Analysing attributes of our company’s employees.

Report

Analysis of Employee Survey Data

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**MIS 770 Foundation Skills in Data Analysis**

**Assignment 2**

**INTRODUCTION**

This report is meant to explain all the required aspects of our company’s employees after a thorough data analysis. We want to investigate the provided dataset of 400 employees reflecting several attributes (such as income, job satisfaction, work years, age, gender, union members, employee-management relationship, feelings of employees towards working for the company, job characteristics, estimating employees needed for the next survey) about our company’s workforce to answer the CEO’s questions. This has been done in the subsequent sections of the report. A few **assumptions** (mentioned throughout, except when referring to the figures provided in the question) in this report have been included; the annual salaries paid to the employees i.e., income is in thousand dollars ($ 000’s) from the last financial year, the work hours have been illustrated per week.

**EXECUTIVE SUMMARY**

Different employee attributes (variables) have been analysed in this report for a provided sample of 400 employees. The total annual income paid to these employees in the last financial year was $ 23644.2. When talking about job satisfaction, we have established that 356 (89 %) of the employees were happy with their jobs meanwhile the remaining 44 (11 %) were not. The incomes and work experience of these employees had a strong relationship which showed us that people with higher experience had higher salaries. When talking about an individual’s union member status we found that more male employees were members of the union as compared to other groups. Further, the age of an employee did not seem to have any relationship with how they describe their relations with the management in the workplace. Speaking about working hours to assist the organisation with its future budgets, all the employees should work between 44 to 46 hours per week. It was also found that 87.06 % to 92.94 % of the employees felt very proud or somewhat proud to work for the company. The annual salary paid to these employees was less than $ 62,000. It was also concluded that more than 40 % of these employees enjoyed their work. To be able to calculate the average annual income and proportion of employees that was satisfied with their jobs in the next survey, we would need to include at least 400 employees.

**Q1. (a)** We are considering a sample of 400 employees. The average (mean) income of the employees was $ 59.11. There was a considerable variation in the incomes of the surveyed employees. The difference between the lowest and highest pay out was $ 163.60. The minimum salary that was paid to the employees in the last financial year was $ 20.20 and the maximum salary that was paid out was $ 183.80. 50 % of the employees had an income below $ 52.4 and the rest were paid above that. There was a $ 28.21 deviation from the mean income of $ 59.11. Incomes of the middle 50 % of the employees varies between $ 37.55 and $ 75.50. The total annual income paid to these 400 employees was $ 23644.2. We can say that this sample includes employees whose incomes vary across several salary bands i.e., low income, moderate income, high income.

**(b)** We establish that the range of job satisfaction varies from little dissatisfied to very satisfied. Out of the 400 employees sampled, 27 (6.75 %) employees were little dissatisfied, 171 (42.75 %) were moderately satisfied, 17 (4.25 %) were very dissatisfied, and 185 (46.25 %) were very satisfied with their jobs. 44 (11 %) employees are not happy with their jobs. To gather their insights, anonymous surveys can be sent out to know what they expect from the company so that their experience can be improved. The remaining 356 (89 %) employees are happy with their jobs.

**Q2. (a)** We can establish that the sample of 400 employees contains people whose work experience ranges from 1 year to 54 years. The experience of the middle 50% of the employees varies between 12 years and 26 years. It is usually believed that with more years of experience comes increased income. Since both of our variables contain numerical data, we use the coefficient of correlation (value ranges from -1 to +1) to measure the relative strength of the linear relationship between work years and income. The close it is to the perfect positive i.e., +1, the stronger the relationship is. In our scenario, its value is 0.3045 which tells us that it is a positive and strong relationship which shows that people with more experience have higher incomes.

**(b)** The number of female employees in the sample of 400 is 162 out of which 21 women are members of the union meanwhile the remaining 141 are not. The number of male employees in this sample is 220 out of which 43 men are members of the union meanwhile the remaining 177 are not. Also, there is a very small number of people who have chosen not to disclose their gender i.e., 18 out of which 5 people are members of the union meanwhile the remaining 13 are not. We can see that more male employees are members of the union as compared to other groups.

**(c)** On the basis of the given sample of 400 employees, 54 (13.50 %) are aged between 18 to ≤ 27 years, 117 (29.25 %) are aged between 27 to ≤ 36 years, 128 (32.00 %) are aged between 36 to ≤ 45 years, 58 (14.50 %) are aged between 45 to ≤ 54 years, 37 (9.25 %) are aged between 54 to ≤ 63 years, and 6 (1.50 %) are above the age of 63 years. The average (mean) age is 39 years. People belonging to the same age have different relations with the management in the workplace for example, several 35-year-old people have described their relationship with the management as very bad, bad, so so, good, very good and the scenario is similar with each age. The age of a person does not seem to affect how an employee described their relationships with the management in the workplace hence, no relationship can be established between “Age” and “ManEmployeeRel”.

**Q3. (a)** On the basis of the given sample of 400 employees, we can establish that 44 (11.00 %) work between 28 to ≤ 38 hours, 236 (59.00 %) work between 38 to ≤ 48 hours, 67 (16.75 %) work between 48 to ≤ 58 hours, 37 (9.25 %) work between 58 to ≤ 68 hours, 10 (2.50 %) work between 68 to ≤ 78 hours and 6 (1.50 %) work more than 78 hours per week. The average (mean) working hours per week are 45. Majority (59.00 %) employees in this sample work between 38 to 48 hours per week and a considerable number of employees (30 %) work for more than 48 hours per week. With the margin of error of 0.9874, I am 95% confident while saying that to fit into the organization’s future budgets, all the employees should work between 44 to 46 hours per week.

**(b)** Based on the sample of 400 employees, a collective of 360 (90 % sample proportion) employees feel somewhat proud or very proud to work for the company. Out of these 360 employees, 251 (69.72 %) feel somewhat proud and 109 (30.28 %) feel very proud to work for the company. With the margin of error of 0.0294, I am 95 % confident while saying that the true proportion of the employees who feel somewhat proud or very proud to work for the company lies between 87.06 % and 92.94 %. The consensus seems to be that most employees feel proud working for the company.

**Q4. (a)** On the basis of the provided sample of 400 employees, we can be sure that 169 (42.45 %) were paid between $ 20.20 to ≤ $ 47.20, 127 (31.75 %) were paid between $ 47.20 to ≤ $ 74.20, 68 (17.00 %) were paid between $ 74.20 to ≤ $ 101.20, 26 (6.50 %) were paid between $ 101.20 to ≤ $ 128.20, 6 (1.50 %) were paid between $ 128.20 to ≤ $ 155.20 and 4 (1.00 %) were paid more than $ 155.20. The average (mean) income is $ 59.11. At 5% level of significance, there is enough evidence to conclude that the employees were paid less than $ 62000 annually.

**(b)** Out of the 400 sampled employees, to 203 (50.75 %; sample proportion) employees the most important job characteristic was “enjoying the work”, to 103 (25.75 %) it was “high income”, to 51 (12.75 %) it was the opportunities for advancement, to 24 (6.00 %) it was “no danger of being fired”, and to 19 (4.75 %) it was “flexible hours”. At 5 % level of significance, there is enough evidence to conclude that more than 40 % of the employees enjoyed their work.

**Q5. (a)** With the margin of error of 489.99, I am 95 % confidence while saying that 400 is the minimum sample size needed to be able to calculate the approximate average annual income paid to the staff by the company within $ 5,000. With the margin of error of 643.95, I am 99 % confidence while saying that 400 is the minimum sample size required for our specifications. With the margin of error of 411.213, I am 90 % confidence while saying that 400 is the minimum sample size required for our specifications.

**(b)** With the margin of error of 0.017, I am 95 % confidence while saying that 400 is the minimum sample size needed to be able to estimate the proportion of employees that is satisfied with their jobs to within 3 %. With the margin of error of 0.022, I am 99 % confidence while saying that 400 is the minimum sample size needed to cater to our specifications. With the margin of error of 0.014, I am 90 % confidence while saying that 400 is the minimum sample size needed to cater to our specifications.

To satisfy both the requirements above, if a single sample was to be chosen, we would choose larger of the two samples (n=400). Hence, we would need to include at least 400 employees in the next survey.

**CONCLUSION**

It can be concluded that: The total salary paid to our employees last year was $ 23644.2. Majority of the employees are happy with their jobs. Knowing the problems faced by unhappy employees through anonymous surveys can help the organisation to improve their experience. Employees who have greater experience have higher incomes. More male employees are union members as compared to other groups. The employees should work between 44 to 46 hours per week to assist the company with its future budgets. Majority of the employees feel proud working for the company. The employees were paid less than $ 62,000 annually. More than 40 % of the employees enjoyed their work. At least 400 employees would have to be included in the next survey to be able to determine average annual income and the proportion of employees that is happy with their jobs.