Statistic Science and Its Relationship to Other Sciences

Dr. Abida Ahmed Al-Taie

Al-Rafidain University College

Accounting Department

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Abstract

Statistics is an ancient Science attributed to previous time,where he was treatedas asystem for counting and numbering for numbering for all the activities of the state and different action,As it is written in the Hammurabi obelisk and the effects of Babylonian ,Assyrian,Greek civilization and the Nile Valley, Manifestations of buying and Selling, calculating soldiers and other……….., They are all manifestations of Statistical Operations.

1-   Introduction :

2-   1-1 The emergence and development of statistics:

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After the emergence of Islam and its spread to the borders of China and what precedes it , East ,west and southernEurope, The Arabs mixed with the people of those countries and were briefed on their Knowledge of Knowledge through translation and study, The outcome of this was a scientific prosperity that impressed, Then the development of civilization and its prosperity, which has become and urgent need to take statistical methods and concepts, and this led to the development of

Arabs for some statistical methods; theoretical and applied . From the above: the development of the definition of statistics Ford time to time, according to the development of the numbering system that the Arabs and others went through.

According to their multiple uses for it (for this science), the following definition of statistics is the most comprehensive of its uses:

- **Statistics Science:-**It is the scientific method that specialize in collecting data and facts about a specific phenomenon or hypothesis, then organizing and cessing data facts in a way that Facilitates the process of analyzing and interpreting it, then extract results and decision- making in light of that(The modified definition for : (Cowden –Croxten).

- **Statistics Branches:**Because of the development of statistics and the large number of its applied branches in various area of life, it is classified into two main branches:

- **a-Descriptive Statistics :-**

- This branch includes all methods used in collecting data and information on the phenomenon or group of phenomena under study, and how to organize, classify and classify this data with the possibility of displaying it in tables and graphics and calculating some required results.

- **B- Inferential Statistics:-**

- This branch is concerned with the subjects of: Estimation (prediction) , and : Testing of hypotheses.

- **The importance of statistics and its application areas:-**

- Statistics has a prominent role in scientific research, and it is considered one of the important means in it, through the use of its rules, laws and all its methods of collecting the necessary data and information for scientific research and analyzing these data in order to obtain the required results. Statistics has an important role in developing future Plans by predicting (estimation) with results and all sectors, whether , productive, service, agricultural, industrial……etc. statistics is considered ameans, not an end; that is : the possibility of using it wherever scientific research is found ,Figure (1) Next, shows the field of statistical application.

Statistical method of Scientific research :-

- The main stages of the statistical method in scientific re search are

-         Summarized as follows:-

- Determine the problem or hypothesis of research (study)

- Collect data and information about the phenomenon under study.

- Data classification, tabulation and display.

- Calculate the statistical indicators required to achieve the goal of the study as estimates for the features of the research community .

- Study data analysis to obtain results in the light of re search hypotheses (study).

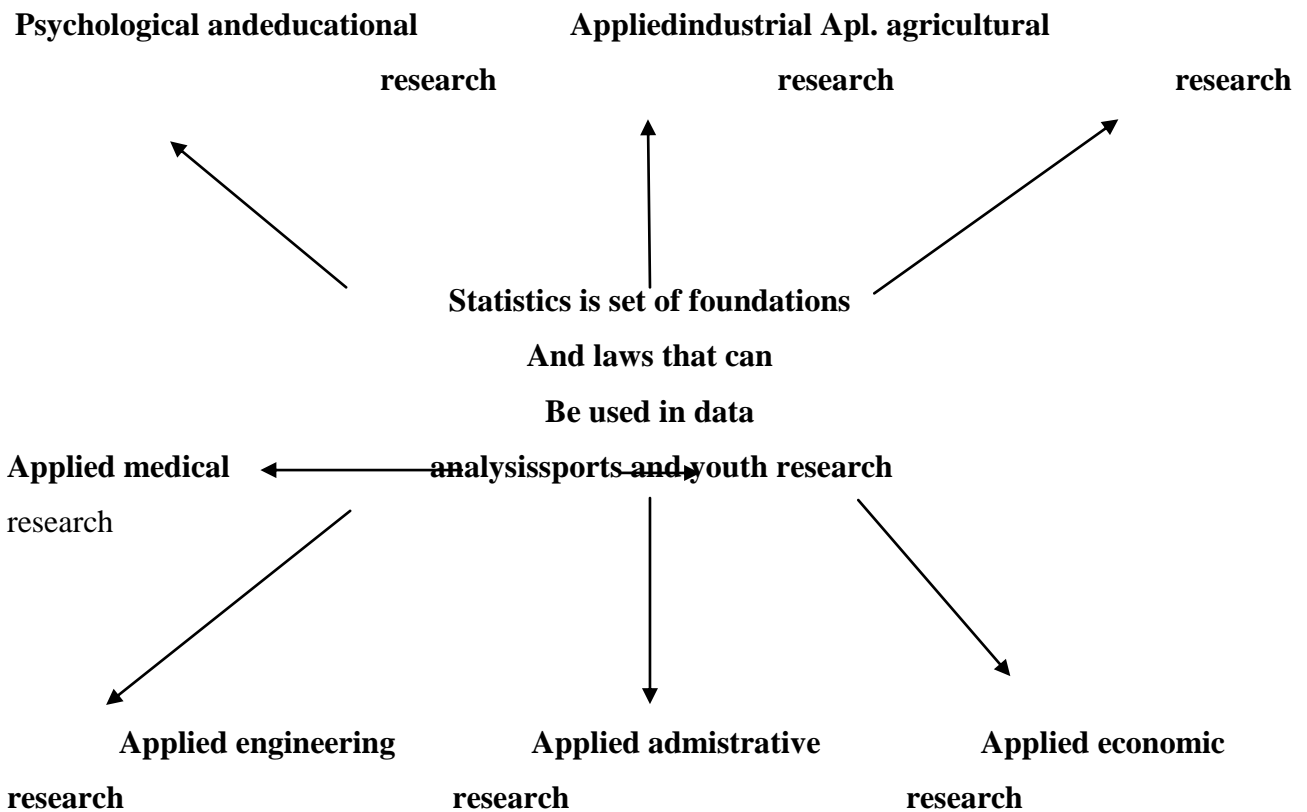- Interpretation of results and decision-making process on research hypotheses

Psychological andeducational   **Appliedindustrial Apl. agricultural**

research   **research**   **research**

Statistics is set of foundations

And laws that can

Be used in data

Applied medical   **analysissports and youth research**

research

Applied engineering   **Applied admistrative**   **Applied economic**

research   **research**   **research**

Figure (1); Explains the areas of statistics application

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Data classification, tabulation and display.

1-   Calculate the statistical indicators required to achieve the goal of the study as estimates for the features of the research community.

2-   Study data analysis to obtain results in the light of research hypotheses (study).

3-   Interpretation of results and decision-making process on research hypotheses.

-Determine the method of collecting data and in formation :-

There are two methods through which the data and information that the research requires it,

a-Comprehensiveregistrationmethod for all vocabulary of the statistical community: population statistics to know the number of the country's souls (for example).

b- The method of registration by samples: that is, taking part of the community, not everyone, this part is called the sample, In a manner that does not affect the percentage of reliability of the final results adopted by the re searcher: Take a group of males and other females as a simple of the study community .

Statistical uses and its relationship to other sciences :-

1-   Due to the benefits of statistics, the re searchers in sociology and experimental psychology have turned towards it that used adequate and valuable statistical means through: A general Revie of the concepts of the process of inference and statistical conclusion and the implementation of common statistical tests used in simple experiences.

2-   The politicians used it to know the opinions of their peoples for the various axes of public and private life, especially those related to issues that concern them and increase their popular balance.

3-   Its use by governments in its management and all their projects by; collecting statistical data by lists or questionnaires that are randomly distributed on a relatively small sum.

4-   Use of factories and businesses, quantitative curricula to reach future plans and determine the extent of the public's demand for their goods and products.

5-   The use of biologists and doctors the quantitative curricula to reach the effectiveness and most successful drugs and the spread of infection and diseases and their properties of neighborhood in general.

6-   The use of quantitative curricula in other sciences such as:

Nature Sciences, Astronomy, chemistry, …………….

In summary, the importance of using the quantitative curricula in studies and scientific research cannot be overlooked, but that we do not see the science of statistics everything (and so on for all sciences) and to take from it the goal for itself, but rather we must use it us a laboratory for experiments in order to reach the truth, and your test (Inquiry , investigation) the realty in light of the data provides to us .

7-   The science of statistics that was mentioned in the Noble Qur'an in (10) Sorbines and (11) dignity verses, and it is honored to be: Al-Mohsa; A name of the Most Beautiful Names of God.

This specialization, which began to countand Gilbert knew that, is a game that we play according to simple rules,health and housing, the environment, and the; The movement of storms, prediction of earthquakes, volcanoes and biological phenomena.

d- Statistics has interred into all areas of life and its appearance

1-Bio- Statistics

2-Geo – Statistics

3-Genetic – Statistics

4-Environmental Statistics

5-Psychological Statistics

6-Industrial, AgriculturalUral and commercial statistics.

7-Statistics with life scientists and believe that: many heart attacks, kidney work and egg division, and in the field of hearing: an analysis is (Fourier) to study liquid dynamic in the shell and put a sports model for them.

8-   Started in stalling DNA and the theories of the contract appeared (knot theories), the theory strands (Linleing) Dynamics theories, chaos theory, the theory of spectral cover and social nerve networks, small Miwati theory, displace logic and for casting by sample space, and many others.

9-   This is what made the mathematician Hardy to say:

Statistics are great artists, they are making examples of ideas, meaning that: Statistics workers; whatever their work increases, they will always find them occupying them in their field of competence as long as there is a person who thinks about development, i.e:in other words: he(she): Always youthful thought.

The Relation ship of statistics with other S in practice (applied)

1-   One of the industrial company for social solidarity company for social solidarity for warkers was established, by deducting: 10 % of their monthly salaries. What is the monthly deduction rate from the salaries of workers if the computationalmilieu for the current salaries: 1.050 million dinars. Answer:

$$q^- = \frac{\sum_{i=1}^{n} K\, Xi}{n} = K(\frac{\sum_{i=1}^{n} Xi}{n} = Kx^-$$

$\therefore q^- = kx^- = 10\ \%\ (1.050) = o,105$ Million dinars

$\Rightarrow 105$: A thousand dinars, The monthly

Deduction rate

And so for other standards

2-   The following table gives a summary of sum statistics on the mothly salaries in dollars for the affiliates working in a private bank in Sudan. we have:

No . employees	Arithmetic Mean	Median	Standard deviation
110	815	850	100

1-   What is the sum of the salaries that the National Bank pays to associate.

2-   If the bank's board of directors decides an additional allowance for the amount: $ 40 per member, then

Using symbols and terms of them in itself. And it has become amethod of thinking that opens the doors for the fields of new knowledge in various fields such as economic, agricultural. Natural and environmental studies such as the earthquake and volcanoes.

Some thinkers that the extent of the use of quantitative Statistical concepts and means in any science is a measure of the development of that science, and Scientists are almost unanimous today as:

Where it not for the rapid progress that took place in the science of statistics, the revolution would not have occurred in the communications and information technology, according to the following:

a-   Modern options for studying contemporary science and the technology systems are to build sports models or computer models, based on available data scientific intuition and experience.

b-   These models are characterized by aesthetic harmony between numbers elegance of shapes and inclusiveness, as they are (models) that allow focus on human factors with the greatest effect in phenomena and permanence, as they can be used (models) in addressing other similar problems.

c-   The complex real attitudes con be understood by these models in terms of their by these models in terms of their comprehensiveness, aesthetic and simplicity, as they describe everything in life the movement of economics and population studies, planning and human development. Social safety net works, the map of living conditions, education, culture,

What is the computational medium, and standard deviation of new salaries with the additional transportation?

3-   The bank established the social solidarity fund for its employees to stat by deducting: 5% of their monthly salaries to cover the expenses of the fund, what is the monthly deduction rate from the salary.

4-   Find the change coefficient before and after the transfer bonus.

Solution:-

1- $\bar{x}$ for: Monthly salaries = 815 \$

$\because \bar{x} = (\sum_{i=1}^{n} Xi) / n \qquad \therefore \sum_{i=1}^{n} Xi = N\bar{x} = (110)*(815) = 89650$ \$

2- $\bar{Y} = \bar{x} + 40 = 815 + 40 = 855$ \$

Sy= Sx=100 → Standard deviation for monthly salaries afrer adding the transport bonus .

3-   The amount of monthly deduction from the salary = monthly salary * the rate of deduction.

∴The monthly deduction rate of salary = monthly salary rate * 5 % \$

∴815 (5 %) = 40.75 \$ The monthly deduction rate of salary >

4-   Calculating the change factor for monthly salaries: Before and after the bonus: we calculate the difference of difference according to the following formula:

C.V $= \frac{S}{\bar{X}}$ (100 %) $= \frac{100}{815}$ (100 %) = 12.27 %

As for the difference factor the bonus: it is:

S.V $= \frac{S}{\bar{Y}} *$ (100 %) $= \frac{100}{855} *$ (100 %) = 11.69 %

The difference coefficient after the additional bonus decreased from what it was before the bonus.

3-   If the possibility of the event is: A= 0.73 which represents the author of a buyer that the supplier will send the matrials of the material free of defective parts, The possibility of a complementary add ident that represents: that the shipment will hare defective parts:

P(A) = 1 – P (A) = 1-0.73=0.27

4-   The Sufi spinning and weaving company pays monthly incentives (thousands of dinars) and as follows : what is the values of the following table :

Incentive Classes	No.fi Employees	Center Xi	fi Xi	Xi- $\bar{X}$	fi $|xi - x|$
3-5	5	4	20	5058	27.9
6-8	12	7	84	2.58	30.96
9-11	22	10	220	0.42	9.24
12-14	7	13	91	3.42	23.94
15-17	4	16	64	6.4	25.68
$\sum$	50		479		117.72

$$X^- = \frac{\sum_{i=1}^{m} FiXi}{\sum_{i=1}^{m} Fi} = \frac{479}{50} = 9.58$$

$$\therefore M.D = \sum_{i=1}^{m} Fi \ |xi - x^-| = \frac{117.72}{50} = 2.35$$

$$\because R = 17- 3 = 14$$

Note : The mean deviation is more accurate then the range when measuring dispersion, because it takes all values in consideration, but : the range : depends on the small and major values .

5-   The following data shows : The cost of each production unit (y) and the total product (x) for aproduction plant , according to the following .

X	Y	X;-- $\bar{X}$	Y;-- $\bar{Y}$	(X; -$\bar{X}$)²	(y; - $\bar{y}$)²	(xi-x⁻)(yi-y⁻)
185	82	18.7	19.5	349.29	380.25	364.25
157	54	-9.3	-8.5	86.49	72.25	79.05
154	52	-12.3	-10.5	151.29	110.25	129.15

170	73	3.7	10.5	13.69	110.25	38.85
160	57	-6.3	-5.5	39.69	30.25	34.65
165	56	-1.3	-5.5	1.69	42.25	8.45
180	80	13.7	17.5	187.69	306.25	239.75
165	65	-1.3	2.5	1.69	6.25	-3.25
157	45	-9.3	-17.5	86.49	306.25	162.75
170	61	3.7	-1.5	13.69	2.25	-5.55
1663	625	0	0	932.10	1366.5	1048.5

To find : Simple Correlation coefficient,follow :

$$rxy = \frac{\sum_{i=1}^{n}(Xi - \bar{X})*(Yi - \bar{y})}{\sqrt{\sum_{i=1}^{n}(Xi - \bar{X})^2 * \sum_{i=1}^{n}(Yi - \bar{y})^2}} = 1048.5 / \sqrt{(932.10)} * (1366.5) = 0.93$$

$\therefore$ The relationship between: X and Y is strong and expense.

6- What is the estimated equation: (Y / X) for the following data for the veriable independent: X (represent the number of working hours) The (Y) change, which accredited variable that represents.

The number of productive units: 8 workers in one of the producing companies; Dat: as in the following table:

xi	yi	yi xi	(Xi)²	(yi)²
12	20	240	144	00
8	22	176	64	484
15	25	390	235	676
19	30	570	361	900
16	25	400	256	625
10	21	210	100	441
6	15	90	36	225
14	28	392	196	784

| 100 | 187 | 2468 | 1382 | 4535 |

$$\because SST = SYY = \sum_{i=1}^{n}(yi - y\bar{})^2 = \sum_{i=1}^{n} yi^2 - (\sum_{i=1}^{n} yi)^2/n$$

$$\because x\bar{} = \sum_{i=1}^{n}\frac{xi}{n} = \frac{100}{8} = 12.5$$

$$\therefore SST = 4535 - \frac{(87)^2}{8} = 163.875$$

$$,\hat{b} = (\sum_{i=1}^{n} Xi\,Yi - n\,x\bar{}\,y\bar{}\,/(\sum_{i=1}^{n} Xi^2 - n\,(X\bar{})^2)$$

= (2468-(8*12.5)*23.375)/(1382-(8*12.5)²) = 0.988

$,\hat{a} = y\bar{} - \hat{b}\,x\bar{} = 23.375 - 0.988 * 12.5 = 11.017$

.. The estimated equation of the regretion line (Y / X)

$$\hat{y} = \hat{a} + \hat{b}x$$

$,\hat{y}$= 11.017 + 0.988 X

Conclusions and Recommendations

For the Statistics department in collegs and institute :

1-   An unfortunate fact that provokes our prisons,because many of out students children, their preparation was insufficient and it may not be allowed to work or participate in the world's pride in the technological progress that is steadily with statistical analyzes and their applications in all Sciences without exception >

There is no field of human knowledge in our time , except for the Science without exception

2-   There is no field of human knowledge in our time , except for the sciences of statistics .

3-   They lack many aspects of knowledge, skills and under standing, although they are required today, so your doubt will become more urgent in the next century .

4-   We must be aware of well. The researcher wales, who warned, Said: ((Human history should be ready to confront one of the two things, either the education race of catastrophe))

5-   Statistical thinking will be necessity in terms of importance :

As learning to read and write .

6-   Failure to provide sufficient amount of education, especially with regard to developing methods of thinking, solving problems, and making modern technologies and integral part of the study of statistics.

7-   Ready – made statistical bags and other aspects of modern technology provides opportunities for coordinated and interesting work for students, far away from various complications.

8-   The cancellation of the central appointment decision for graduates of all colleges (except for medical collegesgraduates, their appointment is central is a shocking decision, which is assumed to study scientifically and socially in order to improve the painful situation of the graduates in general.

9-   Last but not least :

Our ambition is great in the brothers and sisters working in the Central Agencyfor statistics and informatics and other parties working in statistics in general, to provide the appropriate demate for such education and enrich it and prepare programs that allow students to see statistics and its applications, vision of the eye in the real word.

We are great and wide, with distinguished statistical statistics; work on establishing an educational pattern that would develop skills and capabilities to absorb and understand the material presented and in a coordinated and regular way, a pattern that ensures the existence of flexible educational system, that includes advanced scientific curricula that keeps pace with the times and serves the field of work It gives the teaching profession its density and appropriate place to reach effective and productive teaching .

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