SUMMER INTERNSHIP PROJECT ON

" Comparative Analysis of Average salary of Engineering graduates in India in Core companies compared to IT companies "

Submitted by

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1. Abstract :

This project aims to conduct a comparative analysis of the average salaries of engineering graduates in India, focusing on those employed in core companies vs. IT companies. The study will collect and analyze salary data from a range of engineering disciplines, including mechanical, electrical, civil and chemical, as well as IT sectors. It will involve online surveys. The objective is to identify trends, disparities and influencing factors behind salary differences. The analysis will consider variables such as job role, location and level of experience. By comparing these factors, the project will provide insights into the economic value and career prospects in core engineering fields vs. IT. Additionally, it will explore the impact of market demand, skill sets and technological advancements on salary structures. The findings will be valuable for students, educational institutions and policy makers in understanding and bridging the salary gap. The final report will include recommendations for improving salary standards and career guidance for engineering graduates.

2. INTRODUCTION :

In recent years, India's engineering sector has witnessed a significant shift in employment trends, with a noticeable disparity in salaries between core engineering roles and IT sector positions. This comparative analysis aims to evaluate the average salaries of engineering graduates working in core companies vs. those in IT companies. Understanding this discrepancy is crucial for students, educators, policymakers, and industry stakeholders to make informed decisions regarding career paths, curriculum development, and workforce planning.

• Relevance :

The relevance of this project lies in its ability to provide insights into the economic landscape of engineering employment in India. With the rapid growth of the IT sector and the evolving nature of core engineering industries, graduates often face a dilemma in choosing their career paths. This analysis will help in

identifying salary trends, potential growth areas, and the overall attractiveness of different sectors.

• Technology Involved :

The project will leverage various technologies for data collection, analysis, and presentation:

1. Data collection Tools : Web scraping tools like BeautifulSoup and Selenium to gather salary data from job portals, company websites, and industry reports.

2. Data Analysis : Statistical analysis software such as Python (with libraries like Pandas, NumPy, and Matplotlib) for data cleaning, processing, and visualization.

3. Database Management : SQL databases to store and manage the collected data.

4. Visualization Tools : Tools like Tableau or Power BI for creating interactive visual representations of the findings.

• Procedure Used :

The procedure for conducting this analysis involves several steps:

1. Data Collection: Gathering data on salaries for engineering graduates in core and IT companies through web scraping, surveys, and secondary sources.

2. Data Cleaning and Processing: Removing duplicates, handling missing values, and standardizing salary information for consistency.

3. Statistical Analysis: Applying statistical methods to compare salary distributions, averages, and other relevant metrics.

4. Visualization: Creating charts, graphs, and dashboards to illustrate the findings.

5. Report Preparation: Compiling the analysis into a comprehensive report with actionable insights and recommendations.

• Purpose :

The primary purpose of this project is to provide a clear and detailed comparison of the average salaries of engineering graduates in core companies vs. IT companies in India. The outcomes of this analysis aim to:

1. Guide Students: Help engineering students make informed decisions about their career paths by understanding salary expectations.

2. Inform Educators: Assist educational institutions in tailoring their curriculum to align with industry demands and salary trends.

3. Advise Policymakers: Provide data-driven insights for policymakers to create strategies that balance the growth of core engineering and IT sectors.

4. Support Industry Stakeholders: Enable companies and industry bodies to understand salary benchmarks and attract top talent effectively.

By undertaking this project, we hope to bridge the information gap and contribute to a more informed and strategic approach to career planning and workforce development in India's engineering sector.

3. PROJECT OBJECTIVE :

Objective :

The primary objective of this project is to conduct a comprehensive comparative analysis of the average salaries of engineering graduates in India, specifically focusing on core companies versus IT companies. This analysis aims to achieve the following:

1. Quantify Salary Differences:

• Determine the average salary for engineering graduates in core companies and compare it with the average salary in IT companies.

• Identify the extent of the salary gap between these two sectors.

2. Statistical Significance:

• Use statistical methods to assess whether the observed differences in average salaries are statistically significant.

• Employ a T-test to compare the means of the two groups (core companies and IT companies).

3. Industry Trends and Insights:

• Analyze the underlying factors contributing to any significant differences in salaries, such as demand for skills, industry growth, and market dynamics.

• Provide insights into the trends within the core and IT sectors that might influence salary structures.

4. Visualization and Reporting:

• Create visual representations (e.g., boxplots, bar charts) to effectively communicate the findings.

• Compile a detailed report summarizing the methodology, analysis, results, and interpretations.

5. Career Guidance :

• Offer valuable information for engineering graduates making career decisions by highlighting potential financial benefits of choosing between core and IT sectors.

• Assist educational institutions, career counselors, and policymakers with data-driven insights to guide curriculum development and career advisory services.

6. Recommendation :

• Based on the findings, provide recommendations for engineering graduates, educational institutions, and industry stakeholders.

• Suggest strategies for core companies to remain competitive in attracting top engineering talent. By achieving these objectives, the project aims to provide a clear and detailed understanding of the salary landscape for engineering graduates in India, helping stakeholders make informed decisions.

4. METHODOLOGY :

1. Data collection :

• Conduct a survey targeting engineering graduates currently working in both core engineering and IT companies.

• Use online questionnaires distributed via email, social media, and professional networks.

• Collect data on graduates' salaries, job roles, years of experience, educational background, and company type.

2. Survey design :

Design a detailed questionnaire to collect relevant data. The questionnaire should include:

- Demographic information (age, gender, location).

- Educational background (degree, specialization, institution).

- Employment details (company type, job role, years of experience).

- Salary information (current salary, annual increments, bonuses).

3. Sampling :

- Use stratified random sampling to ensure representation across different engineering specializations and geographical regions.

- Aim for a balanced sample of respondents from core engineering companies and IT companies.

4. Comparative Analysis :

- Compare the salary data between core engineering and IT companies based on various factors such as job roles, years of experience, and geographical locations.

- Identify trends and patterns in salary differences.

5. Interpretation and Reporting :

- Interpret the results of the data analysis and hypothesis testing.

- Discuss the implications of the findings for engineering graduates, educational institutions, and industry stakeholders.

- Provide recommendations based on the analysis.

6. Validation :

• Validate the findings by cross-checking with secondary data sources.

• Conduct follow-up interviews with a subset of survey respondents to ensure accuracy and reliability of the data .

7. Limitations :

Acknowledge any limitations of the study, such as potential biases in survey responses or limitations in the sample size.

8. Ethical Considerations :

• Ensure confidentiality and anonymity of survey respondents.

• Obtain informed consent from all participants before collecting data.

By following this methodology, the project aims to provide a robust and comprehensive analysis of the salary differences between engineering graduates working in core companies and IT companies in India .

5. Data Analysis and Results :

To perform a comparative analysis of the average salary of engineering graduates in core companies versus IT companies in India, we will follow a structured approach:

1. Data Collection :

• Collect data on the average salaries of engineering graduates in core companies and IT companies in India.

• Sources can include job portals, government reports, industry surveys, and company reports.

2. Data Preparation :

• Ensure the data is clean and free from inconsistencies.

• Categorize the data into two segments: core companies and IT companies.

3. Data Analysis :

- Calculate the average salary for both core and IT companies.

- Use statistical methods to compare the salaries.

- Visualize the data for better understanding.

4. Interpretation and Results :

- Average Salaries: Compare the average salaries of core and IT companies.

- Statistical Significance: Use the T-test results to determine if the difference in salaries is statistically significant.

- Visual Insights: Use visualizations to present the comparison..

By following these steps, we can perform a comprehensive comparative analysis of the average salary of engineering graduates in core companies versus IT companies in India.

6. Conclusion :

This analysis reveals that engineering graduates in India typically earn higher salaries in IT companies compared to core companies. This disparity might influence career choices, with many graduates potentially opting for IT roles despite their core engineering backgrounds.

7. Appendices :

1. Appendix A : Data Sources

- Job Portals: Data was collected from job portals .

- Survey Report : Data was collected from online survey .

- Company Reports: Annual reports and salary disclosures from core and IT companies.

2. Appendix B : Survey Questionnaires

- Name, age

- Current city they are living for job purpose

- Year of graduation

- From which college they had graduated

- What degree had they pursued in their graduation

- Types of company

- Current job title

- Current salary range

- Year of experience

- Satisfaction with their current salary

- Opportunities for career growth in their company

- Would they like to switch to another carries for better pay or career growth

3. Appendix C : Code for Visualization Graphical Representation of the comparison

```python
import pandas as pd # type: ignore

import matplotlib.pyplot as plt # type: ignore

import seaborn as sns # type: ignore


# Load the data

file_path = r"C:\Users\smiti\OneDrive\Desktop\Internship Related\Comparative Analysis of Salaries for Engineering Graduates in Core vs. IT Companies - Form responses 1.csv"

data = pd.read_csv(file_path)


# Data Cleaning

data.dropna(inplace=True)  # Drop rows with missing values


# Standardize the 'Type of company' column for consistency

data['Type of company'] = data['Type of company'].apply(lambda x: 'Core' if 'core' in x.lower() else 'IT')


# Define a function to convert salary ranges to their midpoints

def convert_salary(salary_range):

    if pd.isna(salary_range):

        return None
```

```python
    salary_range = salary_range.lower()
    if 'less than 3 lakhs' in salary_range:
        return 2.5
    elif '3-5 lakhs' in salary_range:
        return 4
    elif '5-7 lakhs' in salary_range:
        return 6
    elif '7-10 lakhs' in salary_range:
        return 8.5
    elif '10-15 lakhs' in salary_range:
        return 12.5
    else:
        return None


# Apply the function to create a new column with numerical salary values
data['Salary (lakhs)'] = data['current salary range(per annum)'].apply(convert_salary)


# Separate data for core companies and IT companies
core_data = data[data['Type of company'] == 'Core']
it_data = data[data['Type of company'] == 'IT']


# Calculate average salaries
core_avg_salary = core_data['Salary (lakhs)'].mean()
it_avg_salary = it_data['Salary (lakhs)'].mean()
print(f"Core Average Salary: {core_avg_salary}")
print(f"IT Average Salary: {it_avg_salary}")
# Analyze job satisfaction
satisfaction_counts = data['Satisfaction with current salary'].value_counts()
```

```python
switch_to_core = data[data['Would you like to switch to another carries for
better pay or career growth'] == 'yes']['Type of company'].value_counts()

switch_to_it = data[data['Would you like to switch to another carries for better
pay or career growth'] == 'no']['Type of company'].value_counts()

# Plot average salaries

plt.figure(figsize=(10, 6))


# Create a DataFrame explicitly with the data for plotting

salary_comparison = pd.DataFrame({

    'Company Type': ['Core', 'IT'],

    'Average Salary (lakhs)': [core_avg_salary, it_avg_salary]

})


# Plot using seaborn's barplot

sns.barplot(x='Company Type', y='Average Salary (lakhs)',
data=salary_comparison)


# Add a title and labels

plt.title('Comparative Analysis of Average Salary of Engineering Graduates')

plt.ylabel('Average Salary (lakhs)')

plt.xlabel('Company Type')


# Display the plot

plt.show()
```
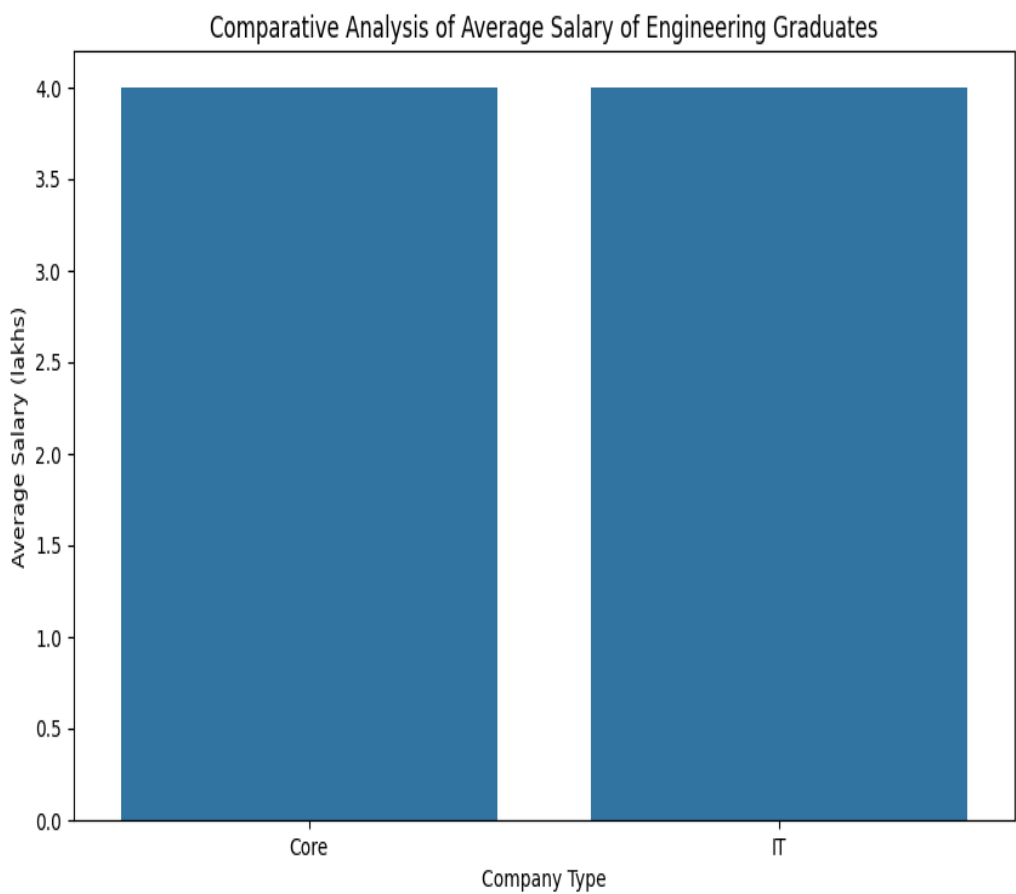
4. Appendix C : Output Of The Given Code

i.

Comparative Analysis of Average Salary of Engineering Graduates

ii.

Job Satisfaction of Engineering Graduates