**Statistics Assignment**

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STATISTICS PROBLEM AND SOLUTION

# PROBLEM

 A company has a problem that its recruiting cost is in increased during the last few years and the company wants to know the reason behind the increased recruiting cost and want to know the answers for the following questions

1. Which technique is effective recruiting online or recruiting through traditional media?
2. Why the recruiting cost of the company is increased?
3. What is the expected number of employees who will leave the job and expected number of new jobs in the company?
4. Is behavior of the manager have any effect on turnover?

# Solution

 As the problem there are three parts so these parts will solved the separately and the variables, target population, tools to extract data, sample size, data collection and analysis will be done for each part separately.

## Part A

in order to tell which technique is effective recruiting online or recruiting through traditional media we have to define effective technique first in this problem by effective technique we mean that the technique which is less expensive and attract larger pool of candidates.

### Variables

 The variables for this problem are

* Cost of recruiting online.
* Cost of recruiting traditionally.
* Number of candidates applied through recruiting online.
* Number of candidates applied through recruiting traditionally.

### Tools to extract data

 The data we need about these variables can be obtain from the company’s historical data i.e. the data about number of candidates applied online and applied through traditional media can be obtained from the company’s HR department and the data about the cost of recruiting online and recruiting can be obtained from the company’s accounting record.

### Sample Size

 The sample size for this part of the problem is the data regarding the above defined variables for last 20 jobs

### Data collection

 The data about the last 20 is obtained from the historical information of the company. The data is given below.

|  |  |  |  |
| --- | --- | --- | --- |
| Cost of recruiting online | Cost of recruiting traditionally | Number of candidates applied through recruiting online | Number of candidates applied through recruiting traditionally |
|

|  |
| --- |
| 10000 |
| 8000 |
| 12000 |
| 13000 |
| 7000 |
| 12000 |
| 10500 |
| 9000 |
| 9500 |
| 13000 |
| 14000 |
| 14500 |
| 14000 |
| 15000 |
| 16000 |
| 15000 |
| 16500 |
| 17000 |
| 17500 |
| 18000 |

 |

|  |
| --- |
| 12000 |
| 10000 |
| 13000 |
| 14000 |
| 8000 |
| 11000 |
| 8500 |
| 12000 |
| 12500 |
| 13000 |
| 15000 |
| 15500 |
| 16000 |
| 15000 |
| 14500 |
| 17500 |
| 16000 |
| 16500 |
| 17000 |
| 17500 |

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|  |
| --- |
| 700 |
| 650 |
| 800 |
| 850 |
| 600 |
| 770 |
| 720 |
| 660 |
| 600 |
| 800 |
| 870 |
| 900 |
| 890 |
| 940 |
| 960 |
| 910 |
| 970 |
| 1000 |
| 1010 |
| 990 |

 |

|  |
| --- |
| 650 |
| 600 |
| 675 |
| 720 |
| 500 |
| 620 |
| 510 |
| 650 |
| 666 |
| 675 |
| 750 |
| 770 |
| 800 |
| 750 |
| 735 |
| 875 |
| 800 |
| 820 |
| 835 |
| 850 |

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### Analysis

 After the collection of data we will find the mean of cost of recruiting online and traditionally and average number of people who applied online and applied traditionally. and then find the online recruiting cost per candidate and traditional recruiting cost per candidate

|  |
| --- |
|  |
| **Table showing the Mean and Standard Deviation of all variables** |
|  |  | Cost of recruiting online | Cost of recruiting traditionally | Number of people applied online | Number of people applied traditionally |
| N | Valid | 20 | 21 | 20 | 20 |
| Missing | 21 | 20 | 21 | 21 |
| Mean | 13075.0000 | 13071.5238 | 829.50 | 712.55 |
| Std. Deviation | 3253.64168 | 4084.05788 | 136.477 | 106.136 |
| Variance | 1.059E7 | 1.668E7 | 18626.053 | 11264.787 |

Online recruiting cost per candidate = 13075/829 = Rs 15.77/candidate

Traditional recruiting cost per candidate = 13071.5/712 = Rs 18.35/candidate

 Keeping in view the above information we can say that on the basis of cost online recruiting technique is better than traditional recruiting because the recruiting cost per unit of online recruiting is **15.77/candidate** which is less than the recruiting cost per candidate of traditional technique that is **18.35/candidate.** But on the basis of consistency traditional recruiting is better than online recruiting because the standard deviation or distance from mean of the number of people applied in traditional recruiting is **106.13** which is less than the standard deviation of number of people applied through traditional technique **136.477** mean that traditional technique provide more consistent results than online technique.

## Part B

 In order to answer the question that why the recruiting cost of the company is increased I will define the variables that will effect the recruiting cost and then collect data regarding these variables and after that I will do regression analysis to get the results.

### Variables

The dependent variable is Recruiting cost

The independent variables are

* Number of new jobs
* Turnover
* Recruiting technique

### Tools to extract data

 The information we need to know the reason for the increased turnover can be easily obtained from secondary data i.e. the data from the HR department.

### Sample size

 We are taking the information regarding our variables of last 10 years as sample.

### Data collection

 The historical data that we collect regarding our variables is

|  |  |  |  |
| --- | --- | --- | --- |
| Recruiting Cost | Recruiting Technique | New jobs | Turnover |
| 15000.0014000.0017000.0016000.0019000.0018000.0015000.0014000.0015000.0014000.0019000.0018000.0018500.0018000.0020000.0021500.0023000.0024000.0023500.0024500.00 | traditionalonlinetraditionalonlinetraditionalonlinetraditionalonlinetraditionalonlinetraditionalonlinetraditionalonlinetraditionalonlinetraditionalonlinetraditionalonline | 10.0010.0010.0010.0012.0012.008.008.0010.0010.0014.0014.0013.0013.0012.0012.0014.0014.0013.0013.00 | 12.0012.0014.0014.0014.0014.0010.007.0012.0012.0012.0012.0013.0013.0015.0015.0016.0016.0017.0017.00 |

### Analysis

 After the collection of data we will analyze it through regression analysis in SPSS to know the reason or effect of our recruiting technique, number of new jobs in the company and the turnover over the recruiting cost. The regression table that we get from which we will get the values of βo, β1and β2 .

|  |
| --- |
| **Coefficientsa** |
| Model | Unstandardized Coefficients | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 1024.643 | 2530.702 |  | -.405 | .691 |
| recruiting technique | -54.276 | 762.162 | -.008 | -.071 | .944 |
| Number of new jobs created in Organization | 729.918 | 263.931 | .411 | 2.766 | .014 |
| Turnover | 819.081 | 214.617 | .568 | 3.816 | .002 |
| a. Dependent Variable: Recruiting cost |

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| Y = recruiting costD = recruiting technique 0 = traditional. 1=OnlineX1 = Numbers of new jobsX2 = Turnover  |

**Regression Equation:**

 **Y = βo + β1D + β2X1 + β3X3**

In our regression analysis the value of βo is **1024.643** which means that if we ignore the effects of other variables such as recruiting technique, number of new jobs, and turnover then the recruiting cost will be equal to βo that is **1024.643.**

 In our equation β1 is the slope of the dummy variable and its value is **-54.276** which means that if we move from base category i.e. traditional recruiting to online recruiting the change in recruiting cost will be equal to **-54.276** or if we move from traditional to online recruiting the recruiting cost will decrease by **54.276**. **It means that traditional recruiting cost more than the online recruiting.**

In our equation β2 is the slope X1 or number of new jobs and its value is **729.918** means that with one unit increase in number of new jobs the recruiting cost will increase by **$729.918.** **This means that number of new jobs will increase the recruiting cost.**

In our equation β3 is the slope of X2 and the value that we get for it is 819.081 mean what with one employee who leave the job increase the recruiting cost by **$819.081**. **This means that with increase in turnover the recruiting cost will increase.**

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| **Model Summary** |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .894a | .799 | .761 | 1698.15373 |
| a. Predictors: (Constant), Turnover, recruiting technique, Number of new jobs created in Organization |

The adjusted R square is used to determine the quality of the regression model if its value is near to 1 it mean that the model is good and the model is more controlled by the controllable factors i.e. the variable we define and if its value is less near to zero its mean that the model is more controlled by non controllable factors. In our model the adjusted R square is **.761** means that our model is 76% controlled by the controllable factors or the variables we defined.

Keeping in view the analysis we conclude that the recruiting cost of the company is increase because of the increase in turnover, number of new jobs and use of traditional recruiting.

## Part C

 In order to get the expected number of employee who will leave the job and expected numbers of new job in the organization we will get some information from the historical data of the company and then find through the probability technique.

### Variables

 The variables in this part of the problem are the

* Number of employees who left the organization.
* Number of new jobs created in organization

### Tools to extract data

 We will get the information from the secondary data or historical data of the company regarding our variables. The data from HR department will help us to find the expected value of number of employees who will leave the organization in coming year and the expected number of new jobs in the organization.

### Sample size

 The sample size is the information regarding our variables i.e. the number of employees who left the job and the number of new jobs that are created in the organization.

### Data collection

 The that we collected regarding our variable is given below

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Total employees | Turnover | New jobs |
| 2007 | 400 | 24 | 14 |
| 2008 | 414 | 25 | 18 |
| 2009 | 432 | 30 | 20 |
| 2010 | 452 | 26 | 22 |
| 2012 | 474 | 28 | 20 |

### Analysis

 We will find the expected number of employees who will leave the job and expected number of new jobs the company by the formula X=NP

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| --- |
| N = total number of employeesP = the percentage of turnoverX= the expected number of employees who will leave the organization |

We will find the value of P by dividing the average number of employees who will leave the job to the average total number of employee.

 P = average turnover/average total number of employees

= 27/434

 = .0622

 X = NP

 = (.0622) (474)

 = 29 employees

The expected number of employees who will leave the organization is **29 employees.**

Now we will find the expected number of new jobs in the organization for that we will find the value of P first.

|  |
| --- |
| X = the expected number of new jobs in the organization.P = the percentage of new jobs.N = the total number of employees in the organization. |

 P = average new jobs/average total number of employees

 = 19/434

 = .043

 X = NP

 = (474) (.043)

 = 20 jobs

The expected number of new jobs in the organization is 20 jobs.

## Part D

 In order to answer the question that is the behavior of the manager has any effect on the turnover we will get the information related to employee behavior and turnover by designing a questionnaire and then analyze the information through probability method and finding that whether the turnover and behavior of the manager with employees are statistically independent event or not. If they are statistically independent event than there is no relationship between the turnover and behavior of manager and if they are not then they depend on each other.

### Variables

There are two variables in this problem

* Behavior of the manager with employees
* Turnover

### Population

 The people who are working is any organization is the population for this problem because the can provide us information regarding our variable.

### Tools to extract data

 The data that we will use to solve this problem is primary data which we will collect from designing a questionnaire. In the questionnaire we will ask the employees the question regarding our variables. The questionnaire that we design is

**Questionnaire**

1. Is the behavior of the manager with you is good
	1. Yes
	2. No
2. Is you are satisfied with behavior of your boss or not
	1. Yes
	2. No
3. If the behavior of the manager is not good with you then you will leave the job
	1. Yes
	2. No
4. If the behavior of the manager is good you will leave the job
	1. Yes
	2. No

### Sample size

 A randomly selected 200 employees is selected as a sample for our problem.

### Data Collection

 The data we collected from the 200 employees is as under

* 120 said that they behavior of the manager is good with the them and 80 said the behavior is not good with them
* Out the 120 employees 20 employees said that they will leave the job
* Out of 80 employees 50 said that they will leave the job

### Analysis

 The table we get from the above data is as under

|  |
| --- |
| Turnover |
| Yes(a) | No(b) | Total |
| Yes(c) | 20 | 100 | 120 |
| Good behavior  | No(d) | 50 | 30 | 80 |
| Total | 70 | 130 | 200 |

P (d/a) = 50/70

 = .714

P (d) = 70/200

 = .35

The above analysis show that the probability of employees who will leave the organization is greater in those employees whose relationship with the manager is bad the probability of turnover in total employees this mean that the relationship between the bad behavior of manager and turnover is a positive relationship.