**Report about the Findings of the Analysis**

Your Name and Position

Company Name

Date

To: The Human Resource Manager

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# Introduction

In response to the growing need to enhance the competitiveness of our sales representatives' salary structures within the technology industry, a comprehensive analysis of factors influencing the salaries of hardware sales representatives was conducted. Leveraging a dataset comprising over 20,000 records extracted from our enterprise data warehouse, this study aimed to discern the intricacies of salary determinants and investigate potential disparities between male and female employees within the hardware sector. The dataset was meticulously filtered to include only observations meeting specific criteria: sales representatives working in the hardware industry, possessing a college degree, and aged 40 or above. This refined dataset, containing 21,988 observations, was the foundation for the subsequent analyses.

The report unfolds with descriptive statistics, employing summary measures to scrutinize salaries and Net Promoter Scores (NPS) across various personality types and genders within the hardware group. Subsequently, a contingency table is constructed, shedding light on the distribution of sales representatives based on gender and personality. The Two-sample t-test delves into potential significant differences in salary, age, feedback, and the number of certifications between female and non-female representatives. The report culminates in a regression analysis, exploring the impact of variables such as certificates, NPS, and personality types on salary and interpreting the associated statistical significance, F-statistic, R-square, and individual coefficients. This multifaceted examination aims to provide actionable insights for optimizing our sales representatives' salary structures and fostering an equitable work environment.

# Steps Involved in the Analysis Process

The data analysis process embarked on a methodical journey, extracting a vast dataset containing over 20,000 records from our enterprise data warehouse. The dataset underwent meticulous filtration to isolate a specific subset, adhering to three critical criteria: the sales representatives had to operate in the hardware industry, possess a college degree, and be 40 years or older. This refined dataset, comprising 21,988 observations, became the focal point for subsequent analyses. Descriptive statistics were then employed to unveil insights into sales representatives' salaries and Net Promoter Scores (NPS), categorized by personality types and gender within the hardware group. A contingency table was constructed to visualize the distribution of sales representatives based on gender and personality. Following this, a Two-sample t-test scrutinized potential differences in salary-related metrics between female and non-female representatives. The analysis culminated in a comprehensive regression model, where variables such as certificates, NPS, and personality types were examined for their impact on salary. Statistical significance tests, F-statistics, and individual coefficients were scrutinized to derive meaningful interpretations. This stepwise approach ensured a thorough exploration of the data, providing actionable insights into salary determinants and potential gender-related variations among our sales representatives in the hardware sector.

# Analysis and Interpretation of the Results

## Descriptive statistics

### Salary

The descriptive statistics reveal critical insights into the salary distribution and demographic composition of sales representatives who are 40 years or older, have a college degree, and work in the hardware industry. The mean annual base salary is $82,883, with a notable range from $30,000 to $197,000. The median salary of $79,200 and the mode at $73,000 suggest a somewhat positively skewed distribution (skewness = 0.866), peaking towards the lower salary range. As indicated by the standard deviation of $23,659, the spread is considerable, reflecting a diverse salary landscape within the hardware group.

### Gender

Examining the gender distribution, the data indicates that 34.35% of sales representatives are female, while 65.65% are non-female. This distribution offers valuable context for understanding the representation of gender within the hardware sales team.

### Personality Types

Most representatives fall into the Explorer (37.96%) and Diplomat (35.59%) categories, suggesting a balanced mix of practical decision-makers and empathetic individuals. Analysts constitute 11.85%, and Sentinels comprise 14.60% of the workforce. This breakdown provides a nuanced understanding of the diverse personality profiles contributing to the dynamics of the hardware sales team.

## Contingency Table

The contingency table cross-classifying personality types by gender for sales representatives who are 40 years or older, have a college degree, and work in the hardware industry provides a comprehensive overview of the distribution of sales representatives within the hardware group. Notably, the table reveals that among the total count of female representatives, 561 have a Diplomat personality type, and the remaining 135 have a Sentinel personality type. The count of Sentinel personality types is further broken down, with 696 representatives falling under this category.

The contingency table and subsequent interpretations shed light on the nuanced interplay between gender and personality types within the hardware sales team. The dominance of the Sentinel personality type, with a count of 696, suggests a prevalent trait among these representatives, emphasizing cooperative and practical tendencies. Meanwhile, the Diplomat personality type is prominent among females, with 561 representatives exhibiting empathetic and cooperative traits. The insights that can be gained from the table include;

***Gender-Personality Dynamics:*** The table underscores the importance of considering both gender and personality traits in understanding the composition of the sales force. It suggests potential correlations between certain personality types and gender, which may influence team dynamics and communication styles.

***Diplomat Representation***: The significant representation of the Diplomat personality type among females implies a potential alignment between empathetic traits and successful sales approaches within the hardware industry.

These findings offer valuable insights for human resources and management. Recognizing the prevalence of certain personality types among gender groups can inform targeted training programs and team-building initiatives tailored to enhance collaboration and effectiveness within the hardware sales team.

## Two Sample t-test

The Two-Sample t-test results assessing the significant differences between female and non-female sales representatives who are 40 years or older, have a college degree, and work in the hardware industry reveal intriguing insights.

### Salary

The two-sample t-test results reveal a statistically significant difference in the average salary between female and non-female sales representatives aged 40 or older, possessing a college degree and working in the hardware industry. The computed p-value of 5.07E-69 is considerably lower than the conventional significance level (alpha = 0.05), leading to the rejection of the null hypothesis (H0) and acceptance of the alternative hypothesis (Ha). This implies that, on average, there is no significant difference in salary between female and non-female employees within the specified demographic parameters.

Statistically, the t-statistic of -17.85 indicates a substantial deviation from the hypothesized mean difference of zero. With a significant degree of freedom (df = 4767) and a critical t-value of 1.960 for a two-tailed test, the evidence strongly supports rejecting the null hypothesis. From an organizational standpoint, these findings carry significant implications. The absence of a significant salary difference between female and non-female sales representatives underscores a potential commitment to pay equity within the specified demographic subset. This aligns with contemporary organizational values emphasizing gender equality and could contribute positively to employee morale, retention, and overall workplace satisfaction.

### Age

The calculated p-value for the Two-Sample t-test comparing the ages of female and non-female sales representatives is 0.5748, exceeding the significance level (alpha) of 0.05. Consequently, there is insufficient evidence to assert a significant age difference between female and non-female sales representatives aged 40 years or older, holding a college degree, and employed in the hardware industry. This analysis suggests that the age distribution within these specific cohorts does not exhibit a statistically significant disparity between genders. This information is valuable for HR planning and may influence decisions related to workforce management, mentoring programs, and age-inclusive policies, ensuring fair treatment and opportunities for all employees within this demographic subset.

### Feedback

For feedback, the average feedback score for female representatives was 2.71, with a standard deviation of 0.876. This score was 2.69 and 0.861, respectively, for non-female. Despite the minute difference in standard deviations, the equal variance assumption was deemed appropriate for this analysis. The computed t-statistic, with an observed value of 0.790, was juxtaposed against the critical t-value (1.960) at a 95% confidence level. The p-value of 0.429, exceeding the significance level of 0.05, led to the retention of the null hypothesis (H0), implying a significant difference in feedback scores between female and non-female sales representatives.

Statistically, this suggests that the observed difference in mean feedback scores is insufficient to be considered significant. Consequently, any apparent distinctions in feedback between female and non-female representatives are likely due to random variability rather than inherent gender-based disparities. From an organizational standpoint, this finding underscores the need for a holistic perspective on employee feedback. While the statistical test does not identify a significant gender-based difference, it prompts the organization to delve deeper into qualitative aspects of feedback, considering individual strengths and weaknesses, professional development needs, and the overall workplace environment. Moreover, it signals an opportunity for the organization to foster an inclusive and equitable feedback culture that transcends gender boundaries, ensuring fair and constructive evaluations for all employees.

### Number of Certificates

The conducted Two-Sample t-test, assuming equal variances, had an output with the computed p-value of 0.0155 below the significance level (α=0.05), leading to the rejection of the null hypothesis (H0). Consequently, we accept the alternative hypothesis (Ha) and conclude that there is no statistically significant difference in the number of certificates achieved between female and non-female sales representatives in the specified demographic. Statistically, this implies that, on average, the number of professional certificates earned by female and non-female representatives is comparable. The minimal difference in means (2.3547 for females vs. 2.4739 for non-females) is not statistically significant, supported by the narrow confidence interval around the mean difference. This finding holds despite the variation in certificate numbers, as reflected in the close standard deviations.

From an organizational perspective, this result suggests that the company's initiatives for professional development, certification programs, and educational opportunities are equally effective for female and non-female sales representatives within the specified demographic. The absence of a significant difference in certifications aligns with the principles of equal opportunity. It underscores the organization's commitment to fostering an inclusive and equitable work environment. This insight can guide future talent development strategies, ensuring that training and certification programs continue to benefit all sales representatives uniformly, contributing to a cohesive and motivated sales force.

## Linear Regression

### Significance of Variables:

The regression model demonstrates statistical significance (p < 0.05) for all variables: Certificates, NPS, Female, Analyst, Diplomat, and Explorer. These factors significantly explain sales representatives' salary variability within the hardware industry.

### F-Statistic:

The F-statistic of 804.46 is highly significant (p < 0.05). The statistic implies that the whole model yields a better fit than an intercept-only model. Ultimately, it is seen that at least one of the predictors in the model has a non-zero effect on salary.

### R-square:

The R-square of 0.50 statistically interprets a finding that 50% of the variability in salary can be attributed to the variables stated in the model. While this indicates a moderate explanatory power, it also suggests that additional factors not considered in the model may influence salary levels among hardware sales representatives.

### Interpretation of β3 (Female):

The coefficient for the Female variable is -11,997.40. sing the code 1 for female representatives and 0 otherwise, the negative coefficient suggests that, on average, female sales representatives earn significantly less than their male counterparts. This observed effect is not only substantial but also statistically significant (p < 0.05).

### Factors Influencing Salary:

Certificates, NPS, Diplomat, and Explorer variables have positive coefficients, indicating that higher levels of certifications, positive NPS, and having a Diplomat or Explorer personality type are associated with higher salaries. On the other hand, being female is negatively associated with salary. Analyst personality type does not show a statistically significant impact on salary.

The results suggest that, within the hardware industry, certifications, positive NPS, and certain personality types significantly influence sales representatives' salaries. The gender-based salary disparity is evident, with female representatives earning significantly less on average. While the model explains a substantial portion of salary variability, other unaccounted factors are likely influencing compensation. The organization should consider addressing gender pay gaps and further exploring factors influencing salaries to ensure equitable compensation practices. Additionally, efforts to enhance certifications and foster positive customer relationships may positively impact sales representative salaries within the hardware sector.

# Recommendations and Conclusions

### Gender Pay Equity:

The analysis reveals a significant gender-based salary disparity within the hardware industry. To foster a more equitable work environment, it is recommended that the organization conduct a thorough review of its compensation policies. Initiatives such as regular salary audits, transparency in pay structures, and targeted efforts to address any systemic biases contributing to the observed differences should be considered. This will align with the principles of fairness and contribute to employee satisfaction and retention.

### Professional Development Programs:

The absence of a significant difference in the number of certifications between female and non-female representatives is a positive finding. It suggests that the organization's professional development initiatives are effective across gender lines. The company should continue investing in training and certification programs to capitalize on this, ensuring accessibility and encouragement for all representatives. This will contribute to a skilled and motivated sales force, positively impacting the bottom line.

### Personality Traits and Sales Performance:

The regression analysis highlights the influence of personality traits, such as Diplomat and Explorer, on sales representatives' salaries. The organization can leverage this insight by incorporating personality assessments into recruitment and training processes. Tailored training programs based on personality types can enhance individual and team performance, fostering a collaborative and effective sales environment.

### Ongoing Evaluation and Inclusion:

While the model explains a substantial portion of salary variability, it is crucial to acknowledge that other unaccounted factors may influence compensation. Therefore, the organization is encouraged to regularly evaluate its salary structures, considering emerging industry trends and market benchmarks. Additionally, fostering a culture of inclusion and open communication can provide a platform for employees to voice concerns and contribute to the continuous improvement of workplace practices.

### Customer Satisfaction Impact:

The positive correlation between Net Promoter Scores (NPS) and salaries indicates the importance of customer satisfaction in the success of sales representatives. Recognizing and rewarding high NPS achievements can further motivate the team. Moreover, the organization should continue investing in customer-centric approaches and employee training to enhance overall customer satisfaction, positively influencing sales representative salaries.

### Comprehensive Feedback Culture:

Analyzing feedback scores emphasizes the need for a holistic perspective on performance evaluation. While statistically, there may not be a significant difference between female and non-female representatives. The organization should prioritize cultivating a comprehensive feedback culture. This involves considering individual strengths, weaknesses, and professional development needs, ensuring fair and constructive evaluations for all employees.

# Conclusion

In conclusion, the findings of this analysis provide valuable insights into the salary structures of hardware sales representatives, shedding light on gender-based differences, the impact of personality traits, and the role of certifications and customer satisfaction. The recommended actions aim to address the identified disparities and enhance overall workforce effectiveness and satisfaction. By prioritizing gender pay equity, investing in professional development, leveraging personality assessments, and fostering a culture of continuous improvement, the organization can position itself as a leader in fair employment practices within the competitive technology industry.