9	0.24	0.02	1646.16	1619.5	0.7296
1.9	0.22	0.02	1548.69	1525.07	0.6864
1.9	0.2	0.02	1444	1423.45	0.64
1.9	0.18	0.02	1332.09	1314.58	0.5904
1.9	0.16	0.02	1212.96	1198.42	0.5376
1.9	0.14	0.02	1086.61	1074.93	0.4816
1.9	0.12	0.02	953.04	944.043	0.4224

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.08$, $z_{\propto} = 1.9$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

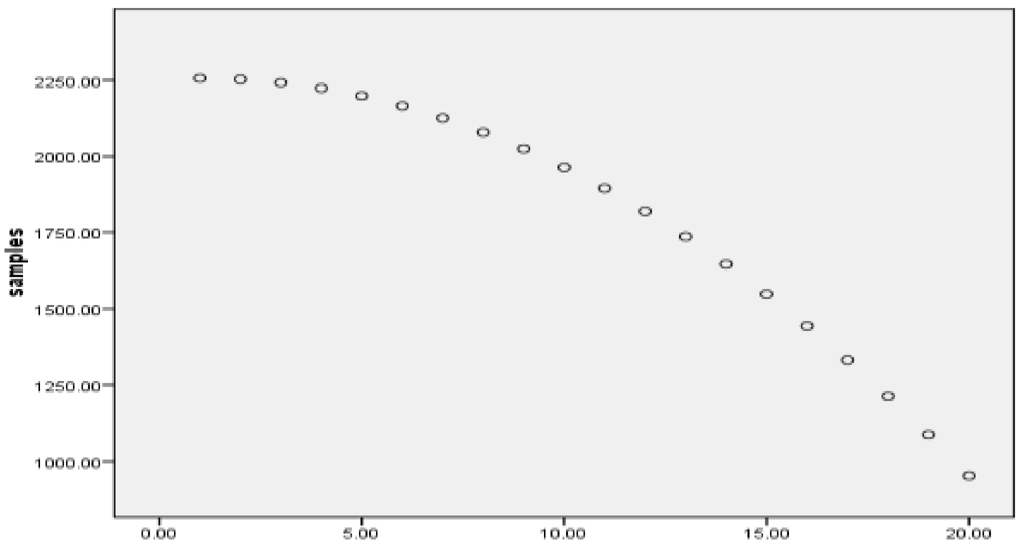

Fig (3-91): scatter diagram for sample sizes(n)

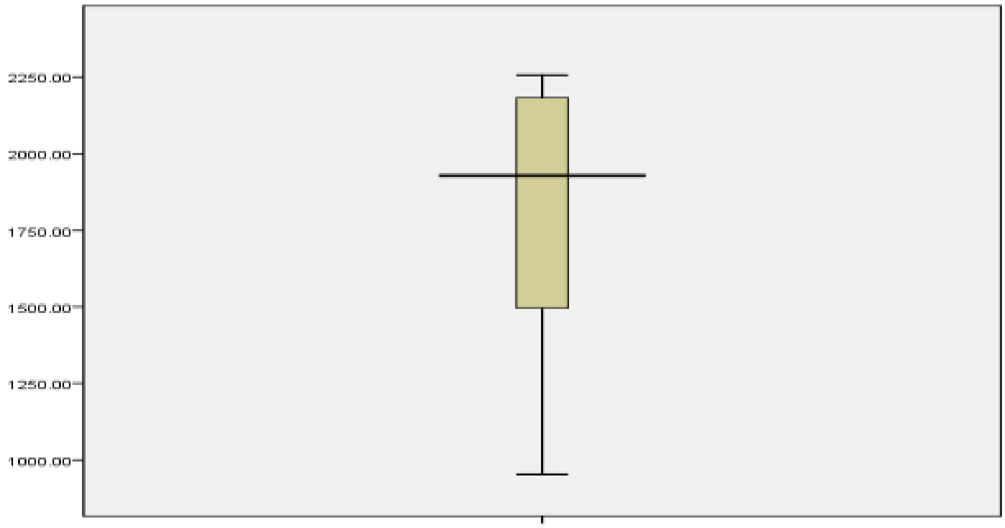

Fig (3-92): box plot for sample sizes(n)

From the tables (3-49, 3-50) we observe that, the sample sizes decreases, as the population proportion decrease. The sample sizes obtained from test of two tails is greater than it from one tail**.**

From figures (3-89, 3-90, 3-91 and 3-92) we showed the scatter diagram and box plot is descending ratio in all sample sizes generation values

Table (3-51): sapmple size determination for proportion $z_{\propto/2} = 3.32, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
3.32	0.5	0.02	6889	6445	1
3.32	0.48	0.02	6877.978	6435.36	0.9984
3.32	0.46	0.02	6844.91	6406.4	0.9936
3.32	0.44	0.02	6789.798	6358.1	0.9856
3.32	0.42	0.02	6712.642	6290.39	0.9744
3.32	0.4	0.02	6613.44	6203.2	0.96
3.32	0.38	0.02	6492.194	6096.4	0.9424
3.32	0.36	0.02	6348.902	5969.88	0.9216
3.32	0.34	0.02	6183.566	5823.47	0.8976
3.32	0.32	0.02	5996.186	5656.98	0.8704
3.32	0.3	0.02	5786.76	5470.21	0.84
3.32	0.28	0.02	5555.29	5262.92	0.8064
3.32	0.26	0.02	5301.774	5034.84	0.7696
3.32	0.24	0.02	5026.214	4785.68	0.7296
3.32	0.22	0.02	4728.61	4515.11	0.6864
3.32	0.2	0.02	4408.96	4222.78	0.64
3.32	0.18	0.02	4067.266	3908.3	0.5904
3.32	0.16	0.02	3703.526	3571.26	0.5376
3.32	0.14	0.02	3317.742	3211.2	0.4816
3.32	0.12	0.02	2909.914	2827.63	0.4224

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.001$, $z_{\propto/2} = 3.32$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

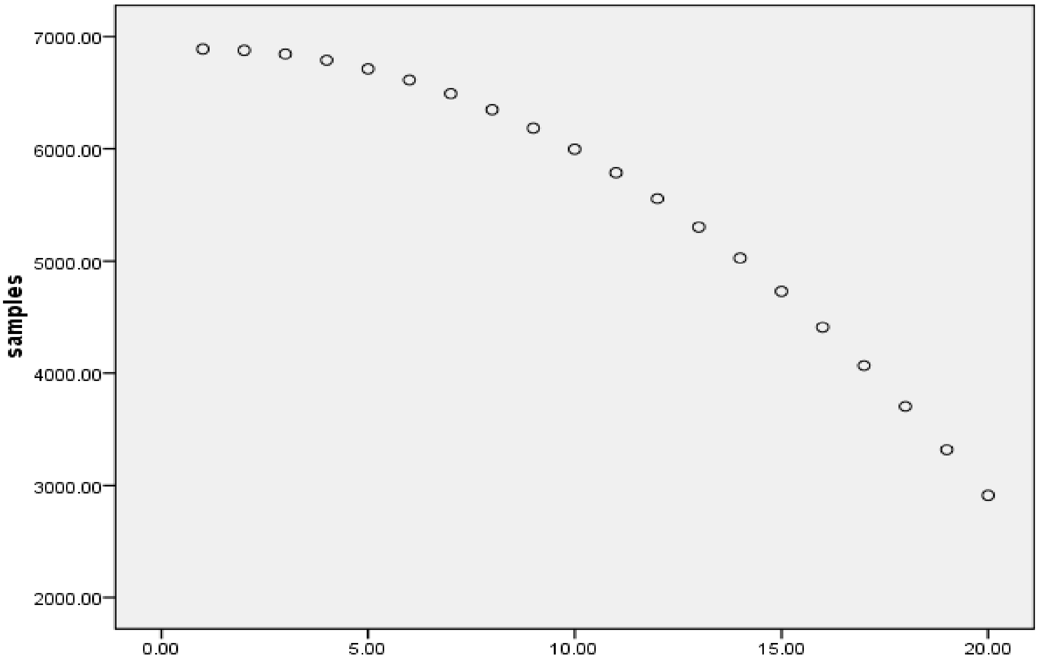

Fig (3-93): scatter diagram for sample sizes(n)

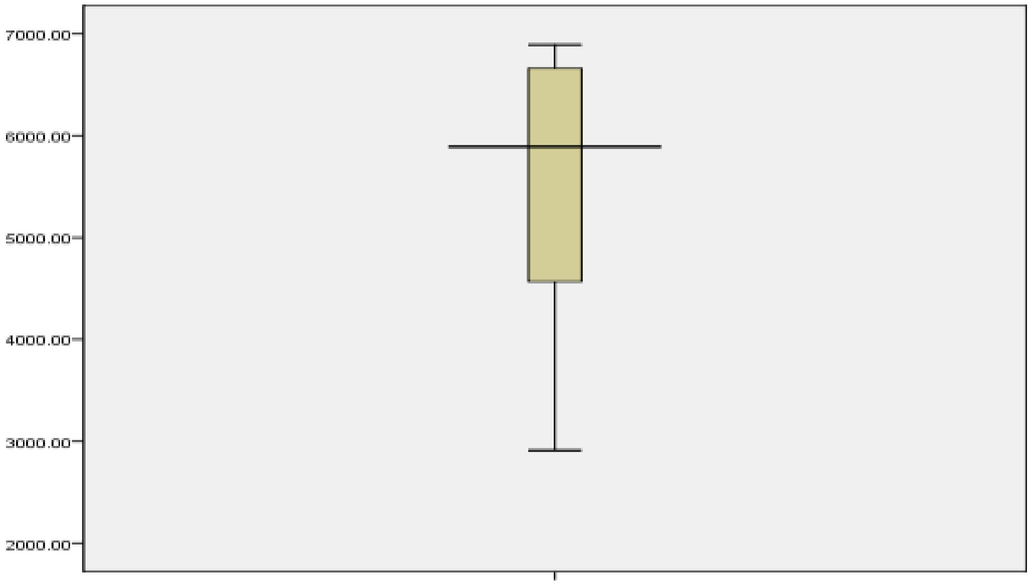

Fig (3-94): box plot for sample sizes(n)

Table (3-52): sapmple size determination for proportion $z_{\propto} = 3.1, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
3.1	0.5	0.02	6006.25	5666	1
3.1	0.48	0.02	5996.64	5657	0.9984
3.1	0.46	0.02	5967.81	5632	0.9936
3.1	0.44	0.02	5919.76	5589	0.9856
3.1	0.42	0.02	5852.49	5529	0.9744
3.1	0.4	0.02	5766	5452	0.96
3.1	0.38	0.02	5660.29	5357	0.9424
3.1	0.36	0.02	5535.36	5245	0.9216
3.1	0.34	0.02	5391.21	5115	0.8976
3.1	0.32	0.02	5227.84	4968	0.8704
3.1	0.3	0.02	5045.25	4803	0.84
3.1	0.28	0.02	4843.44	4620	0.8064
3.1	0.26	0.02	4622.41	4418	0.7696
3.1	0.24	0.02	4382.16	4198	0.7296
3.1	0.22	0.02	4122.69	3959	0.6864
3.1	0.2	0.02	3844	3702	0.64
3.1	0.18	0.02	3546.09	3425	0.5904
3.1	0.16	0.02	3228.96	3128	0.5376
3.1	0.14	0.02	2892.61	2811	0.4816
3.1	0.12	0.02	2537.04	2474	0.4224

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.001$, $z_{\propto/2} = 3.1$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

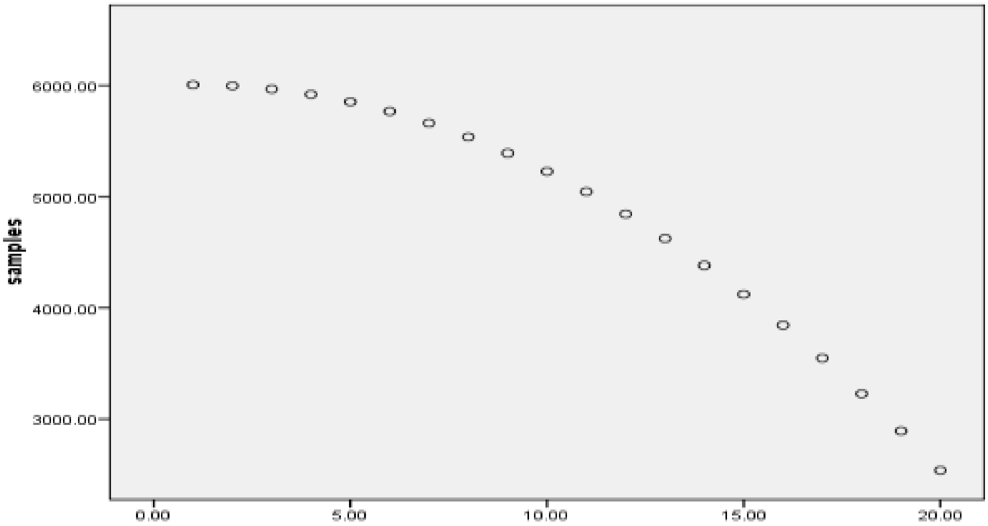

Fig (3-95): scatter diagram for sample sizes(n)

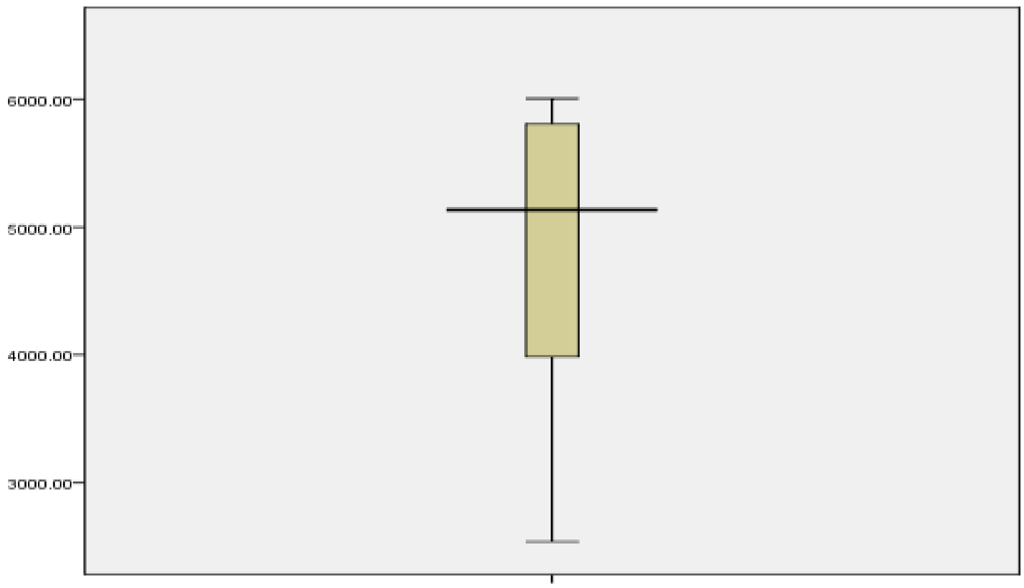

Fig (3-96): box plot for sample sizes(n)

From the tables (4-51, 4-52) we observe that, the sample sizes decreases, as the population proportion decrease. The sample sizes obtained from test of two tails is greater than it from one tail**.**

From figures (4-93, 4-94, 4-95 and 4-96) we showed the scatter diagram and box plot is descending ratio in all sample sizes generation values.

Table (4-53): sapmple size determination for proportion $z_{\propto/2} = 1.76, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.76	0.5	0.02	1936	1899.23	1
1.76	0.48	0.02	1932.902	1896.25	0.9984
1.76	0.46	0.02	1923.61	1887.31	0.9936
1.76	0.44	0.02	1908.122	1872.39	0.9856
1.76	0.42	0.02	1886.438	1851.51	0.9744
1.76	0.4	0.02	1858.56	1824.65	0.96
1.76	0.38	0.02	1824.486	1791.79	0.9424
1.76	0.36	0.02	1784.218	1752.94	0.9216
1.76	0.34	0.02	1737.754	1708.07	0.8976
1.76	0.32	0.02	1685.094	1657.17	0.8704
1.76	0.3	0.02	1626.24	1600.22	0.84
1.76	0.28	0.02	1561.19	1537.19	0.8064
1.76	0.26	0.02	1489.946	1468.07	0.7696
1.76	0.24	0.02	1412.506	1392.83	0.7296
1.76	0.22	0.02	1328.87	1311.44	0.6864
1.76	0.2	0.02	1239.04	1223.88	0.64
1.76	0.18	0.02	1143.014	1130.1	0.5904
1.76	0.16	0.02	1040.794	1030.07	0.5376
1.76	0.14	0.02	932.3776	923.765	0.4816
1.76	0.12	0.02	817.7664	811.133	0.4224

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.08$, $z_{\propto/2} = 1.76$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

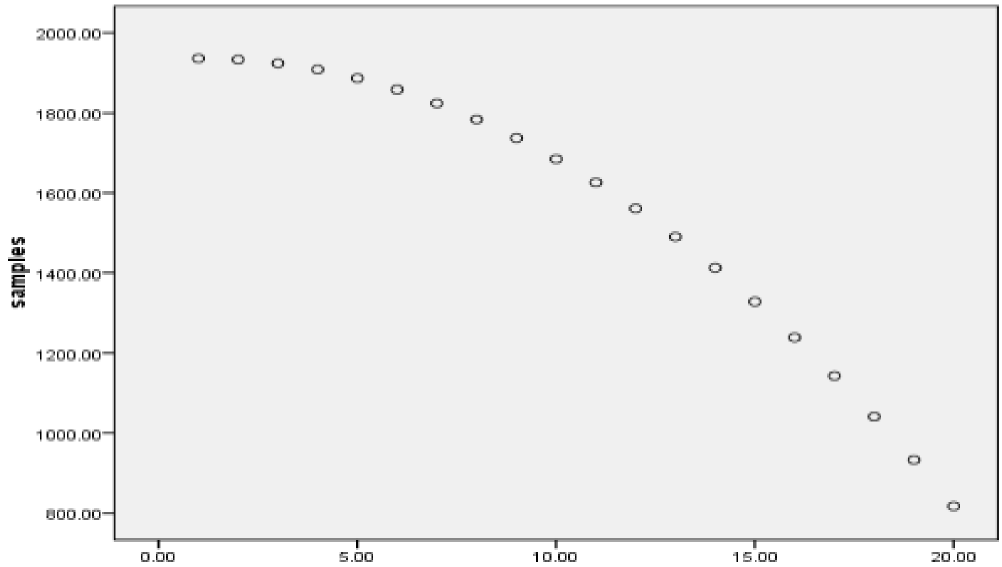

Fig (4-97): scatter diagram for sample sizes(n)

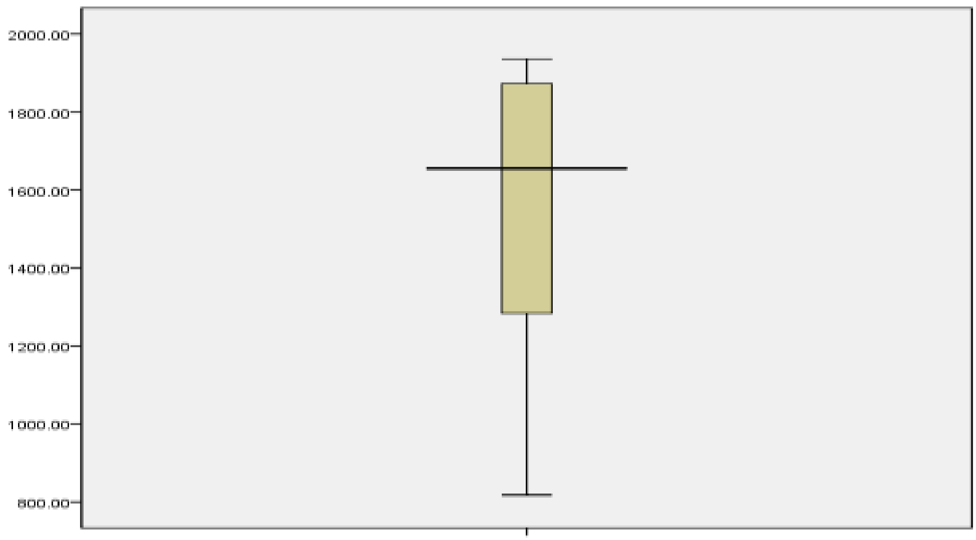

Fig (4-98): box plot for sample sizes(n)

Table (4-54): sapmple size determination for proportion $z_{\propto} = 1.41, e = 0.02$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.41	0.5	0.02	1242.563	1227.31	1
1.41	0.48	0.02	1240.574	1225.37	0.9984
1.41	0.46	0.02	1234.61	1219.55	0.9936
1.41	0.44	0.02	1224.67	1209.85	0.9856
1.41	0.42	0.02	1210.753	1196.27	0.9744
1.41	0.4	0.02	1192.86	1178.8	0.96
1.41	0.38	0.02	1170.991	1157.44	0.9424
1.41	0.36	0.02	1145.146	1132.18	0.9216
1.41	0.34	0.02	1115.324	1103.02	0.8976
1.41	0.32	0.02	1081.526	1069.95	0.8704
1.41	0.3	0.02	1043.753	1032.97	0.84
1.41	0.28	0.02	1002.002	992.062	0.8064
1.41	0.26	0.02	956.2761	947.218	0.7696
1.41	0.24	0.02	906.5736	898.429	0.7296
1.41	0.22	0.02	852.8949	845.682	0.6864
1.41	0.2	0.02	795.24	788.966	0.64
1.41	0.18	0.02	733.6089	728.266	0.5904
1.41	0.16	0.02	668.0016	663.569	0.5376
1.41	0.14	0.02	598.4181	594.858	0.4816
1.41	0.12	0.02	524.8584	522.118	0.4224

Z-test value was used on level significant from one tail $\propto = 0.08$, $z_{\propto} = 1.76$ Proportion population between (0.5 - 0.12), the value of the standard error is (0.02) were used.

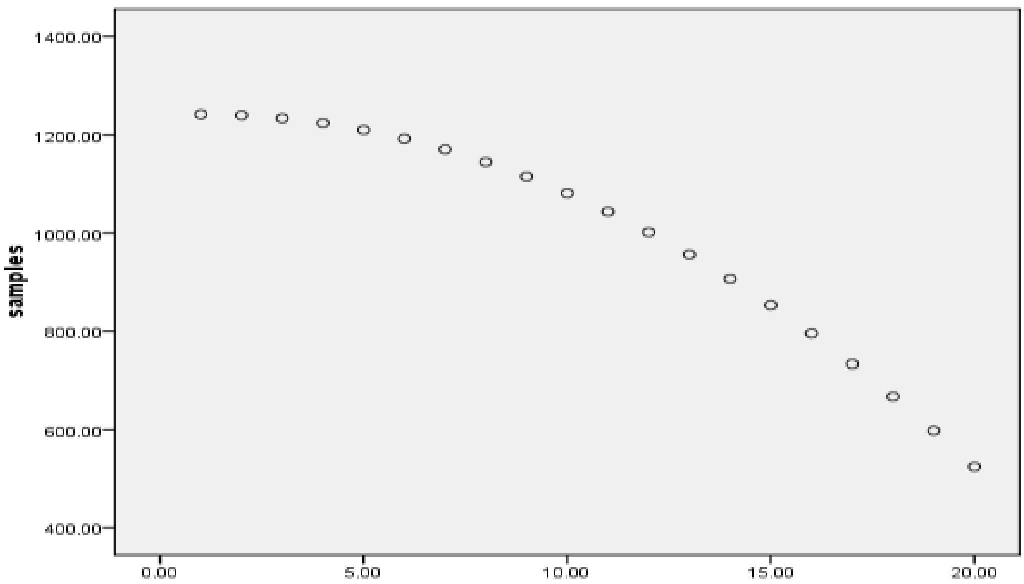

Fig (4-99): scatter diagram for sample sizes(n)

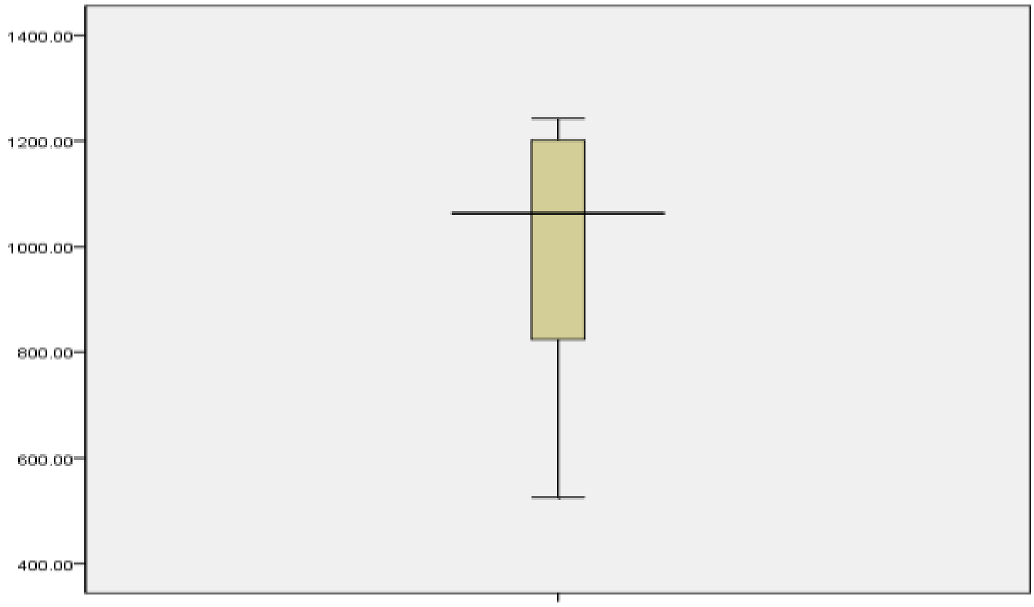

Fig (3-100): box plot for sample sizes(n)

From the tables (3-53, 3-54) we observe that, the sample sizes decreases, as the population proportion decrease. The sample sizes obtained from test of two tails is greater than it from one tail**.**

From figures (3-97, 3-98, 3-99 and 3-100) we showed the scatter diagram and box plot is descending ratio in all sample sizes generation values.

Table (4-55): sapmple size determination for variance $z_{\propto/2} = 1.96, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.96	0.5	0.02	2401	2344.7	1
1.96	0.48	0.019	2656.131	2587.41	1.10626
1.96	0.46	0.018	2945.227	2860.97	1.226667
1.96	0.44	0.017	3275.33	3171.45	1.364152
1.96	0.42	0.016	3655.523	3526.61	1.5225
1.96	0.4	0.015	4097.707	3936.4	1.706667
1.96	0.38	0.014	4617.76	4413.94	1.923265
1.96	0.36	0.013	5237.306	4976.66	2.181302
1.96	0.34	0.012	5986.493	5648.35	2.493333
1.96	0.32	0.011	6908.53	6462.09	2.877355
1.96	0.3	0.01	8067.36	7465.12	3.36
1.96	0.28	0.009	9561.316	8726.91	3.982222
1.96	0.26	0.008	11548.81	10353.1	4.81
1.96	0.24	0.007	14300.16	12511.1	5.955918
1.96	0.22	0.006	18311.63	15477.5	7.626667
1.96	0.2	0.005	24586.24	19734.3	10.24
1.96	0.18	0.004	35438.76	26165.9	14.76
1.96	0.16	0.003	57367.89	36454.6	23.89333
1.96	0.14	0.002	115632.2	53624.7	48.16
1.96	0.12	0.001	405673	80224.4	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.05$, $z_{\propto/2} = 1.96$ Proportion population between (0.5 - 0.12), the value of the standard error between (0.02-0.001) were used.

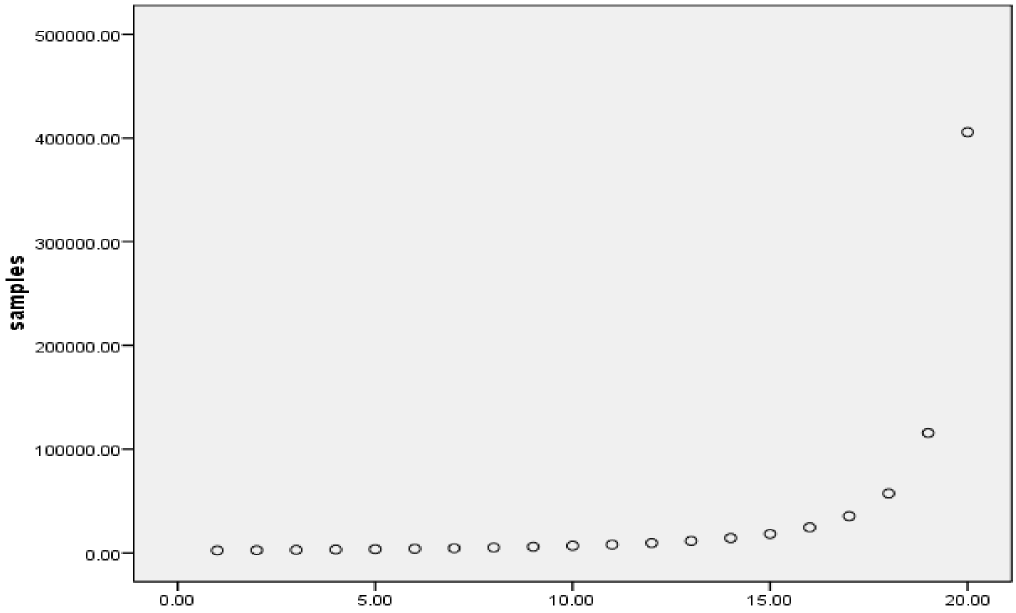

Fig (4-101): scatter diagram for sample sizes(n)

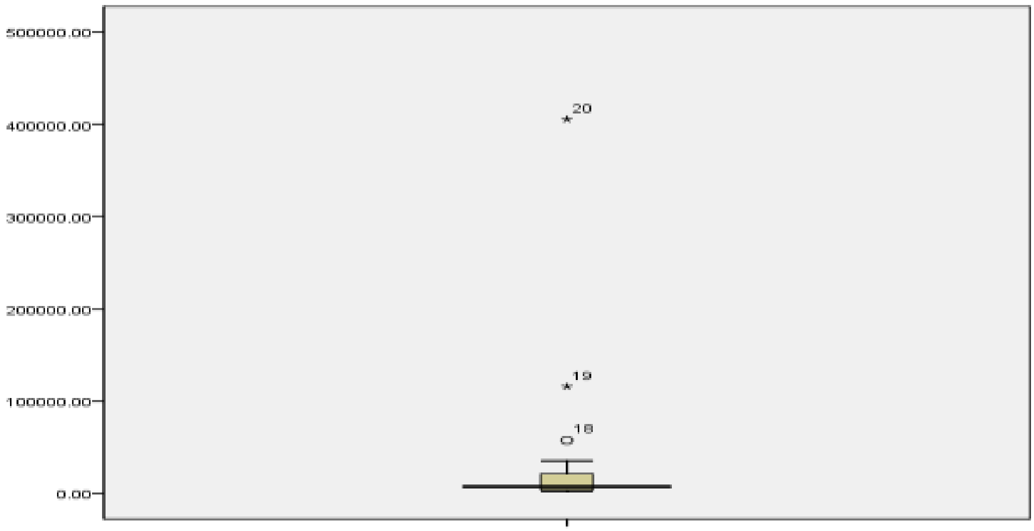

Fig (4-102): box plot for sample sizes(n)

Table (3-56): sapmple size determination for variance $z_{\propto} = 1.64, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.64	0.5	0.02	1681	1653.21	1
1.64	0.48	0.019	1859.624	1825.67	1.10626
1.64	0.46	0.018	2062.027	2020.37	1.226667
1.64	0.44	0.017	2293.14	2241.73	1.364152
1.64	0.42	0.016	2559.323	2495.46	1.5225
1.64	0.4	0.015	2868.907	2788.9	1.706667
1.64	0.38	0.014	3233.009	3131.76	1.923265
1.64	0.36	0.013	3666.768	3537.07	2.181302
1.64	0.34	0.012	4191.293	4022.69	2.493333
1.64	0.32	0.011	4836.834	4613.68	2.877355
1.64	0.3	0.01	5648.16	5346.2	3.36
1.64	0.28	0.009	6694.116	6274.12	3.982222
1.64	0.26	0.008	8085.61	7480.75	4.81
1.64	0.24	0.007	10011.9	9100.74	5.955918
1.64	0.22	0.006	12820.43	11363.6	7.626667
1.64	0.2	0.005	17213.44	14685.6	10.24
1.64	0.18	0.004	24811.56	19879.2	14.76
1.64	0.16	0.003	40164.69	28655.4	23.89333
1.64	0.14	0.002	80956.96	44738.2	48.16
1.64	0.12	0.001	284021.8	73959.8	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.05$, $z_{\propto} = 1.64$ Proportion population between (0.5 - 0.12), the value of the standard error is between (0.001 -0.02) were used.

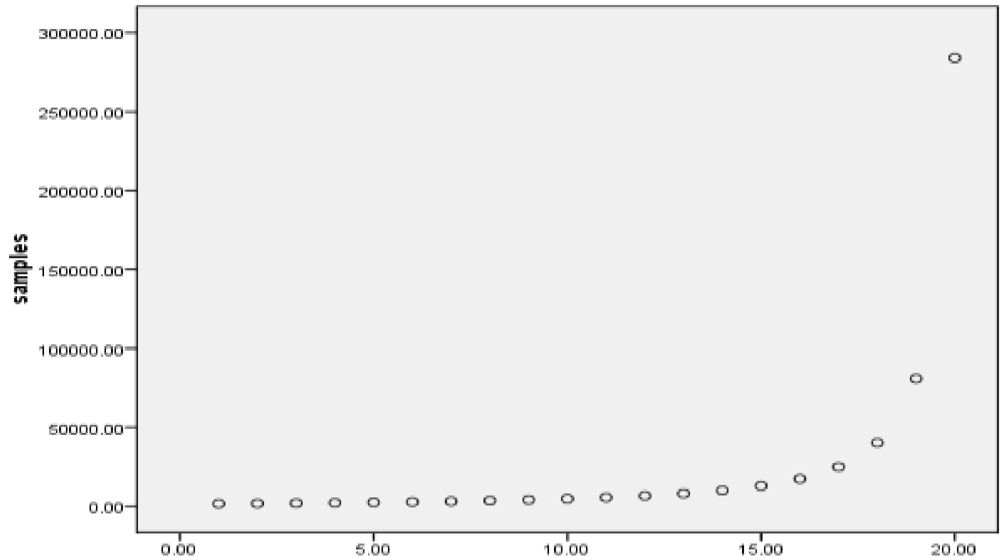

Fig (4-103): scatter diagram for sample sizes(n)

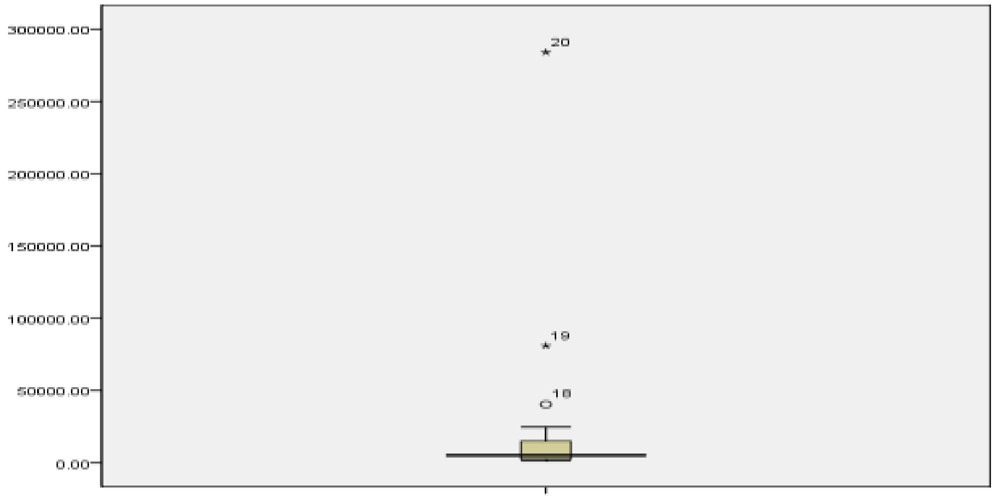

Fig (4-104): box plot for sample sizes(n)

From the tables (3-55, 3-56) we observe that, the sample sizes increases, as the standard error increases if the population proportion decrease. The sample sizes obtained from test of two tails is greater than it from one tail**.**
From figures (3-101, 3-102, 3-103 and 3-104) we showed the scatter diagram and box plot is descending ratio in all sample sizes generation values.

Table (3-57): sapmple size determination for variance $z_{\propto/2} = 2.58, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
2.58	0.5	0.02	4160.25	3994.09	1
2.58	0.48	0.019	4602.32	4399.83	1.10626
2.58	0.46	0.018	5103.24	4855.45	1.226667
2.58	0.44	0.017	5675.214	5370.43	1.364152
2.58	0.42	0.016	6333.981	5956.69	1.5225
2.58	0.4	0.015	7100.16	6629.46	1.706667
2.58	0.38	0.014	8001.264	7408.49	1.923265
2.58	0.36	0.013	9074.761	8319.76	2.181302
2.58	0.34	0.012	10372.89	9398.04	2.493333
2.58	0.32	0.011	11970.52	10690.8	2.877355
2.58	0.3	0.01	13978.44	12264.1	3.36
2.58	0.28	0.009	16567.04	14212.5	3.982222
2.58	0.26	0.008	20010.8	16674.2	4.81
2.58	0.24	0.007	24778.11	19857.7	5.955918
2.58	0.22	0.006	31728.84	24086.5	7.626667
2.58	0.2	0.005	42600.96	29874.2	10.24
2.58	0.18	0.004	61405.29	38044.2	14.76
2.58	0.16	0.003	99402.24	49850.1	23.89333
2.58	0.14	0.002	200357.6	66706.4	48.16
2.58	0.12	0.001	702915.8	87545.4	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.01$, $z_{\propto} = 2.58$ Proportion population between (0.5 - 0.12), the value of the standard error is between (0.001 -0.02) were used.

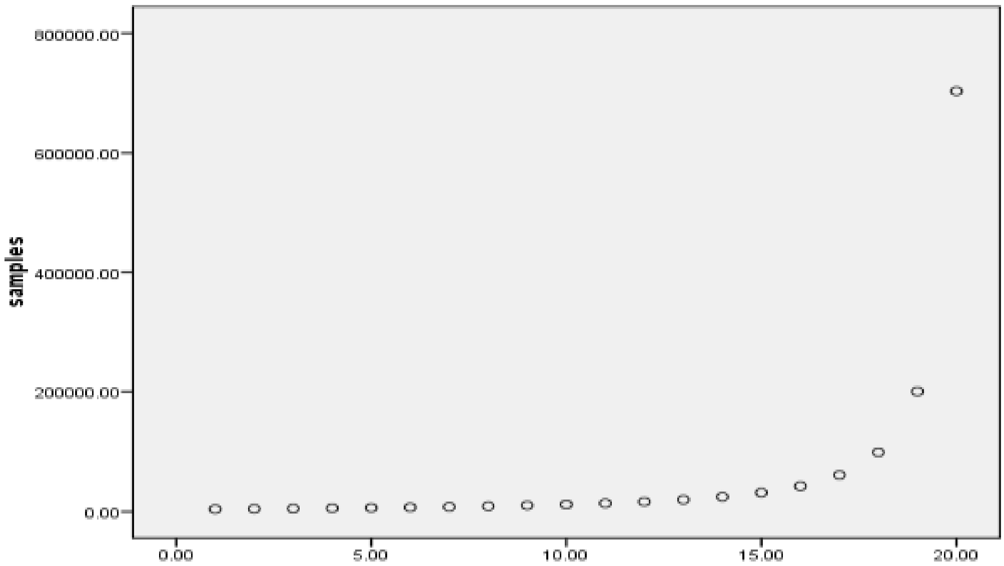

Fig (4-105): scatter diagram for sample sizes(n)

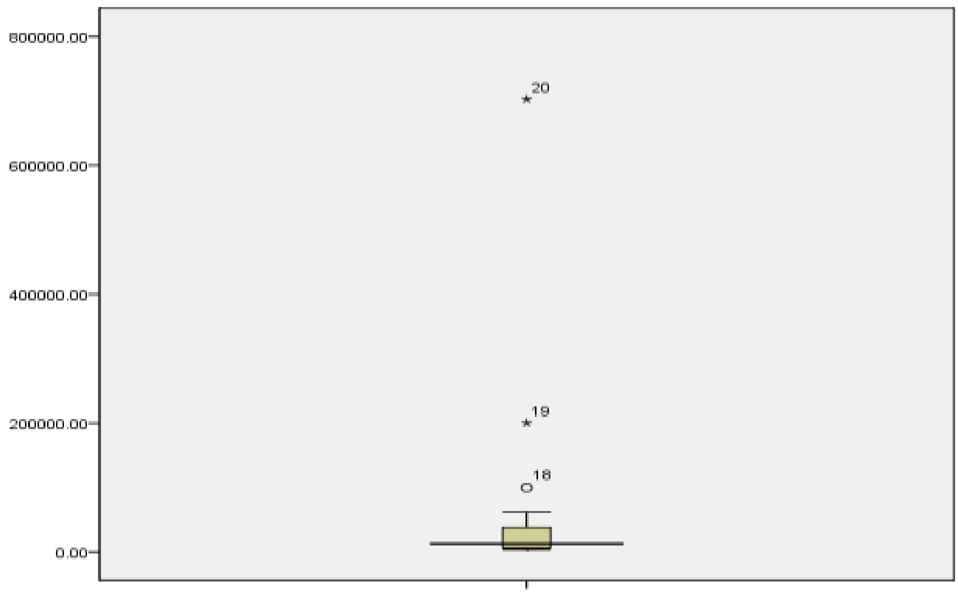

Fig (4-106): box plot for sample sizes(n)

Table (4-58): sapmple size determination for variance $z_{\propto} = 2.33, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
2.33	0.5	0.02	3393.063	3281.71	1
2.33	0.48	0.019	3753.611	3617.81	1.10626
2.33	0.46	0.018	4162.157	3995.84	1.226667
2.33	0.44	0.017	4628.654	4423.89	1.364152
2.33	0.42	0.016	5165.938	4912.18	1.5225
2.33	0.4	0.015	5790.827	5473.85	1.706667
2.33	0.38	0.014	6525.759	6125.99	1.923265
2.33	0.36	0.013	7401.293	6891.25	2.181302
2.33	0.34	0.012	8460.036	7800.14	2.493333
2.33	0.32	0.011	9763.047	8894.66	2.877355
2.33	0.3	0.01	11400.69	10233.9	3.36
2.33	0.28	0.009	13511.93	11903.5	3.982222
2.33	0.26	0.008	16320.63	14030.7	4.81
2.33	0.24	0.007	20208.8	16811.4	5.955918
2.33	0.22	0.006	25877.76	20557.8	7.626667
2.33	0.2	0.005	34744.96	25785.7	10.24
2.33	0.18	0.004	50081.6	33369.6	14.76
2.33	0.16	0.003	81071.57	44773.2	23.89333
2.33	0.14	0.002	163409.9	62036.4	48.16
2.33	0.12	0.001	573291.8	85147.6	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.01$, $z_{\propto} = 2.33$ Proportion population between (0.5 - 0.12), the value of the standard error is between (0.001 -0.02) were used.

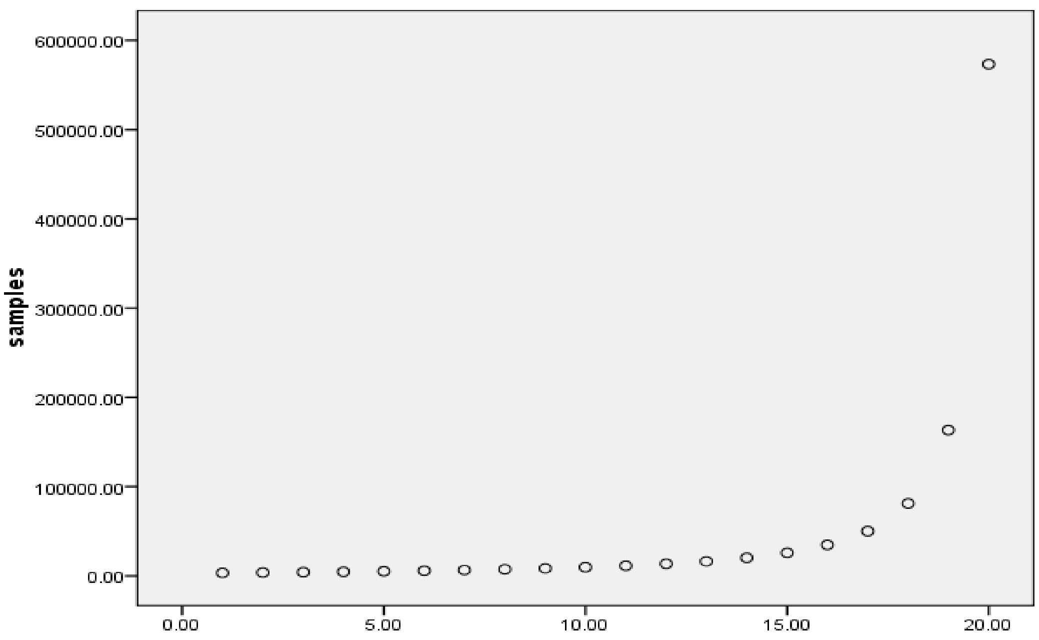

Fig (4-107): scatter diagram for sample sizes(n)

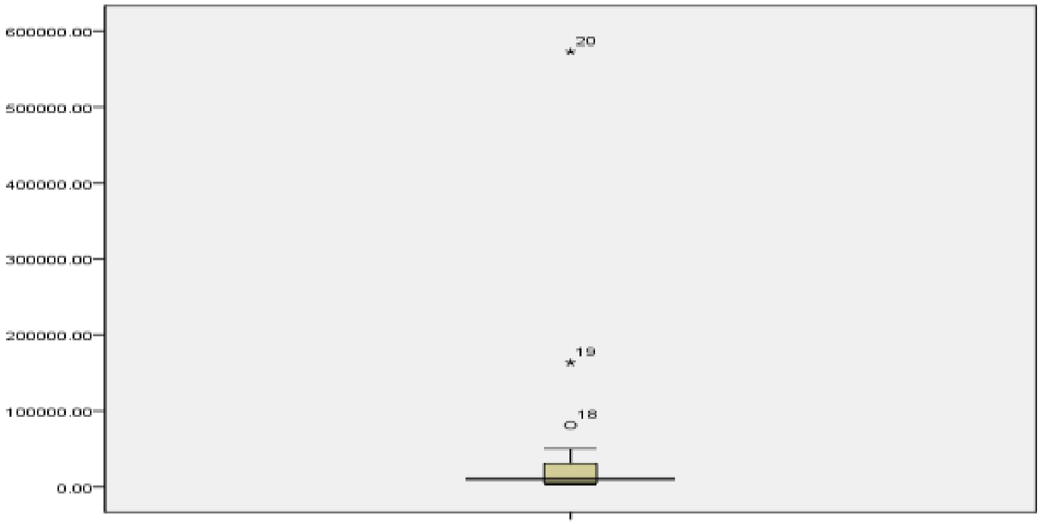

Fig (4-108): box plot for sample sizes(n)

From the tables (3-57, 3-58) we observe that, the sample sizes increases, as the standard error increases if the population proportion decrease. The sample sizes obtained from test of two tails is greater than it from one tail**.**
From figures (3-105, 3-106, 3-107 and 3-108) we showed the scatter diagram and box plot is progressive ratio in all sample sizes generation values with three out layer value, when the values of standard error is equal (0.001, 0.002, 0.003).

Table (4-59): sapmple size determination for variance $z_{\propto/2} = 2.17, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
2.17	0.5	0.02	2943.063	2858.92	1
2.17	0.48	0.019	3255.793	3153.13	1.10626
2.17	0.46	0.018	3610.157	3484.37	1.226667
2.17	0.44	0.017	4014.785	3859.82	1.364152
2.17	0.42	0.016	4480.813	4288.65	1.5225
2.17	0.4	0.015	5022.827	4782.61	1.706667
2.17	0.38	0.014	5660.29	5357.06	1.923265
2.17	0.36	0.013	6419.707	6032.44	2.181302
2.17	0.34	0.012	7338.036	6836.38	2.493333
2.17	0.32	0.011	8468.237	7807.11	2.877355
2.17	0.3	0.01	9888.69	8998.82	3.36
2.17	0.28	0.009	11719.93	10490.5	3.982222
2.17	0.26	0.008	14156.13	12400.7	4.81
2.17	0.24	0.007	17528.64	14914.4	5.955918
2.17	0.22	0.006	22445.76	18331.2	7.626667
2.17	0.2	0.005	30136.96	23157.9	10.24
2.17	0.18	0.004	43439.6	30284.2	14.76
2.17	0.16	0.003	70319.57	41286.8	23.89333
2.17	0.14	0.002	141737.9	58632.9	48.16
2.17	0.12	0.001	405673	80224.4	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.03$, $z_{\frac{\propto}{2}} = 2.17$ Proportion population between (0.5 - 0.12), the value of the standard error is between (0.001 -0.02) were used.

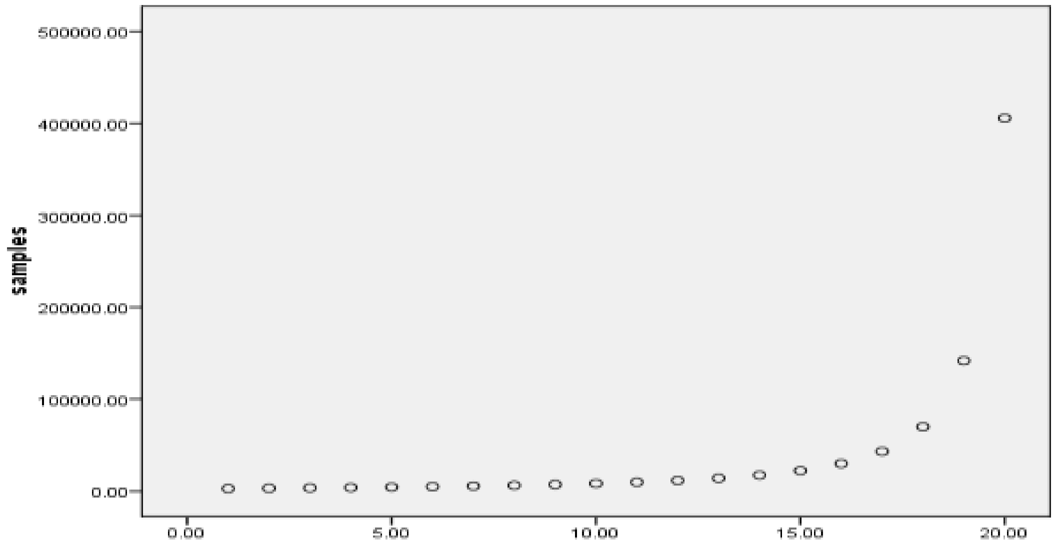

Fig (4-109): scatter diagram for sample sizes(n)

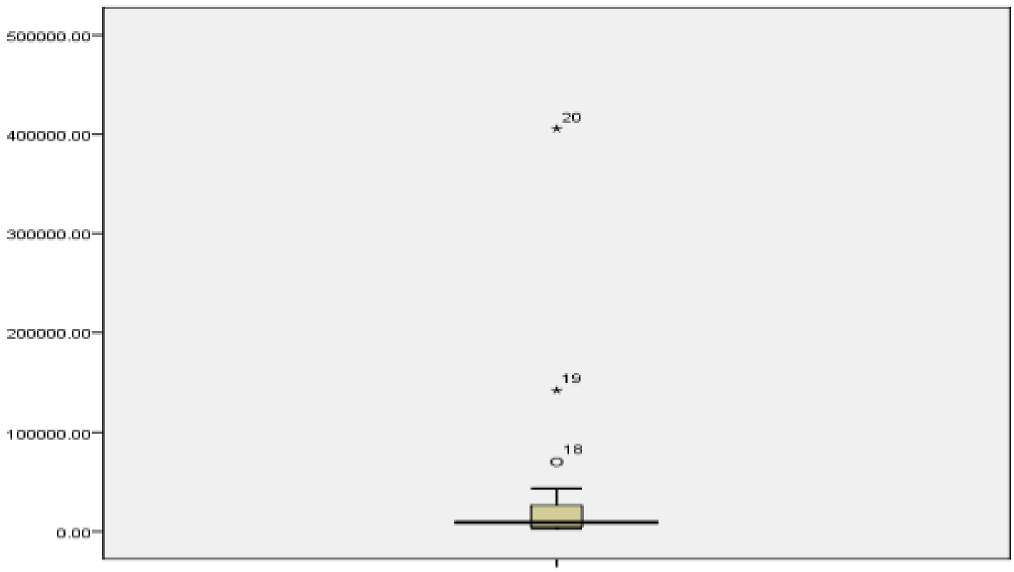

Fig (4-110): box plot for sample sizes(n)

Table (4-60): sapmple size determination for variance $z_{\propto} = 1.9, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.9	0.5	0.02	2256.25	2206.47	1
1.9	0.48	0.019	2496	2435.22	1.10626
1.9	0.46	0.018	2767.667	2693.13	1.226667
1.9	0.44	0.017	3077.869	2985.96	1.364152
1.9	0.42	0.016	3435.141	3321.06	1.5225
1.9	0.4	0.015	3850.667	3707.89	1.706667
1.9	0.38	0.014	4339.367	4158.9	1.923265
1.9	0.36	0.013	4921.562	4690.71	2.181302
1.9	0.34	0.012	5625.583	5325.97	2.493333
1.9	0.32	0.011	6492.033	6096.26	2.877355
1.9	0.3	0.01	7581	7046.78	3.36
1.9	0.28	0.009	8984.889	8244.16	3.982222
1.9	0.26	0.008	10852.56	9790.09	4.81
1.9	0.24	0.007	13438.04	11846.1	5.955918
1.9	0.22	0.006	17207.67	14681.4	7.626667
1.9	0.2	0.005	23104	18767.9	10.24
1.9	0.18	0.004	33302.25	24982.5	14.76
1.9	0.16	0.003	53909.33	35026.7	23.89333
1.9	0.14	0.002	108661	52075.4	48.16
1.9	0.12	0.001	381216	79219.3	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.03$, $z_{\propto} = 1.64$ Proportion population between (0.5 - 0.12), the value of the standard error is between (0.001 -0.02) were used.

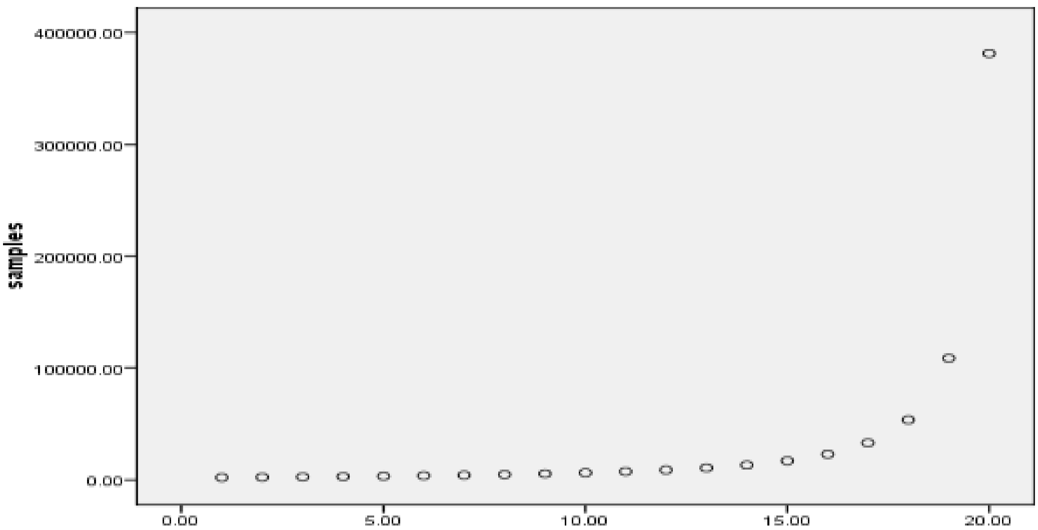

Fig (4-111): scatter diagram for sample sizes(n)

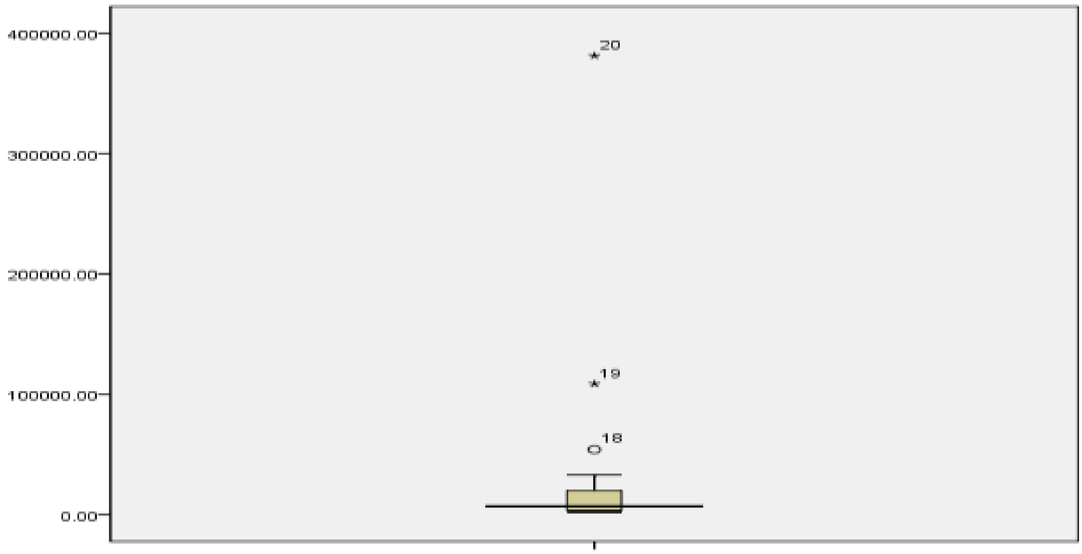

Fig (4-112): box plot for sample sizes(n)

From the tables (3-59, 3-60) we observe that, the sample sizes increases, as the standard error increases if the population proportion decrease. The sample sizes obtained from test of two tails is greater than it from one tail.

From figures (3-109, 3-110, 3-111 and 3-112) we showed the scatter diagram and box plot is progressive ratio in all sample sizes generation with three out layer values, when the values of standard error is equal (0.001, 0.002, 0.003).

Table (4-61): sapmple size determination for variance $z_{\propto/2} = 3.32, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
3.32	0.5	0.02	6889	6445	1
3.32	0.48	0.019	7621.028	7081.36	1.10626
3.32	0.46	0.018	8450.507	7792.04	1.226667
3.32	0.44	0.017	9397.645	8590.35	1.364152
3.32	0.42	0.016	10488.5	9492.84	1.5225
3.32	0.4	0.015	11757.23	10520.3	1.706667
3.32	0.38	0.014	13249.37	11699.3	1.923265
3.32	0.36	0.013	15026.99	13063.9	2.181302
3.32	0.34	0.012	17176.57	14658.7	2.493333
3.32	0.32	0.011	19822.1	16542.9	2.877355
3.32	0.3	0.01	23147.04	18796.3	3.36
3.32	0.28	0.009	27433.53	21527.7	3.982222
3.32	0.26	0.008	33136.09	24888.9	4.81
3.32	0.24	0.007	41030.32	29093.3	5.955918
3.32	0.22	0.006	52540.11	34443.5	7.626667
3.32	0.2	0.005	70543.36	41363.9	10.24
3.32	0.18	0.004	101681.6	50416.9	14.76
3.32	0.16	0.003	164601.2	62207.3	23.89333
3.32	0.14	0.002	331774.2	76839.7	48.16
3.32	0.12	0.001	1163965	92088.4	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.001$, $z_{\frac{\propto}{2}} = 3.32$ Proportion population between (0.5 - 0.12), the value of the standard error is between (0.001 -0.02) were used.

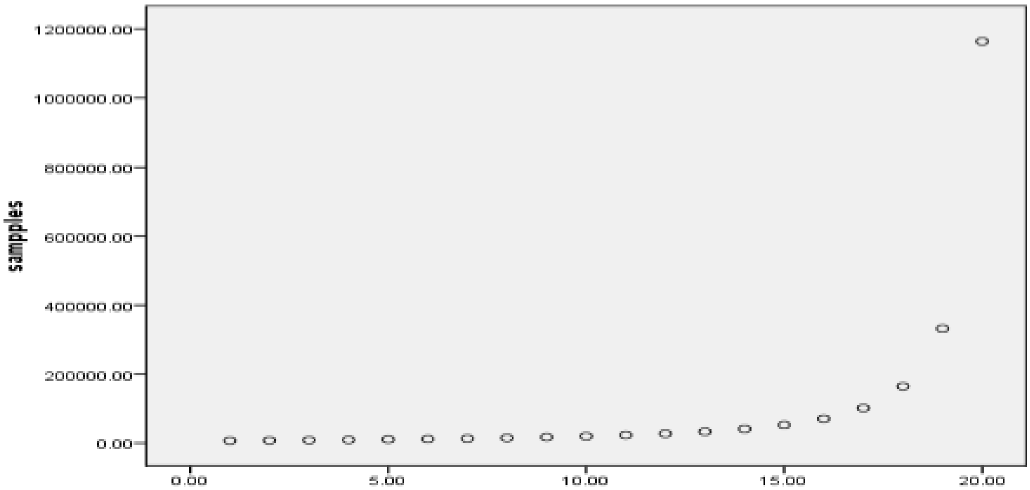

Fig (4-113): scatter diagram for sample sizes(n)

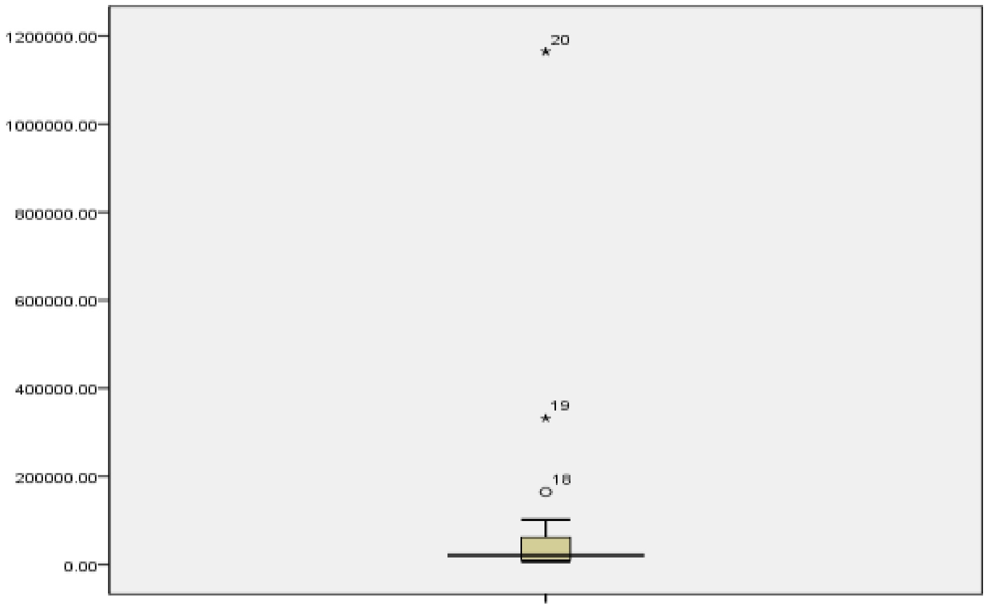

Fig (4-114): box plot for sample sizes(n)

Table (4-62): sapmple size determination for variance $z_{\propto} = 3.1, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
3.1	0.5	0.02	6006.25	5665.94	1
3.1	0.48	0.019	6644.476	6230.49	1.10626
3.1	0.46	0.018	7367.667	6862.09	1.226667
3.1	0.44	0.017	8193.439	7572.95	1.364152
3.1	0.42	0.016	9144.516	8378.36	1.5225
3.1	0.4	0.015	10250.67	9297.6	1.706667
3.1	0.38	0.014	11551.61	10355.4	1.923265
3.1	0.36	0.013	13101.44	11583.8	2.181302
3.1	0.34	0.012	14975.58	13025	2.493333
3.1	0.32	0.011	17282.12	14735.5	2.877355
3.1	0.3	0.01	20181	16792.2	3.36
3.1	0.28	0.009	23918.22	19301.6	3.982222
3.1	0.26	0.008	28890.06	22414.5	4.81
3.1	0.24	0.007	35772.73	26347.5	5.955918
3.1	0.22	0.006	45807.67	31416.5	7.626667
3.1	0.2	0.005	61504	38082	10.24
3.1	0.18	0.004	88652.25	46992.4	14.76
3.1	0.16	0.003	143509.3	58933.8	23.89333
3.1	0.14	0.002	289261	74310.3	48.16
3.1	0.12	0.001	1014816	91029.9	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.001$, $z_{\propto} = 3.32$ Proportion population between (0.5 - 0.12), the value of the standard error is between (0.001 -0.02) were used.

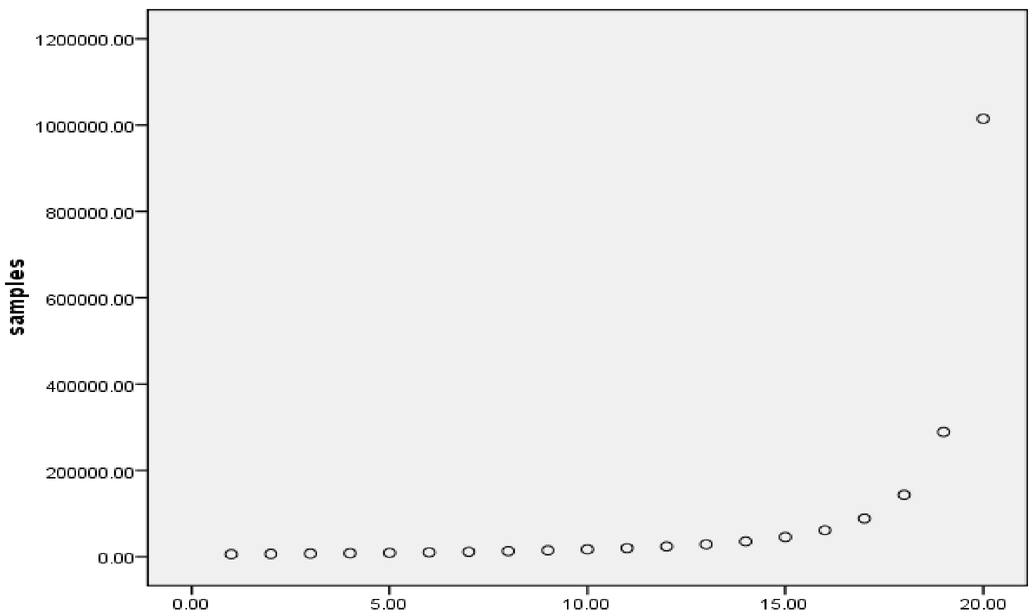

Fig (4-115): scatter diagram for sample sizes(n)

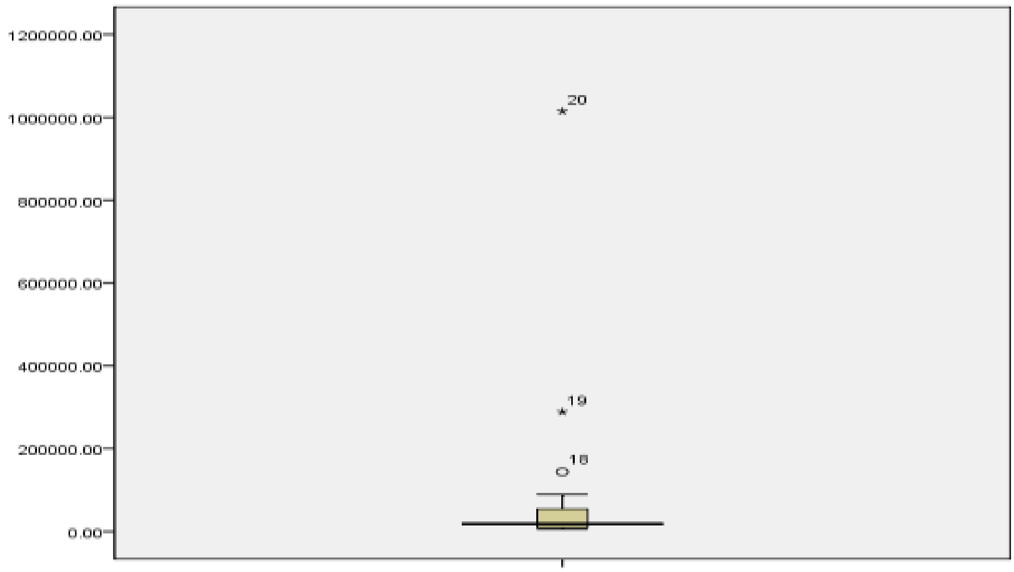

Fig (4-116): box plot for sample sizes(n)

From the tables (3-61, 3-62) we observe that, the sample sizes increases, as the standard error increases if the population proportion decrease. The sample sizes obtained from test of two tails is greater than it from one tail**.**

From figures (3-113, 3-114, 3-115 and 3-116) we showed the scatter diagram and box plot is progressive ratio in all sample sizes generation with three out layer value, when the values of standard error is equal (0.001, 0.002, 0.003).

Table (4-63): sapmple size determination for variance $z_{\propto/2} = 1.76, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.76	0.5	0.02	1936	1899.23	1
1.76	0.48	0.019	2141.72	2096.81	1.10626
1.76	0.46	0.018	2374.827	2319.74	1.226667
1.76	0.44	0.017	2640.999	2573.04	1.364152
1.76	0.42	0.016	2947.56	2863.17	1.5225
1.76	0.4	0.015	3304.107	3198.43	1.706667
1.76	0.38	0.014	3723.442	3589.78	1.923265
1.76	0.36	0.013	4223	4051.89	2.181302
1.76	0.34	0.012	4827.093	4604.81	2.493333
1.76	0.32	0.011	5570.56	5276.62	2.877355
1.76	0.3	0.01	6504.96	6107.66	3.36
1.76	0.28	0.009	7709.582	7157.75	3.982222
1.76	0.26	0.008	9312.16	8518.87	4.81
1.76	0.24	0.007	11530.66	10338.6	5.955918
1.76	0.22	0.006	14765.23	12865.6	7.626667
1.76	0.2	0.005	19824.64	16544.7	10.24
1.76	0.18	0.004	28575.36	22224.6	14.76
1.76	0.16	0.003	46257.49	31627.4	23.89333
1.76	0.14	0.002	93237.76	48250.3	48.16
1.76	0.12	0.001	327106.6	76586.6	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.08$, $z_{\frac{\propto}{2}} = 1.76$ Proportion population between (0.5 - 0.12), the value of the standard error is between (0.001 -0.02) were used.

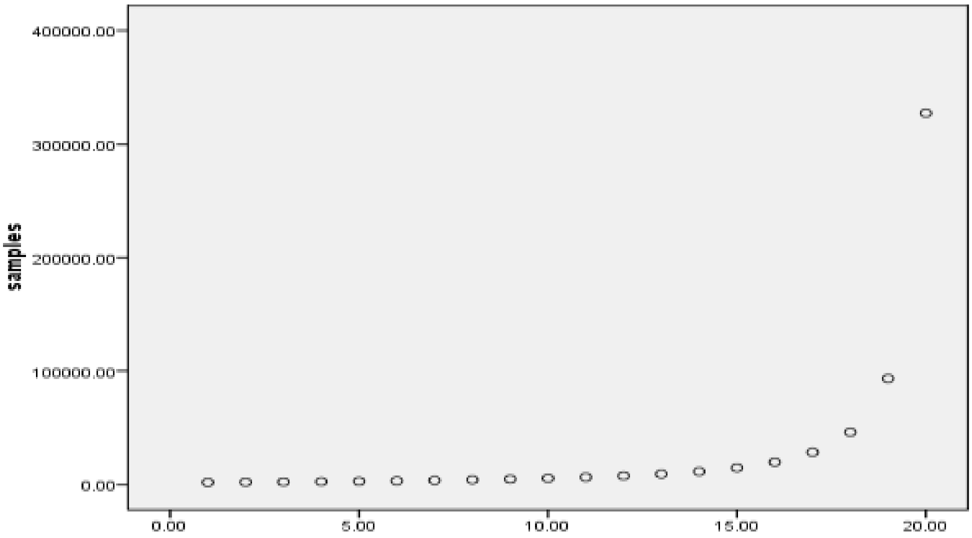

Fig (4-117): scatter diagram for sample sizes(n)

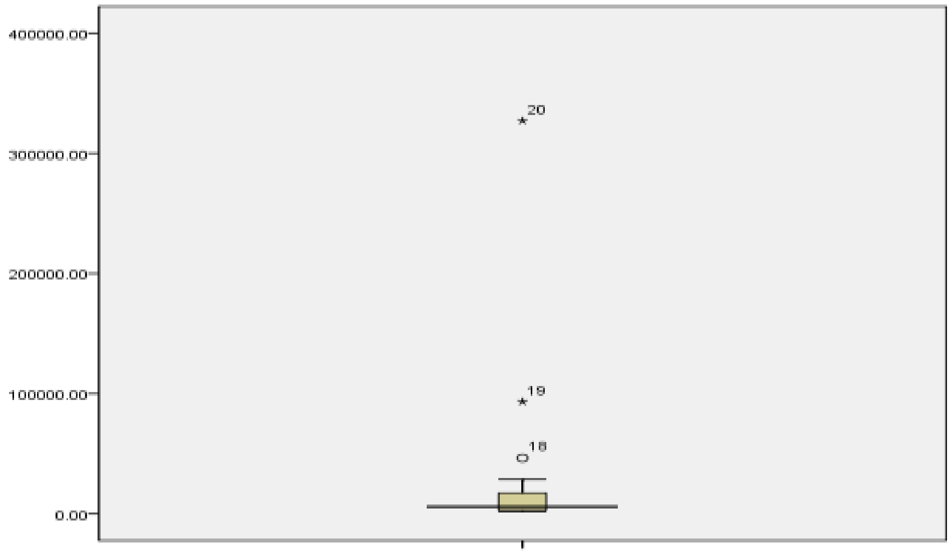

Fig (4-118): box plot for sample sizes(n)

Table (4-64): sapmple size determination for variance $z_{\propto} = 1.41, p = (0.5 - 0.12)$

$z_{\propto/2}$	p	e	n_0	n	Ratio
1.41	0.5	0.02	1242.563	1227.31	1
1.41	0.48	0.019	1374.598	1355.96	1.10626
1.41	0.46	0.018	1524.21	1501.33	1.226667
1.41	0.44	0.017	1695.044	1666.79	1.364152
1.41	0.42	0.016	1891.801	1856.68	1.5225
1.41	0.4	0.015	2120.64	2076.6	1.706667
1.41	0.38	0.014	2389.777	2334	1.923265
1.41	0.36	0.013	2710.404	2638.88	2.181302
1.41	0.34	0.012	3098.123	3005.02	2.493333
1.41	0.32	0.011	3575.294	3451.88	2.877355
1.41	0.3	0.01	4175.01	4007.69	3.36
1.41	0.28	0.009	4948.16	4714.86	3.982222
1.41	0.26	0.008	5976.726	5639.66	4.81
1.41	0.24	0.007	7400.601	6890.65	5.955918
1.41	0.22	0.006	9476.61	8656.29	7.626667
1.41	0.2	0.005	12723.84	11287.6	10.24
1.41	0.18	0.004	18340.22	15497.9	14.76
1.41	0.16	0.003	29688.96	22892.4	23.89333
1.41	0.14	0.002	59841.81	37438.1	48.16
1.41	0.12	0.001	209943.4	67736	168.96

Source: prepared by researcher, using SPSS, 2019

Z-test value was used on level significant from one tail $\propto = 0.08$, $z_{\propto} = 1.41$ population Proportion between (0.5 - 0.12), the value of the standard error is between (0.001 -0.02) were used.

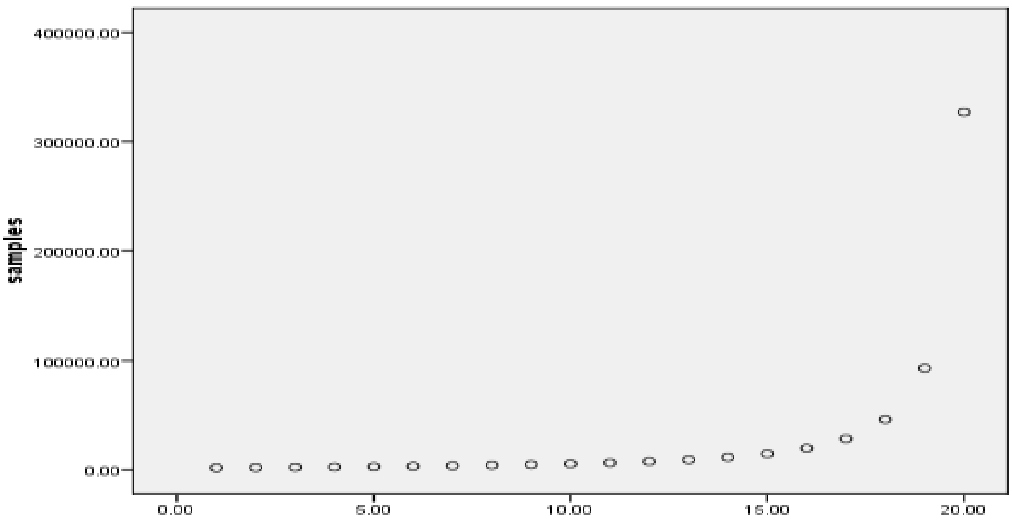

Fig (4-119): scatter diagram for sample sizes(n)

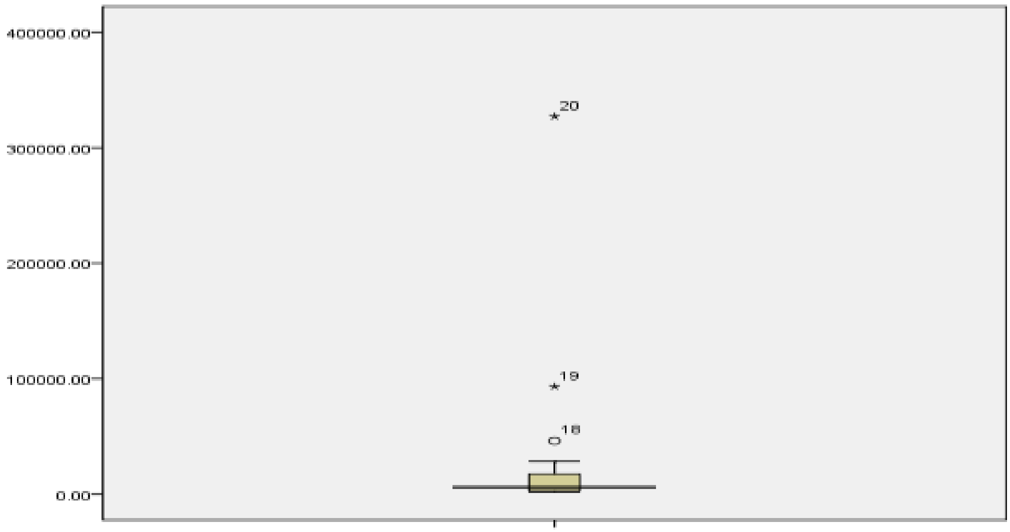

Fig (4-120): box plot for sample sizes(n)

From the tables (3-63, 3-64) we observe that, the sample sizes increases, as the standard error increases if the population proportion decrease. The sample sizes obtained from test of two tails is greater than it from one tail**.**

From figures (3-117, 3-118, 3-119 and 3-120) we showed the scatter diagram and box plot is progressive ratio in all sample sizes generation with three out layer values, when the values of standard error is equal (0.001, 0.002, 0.003)

Table (3-65): The goodness of fit testing

					Exponential	
Tables Number	$z_{\propto}/_{2}$	$\propto$	e	p	Chi-square	p-value
(4-35)	1.96	0.05	(0.001-0.02)	0.5	2.12	0.000
(4-36)	1.96	0.05	(0.001-0.02)	0.5	2.12	0.000
(4-37)	1.64	0.05	(0.001-0.02)	0.5	2.12	0.000
(4-38)	1.64	0.05	(0.001-0.02)	0.5	2.12	0.000
(4-39)	2.58	0.01	(0.001-0.02)	0.5	2.12	0.000
(4-40)	2.58	0.01	(0.001-0.02)	0.5	2.12	0.000
(4-41)	2.33	0.01	(0.001-0.02)	0.5	2.12	0.000
(4-42)	2.33	0.01	(0.001-0.02)	0.5	2.12	0.000
(4-43)	2.17	0.03	(0.001-0.02)	0.5	2.12	0.000
(4-44)	2.17	0.03	(0.001-0.02)	0.5	2.12	0.000
(4-45)	1.96	0.05	0.02	(0.12-0.5)	1.83	0.002
(4-46)	1.64	0.05	0.02	(0.12-0.5)	1.83	0.002
(4-47)	2.58	0.01	0.02	(0.12-0.5)	1.83	0.002
(4-48)	2.33	0.01	0.02	(0.12-0.5)	1.83	0.002
(4-49)	2.17	0.03	0.02	(0.12-0.5)	1.83	0.002

(4-50)	1.9	0.03	0.02	(0.12-0.5)	1.83	0.002
(4-51)	3.32	0.001	0.02	(0.12-0.5)	1.83	0.002
(4-52)	3.1	0.001	0.02	(0.12-0.5)	1.83	0.002
(4-53)	1.76	0.08	0.02	(0.12-0.5)	1.83	0.002
(4-54)	1.41	0.08	0.02	(0.12-0.5)	1.83	0.002
(4-55)	1.9	0.03	(0.001-0.02)	(0.12-0.5)	2.12	0.000
(4-56)	1.9	0.03	(0.001-0.02)	(0.12-0.5)	2.12	0.000
(4-57)	3.32	0.001	(0.001-0.02)	(0.12-0.5)	2.12	0.000
(4-58)	3.32	0.001	(0.001-0.02)	(0.12-0.5)	2.12	0.000
(4-59)	3.1	0.001	(0.001-0.02)	(0.12-0.5)	2.12	0.000
(4-60)	3.1	0.001	(0.001-0.02)	(0.12-0.5)	2.12	0.000
(4-61)	1.76	0.08	(0.001-0.02)	(0.12-0.5)	2.12	0.000
(4-62)	1.76	0.08	(0.001-0.02)	(0.12-0.5)	2.12	0.000
(4-63)	1.41	0.08	(0.001-0.02)	(0.12-0.5)	2.12	0.000
(4-64)	1.41	0.08	(0.001-0.02)	(0.12-0.5)	2.12	0.000

Source: prepared by researcher, using SPSS, 2019

- The value of chi-square for the first ten rows is (2.12) with (p-value=0.000<0.05), and depending to indicates that, the sample sizes is following the exponential distribution.
- The value of chi-square for the second ten rows is (1.83) with (p-value=0.000< 0.05), depending to indicates that, the sample sizes is following the exponential distribution.
- The value of chi-square for the third ten rows is (2.12) with (p-value=0.000< 0.05), depending to indicates that, the sample sizes is following the exponential distribution.

Table (4-66): Correlations between n and e

Correlations		n
e	Pearson Correlation	-0.522
	Sig	0.018

Source: prepared by researcher, using SPSS, 2018

From the above table the value of Pearson Correlation is (-0.522) with (p-value= 0.018< 0.05), and depending on that, there is negative significant Correlation between value of e (standard error) and n (sample size) at the level 0.05.

Table (4- 67): Correlations between n and s^2

Correlations		n
s^2	Pearson Correlation	0.965
	Sig	0.000

Source: prepared by researcher, using SPSS, 2018

From the above table the value of Pearson Correlation is (0.965) with (p-value= 0.000< 0.05), and depending on that, there is significant Correlation between value of s^2 (variance) and n (sample size) at the level 0.

Table (4- 68): Independent sample t- test

	t-test for Equality of Means	
	T-value	Sig
Table (4-35) and (4-36)	0.391	0.698
Table (4-37) and (4-38)	0.228	0.821
Table (4-39) and (4-40)	0.295	0.770
Table (4-41 and (4-42)	0.154	0.879
Table (4-43) and (4-44)	0.480	0.634
Table (4-45) and (4-46)	0.449	0.656
Table (4-47) and (4-48)	0.261	0.795
Table (4-49) and (4-50)	0.215	0.831
Table (4-51) and (4-52)	0.177	0.861
Table (4-53) and (4-54)	0.551	0.585
Table (4-55) and (4-56)	4.731	0.000
Table (4-57) and (4-58)	2.752	0.009
Table (4-59) and (4-60)	3.567	0.001
Table (4-61) and (4-62)	1.860	0.071
Table (4-63) and (4-64)	5.806	0.000

Source: prepared by researcher, using SPSS, 2018

- The value of t test in 14th row is (0.391) with (p-value=0.698> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.

- The value of t test in 14th row is (0.228) with (p-value=0.821> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (0.295) with (p-value=0.77> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (0.154) with (p-value=0.831> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (0.480) with (p-value=0.634> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (0.449) with (p-value=0.656> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (0.261) with (p-value=0.215> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (0.215) with (p-value=0.836> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (0.177) with (p-value=0.886> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 14th row is (0.551) with (p-value=0.558> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, when test from one tail or two tails.
- The value of t test in 14th row is (4.731) with (p-value=0.000> 0.05), and depending on this indicates, there is significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (2.752) with (p-value=0.009> 0.05), and depending on this indicates, there is significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (3.567) with (p-value=0.001> 0.05), and depending on this indicates, there is significant different between values of sample sizes determination, from one tail or two tails.

- The value of t test in 14th row is (1.860) with (p-value=0.071> 0.05), and depending on this indicates, there is no significant different between values of sample sizes determination, from one tail or two tails.
- The value of t test in 14th row is (5.806) with (p-value=0.000> 0.05), and depending on this indicates, there is significant different between values of sample sizes determination, from one tail or two tails.

Conclusion and Recommendations

Conclusion:

- In completing this discussion of determining sample size, there are three additional issues. First, the above approaches to determining sample size have assumed that a simple random sample is the sampling design. More complex designs, e.g., stratified random samples, must take into account the variances of subpopulations, strata, or clusters before an estimate of the variability in the population as a whole can be made.
- Another consideration with sample size is the number needed for the data analysis. If descriptive statistics are to be used, e.g., mean, frequencies, then nearly any sample size will suffice. On the other hand, a good size sample, e.g., 200-500, is needed for multiple regression, analysis of covariance, or log linear analysis, which might be performed for more rigorous state impact evaluations. The sample size should be appropriate for the analysis that is planned.
- In addition, an adjustment in the sample size may be needed to accommodate a comparative analysis of subgroups (e.g., such as an evaluation of program participants with nonparticipants). Sudman (1976) suggests that a minimum of 100 elements is needed for each major group or subgroup in the sample and for each minor subgroup, a sample of 20 to 50 elements is necessary. Similarly, Kish (1965) says that 30 to 200 elements are sufficient when the attribute is present 20 to 80 percent of the time (i.e., the distribution approaches normality). On the other hand, skewed distributions can result in serious departures from normality even for moderate size samples (Kish, 1965:17). Then a larger sample or a census is required.
- For any survey that require very large sample size, the survey should stand with values greater than (3699) depending on the restriction of the equation.
- For medical surveys sample size determination precision may need standard error less than or equal ($e = 0.001, 0.002, 0.003$) and level of significant less than or equal ($\propto = 0.01, 0.03$).
- For family surveys any sample size value may be used depending on the employed equation and it should be suitable for the required error and precision.
- The sample size was affected by the increases or decreases of variance.
- To select appropriate sample size for any study, we need to know the hypothesis, where the test from one tail or two tails.

- The correlation between estimated sample sizes and variance when the test from two tails is equal 0.938, and equal 0.939, when, the test from one tail.
- May indicate the existence of the strong correlation between sample sizes and variance. In a sample surveys, it may be use test Z from two tails to giving larger sample size.
- The standard error and population proportion has strong effect on sample size.
- The value of correlation between estimated sample sizes and variance is equal 0.965, when, the sample size determine for proportion.
- The correlation between estimated sample sizes and standard error is equal (-0.52), when, the sample size determine for proportion.
- The population proportion has negative effect on the sample size, i.e.
- The sample size there for depends mainly on the degree of precision, and population proportion.
- In a sample surveying if large sample size is needed we may decrease the standard error or increase the proportion (e.g. clinical research).
- By using variance the sample size obtained is following the Poisson distribution.
- By using proportion the sample sizes obtained is following the Poisson and exponential distribution.
- Z-test for two tails may be used when large sample size is required.
- Finally, the sample size formulas provide the number of responses that need to be obtained. Many researchers commonly add 10% to the sample size to compensate for persons that the researcher is unable to contact. The sample size also is often increased by 30% to compensate for nonresponse. Thus, the number of mailed surveys or planned interviews can be substantially larger than the number required for a desired level of confidence and precision.

Recommendations:

- For more precision in sample size determination we may need to take inconsideration a method that measure the variance within the population by using pilot studies
- The research in the filed should give more information to the phenomena under study and its characteristic because they cannot be treated for a way from the sample size.
- The research may need to determine at the beginning of the study, the required level of precision because sample size is increasing when the level of precision is higher.
- In statistical surveys the sample size may be controlled by changing the values of the standard error and variance to phenomena under study.
- When the population has exponential distribution we must be used the test from two tails with small margin of error among (0.001-0.02) and small variance.
- When the population has poison distribution we must can used the test from two tails or one tails.
- Prefers using population Proportion in sample size when the population has exponential distribution.
- Future studies may need to take inconsideration the cost as one of the effective factors that could determine sample size.
- Future studies may need to take inconsideration the comparing between different types of sampling, when could determine sample size.

References

References:

1- Amy L Whitehead, Steven A Julious, Cindy L Cooper, Michael J Campbell, 2016, Estimating the sample size for a pilot randomized trial to minimize the overall trial sample size for the external pilot and main trial for a continuous outcome variable, *statistical methods med res.25(3):1057*-1073.
2- Audit Manual Chapter 13 (Statistical Sampling) Sales and Use Tax Department - California State Board of Equalization
3- Birkett MA and Day SJ. Internal pilot studies for estimating sample size. Stat Med 1994; 13: 2455–2463.
4- Browne, R. H. (1995). On the use of a pilot sample for sample size determination. Statistics in Medicine, 14, 1933-1940.
5- Charles Guandaru, Kariuki, Samuel Nduati, (2012), Factors Influencing Sample Size for Internal Audit Evidence Collection in the Public Sector in Kenya Kamau. *International Journal of Advances in Management and Economics*, **1**: 42-49.
6- Cohen J. A power primer. Psychol Bull 1992; 112: 155–159.19. Birkett MA and Day SJ. Internal pilot studies for estimating sample size. Stat Med 1994; 13: 2455–2463.
7- Elizabeth Burmeister, Leanne M Atiken. (2012). Sample Size, How Many Is Enough? Official. Australian Critical Care. **4**(25):271-274.
8- Estimation of Proportions of Given Populations when Observable Units Contain Several Populations J. P. BASU AND REKHA BASU.
9- Gene Shack man, 2001, Sample size and design effect, American Statistical Association, NYS DOH (Seminar- 24March).
10- Glenn D. Israel2, 1992, Determining Sample Size1, Fact Sheet PEOD-6.
11- Gwowen Shieh, (2013), on using a pilot sample variance for sample size determination in the detection of differences between two means, *Psicológica*, **34**: 125-143.
12- Hemanta Kr. Sarmah, B Bora Hazarika, (2012), Importance of the size of sample and its determination in the context of data related to the schools of Greater Guwahati, Bulletin of the Gauhati University Mathematics Association, vol: 12, ISSN 0975-4148.
13- Importance of the size of sample and its determination in the context of data related to the schools of Guwahati" which was published in the Bulletin of the Gauhati University Mathematics AssociationVol. 12, 2012

14- James Dean Brown, (2007), Sample size and statistical precision, JALT Publications, **11**(2):21- 24.Paula Lagares Barreiro - Justo Puerto Albandoz.

15- James Nicholson, 1997, the Relative Estimation Sample Size and Proportion, Teaching Statistics. 19 :(2).

16- Julius Sim, Martyn Lewis. (2012). The size of a pilot study for a clinical trial should be calculated in relation to considerations of precision and efficiency, Journal of Clinical Epidemiology, 65(3):301-308.

17- Julius SA and Owen RJ. Sample size calculations for clinical studies allowing for uncertainty about the variance. Pharmacist Stat 2006; 5: 29–37.

18- Kieser, M., & Wassmer, G. (1996). On the use of the upper confidence limit for the variance from a pilot sample for sample size determination. Biometrical Journal, 38, 941-949.

19- Kish, Leslie. 1965. Survey Sampling. New York: John Wiley and Sons, Inc.

20- Kupper, L. L., & Hafner, K. B. (1989). How appropriate are popular sample size formulas? The American Statistician, 43, 101-105.

21- MaMaEuSch, (2001), Population and sample. Sampling techniques, *International Journal of Applied Mathematics and Statistical Sciences*. **2** (1).

22- Machin D, Campbell MJ, Tan SB, et al. Sample size tables for clinical studies, 3rd ed. Chichester, UK: Wiley- Blackwell, 2008.

23- Mohd asraf and james k.brewer, (2004), Conducting test of *hypotheses the need for an adequate Samplesize, The Australian educational researcher,31(1):*

24- Rosie Cornish. 2006, Statistics: An introduction to sample size calculations, Mathematic Learning Support Center.

25- Sharon L. lohr, (2010), Sampling design and analysis. Second edition-Brooks/Cole- USA.

26- shein-chung chow , jun shao , hansheng wang, (2017), Sample Size Calculations in Clinical Research- print edition Marcel Dekker, Inc. New York.

27- Standard deviation, Standard Error: Which 'Standard' should we use? George W Brown, MD Los Lunas Hospital and Training School, NM, and Dept of Pediatrics, U of New Mexico School of Medicine, Albuquerqu

28- Subhash C. Narula, 2018, Sample size precision function, journal of Quality Technology, **1**(8): 49-52

29- William J Artman, Inbal Nahum-Shani, Tianshuang Wu, James R Mckay, Ashkan Ertefaie, (2018), Power analysis in a SMART design: sample size estimation for determining the best embedded dynamic treatment regime, Biostatistis/kxy064.
30- William G. Cochran – john willey & sons, (1977), Sampling techniques.
31- Wittes J, 2002, Sample size calculations for randomized controlled trials. Epidemiol Rev; 24:39 e53.

Arabic references:

1- اثر اسلوب اختيار العينة وحجمها على دقة تقدير معالم المجتمع الاحصائي -عبد اللطيف بن محمد بن احمد هجران الغامدي.
2- آغا،عمار ناصر- تنظيم المعاينة الإحصائية وتصميمها في عمليات ضبط (مراقبة) الجودة على المنتجات الصناعية (حالة تطبيقية على الشركة السورية لصناعة الكابلات في دمشق) - كلية الاقتصاد- جامعة دمشق 2012.
3- مصطفي،جلال الدين الصياد، الاستدلال الاحصائي 1993م.
4- عبد الرحيم، زين العابدين البشير، وعودة،احمد عبد المجيد_ الاستدلال الاحصائي 1997م.
5- سبيل، ادم- اثر المتغيرات المساعدة وحجم العينة في تقديرات المعاينات الاحتمالية –رسالة دكتوراة –2015