ANALYTIC TOOLS & DECISION MAKING

KNOW YOUR WORTH!

INDEX

Introduction

The German economy has always been a dynamic one. Germany has been recognized as a leader in digital and technological fields, not only nationally but also internationally. The IT sector in Germany is growing through a remarkable evolution process. Companies in the IT sector are continuously innovating products to attract customers in the face of digitalization.

This led to several people entering the IT industry, as there are big open doors for newcomers to kick start their careers and experienced people are looking for better opportunities. To understand the Information Technology market in Germany, a survey was conducted for three consecutive years from 2018 to 2020 to assess the importance of skill sets for IT specialists in relation to experience, position, and other key factors.

Dataset selected

The dataset acquired from "Kaggle" contains the salary information of IT professionals and the data was collected anonymously through Microsoft forms for 3 years starting from 2018. During the inauguration year 2018, The questions were straightforward, and the count kept increasing over the next couple of years including some of the predominant questions like skill set, vacation days per year, and even covered the epic corona pandemic.

Dataset source - https://www.kaggle.com/datasets/parulpandey/2020-it-salary-survey-for-eu-region

Background

There are positions in the IT world that are high in demand and where there is a shortage of qualified workers. In addition to indicating mid-to senior-level positions, these professions are also associated with higher incomes. A lower salary is generally associated with entry-level positions. These include positions such as help desk analyst, IT technician, and IT associate. One will see your salary increase as you gain more experience and specialize in areas like systems administration or cloud computing.

By acquiring in-demand skills through certifications or other means, salaries have increased. This is also true of furthering your education. A survey by Global Knowledge found that 12 percent of those who received a raise in 2020 attributed it to new skills, whether they achieved certifications or not. The average salary increased for IT professionals who got new certifications was $13,000.

Motivation

The salary analysis serves a variety of goals, ranging from wage determination to market competitiveness to internal salary equity problems as they occur. With changes in employment markets and supply and demand, the statistics in a wage analysis will fluctuate throughout time, shifting up and down based on need and relevance.

Salary surveys conducted over a few years can assist human resource professionals, Job consulting firms and Job seekers in determining new roles, compensation increases, volatility, trends, or jobs on the decrease.

Insights

It was unheard of in the past for tools to help analyze which technologies are in demand, giving employees who are looking to switch companies the opportunity to earn a better salary. Consultancies, recruitment departments, and startup companies would need to spend a great deal of time finding out about emerging technologies and the packages they can offer without these tools and data.

The IT employees can evaluate the information obtained from the analysis and comprehend the technologies that are in demand, as well as the packages being offered by companies for each technology without utilizing the services of consultants.

Problem statement

The objective is to estimate the expected salary level of each job position and most promising skill set every year based on the survey results for Germany from 2018 to 2020, considering multiple factors like years of experience, work locations, and contract types. The big tech companies hire or retain many employees based on industry requirements. A person might find it confusing to determine the right career path due to the wide range of career opportunities in the IT sector in Germany.

Salary planning is one of the most important sub-disciplines of human resources and plays an essential role in attracting, motivating, and retaining talents. One important part of this planning is salary benchmarking, which aims to determine the market pay scales of employees with respect to different job roles. This analysis of survey results will help the HR team in the big companies, Consulting firms and Individual job seekers for a better understanding of the market.

Project Proposal

We will be curating a descriptive analysis with the dataset, answering most of the hypothetical questions that pop up when seeking a job in a corporate firm and providing insights to the job consulting firms about the Information Technology industry as well as Human resource professionals working in the same industry. In this manner, they can assess their candidates based on their level of work experience and waive off other required skill sets helping them to land their dream job.

Examine the highest paid salaries, the most popular programming languages, and the seniority and their pay based on these languages here. A key goal of this study is to estimate the competitive value of an IT skill set based on the years of experience, place, salary, etc.

Target Audience

The Job consulting firms that are based in Germany and Human resource professionals will be our target, giving them major insights about the Cost to company (CTC) discussions considering various factors of an employee along with the top skills that are required to get a job from a lucrative organization.

Getting a decent pay job nowadays is a hustle when you are new to the market and the same is applicable to experienced employees as well. The consulting firms should be all ears to the market, knowing what they should do to get a job seeker inside a corporate firm. This project will help the firm to seek a naive employee who is looking for a job, consult him, and advise the current market strategy to end up getting them a high pay job.

Start-ups and Human Resource professionals

In this new era of technology where every individual is aspiring to start their own company. Based on this information, the company will be able to determine the employee's career path and their position within the company, as well as the type and area of business the company engages in.

Job Consultancy firms

Most consultancies analyze these data to find the most sought-after technologies with highly competitive salaries and then recommend training people for those technologies.

Analysis questions

- Which age group has the most responses?
- Which city has the greatest number of respondents?
- What is the median salary of Male, females, and other sexualities?
- What are the top 5 skill sets of respondents?
- What language do most of the respondents speak at work?
- What is the total percentage of people who lost their jobs due to the Corona outbreak?
- What are the top 5 high-paying business sectors?
- What is the most common position of the respondents?

EXPLORATORY DATA ANALYSIS(EDA)

Information Technology Salary Survey for Europe region

Dataset description

An anonymous salary survey has been conducted annually since the year 2018 among European IT specialists with a stronger focus on Germany. The data has been made publicly available by the authors. The dataset contains rich information about the salary patterns among the IT professionals in the EU region and offers some great insights about the top skills and other key factors to sustain their position in the market. A study of IT individuals over a 3-year period depicted a gradual rise in participation by about a quarter percent.

The dataset contains 3 CSV files for the consecutive years 2018, 2019 and 2020. There are 23 features and 3K observations each representing an IT professional with different backgrounds and skillsets. The predominant feature of the dataset that discusses the corona outbreak gives an idea of lay off and recession that happened during the pandemic.

Column description and data type

COLUMN NAME	DATA TYPE	DESCRIPTION
Timestamp	Date	Date of entry
Age	Numerical	Age of the respondent
Gender	Categorical	Gender of the respondent
City	Categorical	City of the respondent
Position	Categorical	Role at the working firm
Total years of experience	Numerical	Overall total experience
Years of experience in Germany	Numerical	Work experience in Germany
Seniority level	Categorical	Designation at the working firm
Your main technology/ programming language	Categorical	Primary skill set
Other technologies/programming languages you use often	Categorical	Secondary skill set
Yearly Brutto salary (without bonus and stocks) in EUR	Numerical	Annual salary excluding Bonus and Stocks
Yearly bonus + stocks in EUR	Numerical	Annual Bonus and Stocks
Annual Brutto salary (without bonus and stocks) one year ago. Only answer if staying in the same country	Numerical	Previous annual salary excluding Bonus and Stocks
Annual bonus+stocks one year ago. Only answer if staying in same country	Numerical	Previous annual Bonus and Stocks
Number of vacation days	Numerical	Total number of vacation days per year
Employment status	Categorical	Employment type of the respondent

Ð¡ontract duration	Categorical	Contract duration of the respondent
Main language at work	Categorical	Communication language at the workplace
Company size	Numerical	Size of the company
Company type	Categorical	Business unit of the organization
Have you lost your job due to the coronavirus outbreak?	Categorical	Did you lose your job due to the Corona pandemic?
Have you been forced to have a shorter working week (Kurzarbeit)? If yes, how many hours per week	Numerical	Have you been given the work hours you suppose to work?
Have you received additional monetary support from your employer due to Work from Home? If yes, how much in 2020 in EUR	Numerical	Did your firm help with work from allowance?

Incomplete, missing or Invalid records

The dataset contains missing values, and the below table encompasses the number of missing values per column from the dataset.

Timestamp	0
Age	229
Gender	24
City	29
Position	35
Total years of experience	49
Years of experience in Germany	1788
Seniority level	49
Your main technology / programming language	905
Other technologies/programming languages you use often	1913
Yearly brutto salary (without bonus and stocks) in EUR	16
Yearly bonus + stocks in EUR	1706
Annual brutto salary (without bonus and stocks) one year ago. Only answer if staying in the same country	925
Annual bonus+stocks one year ago. Only answer if staying in same country	2106
Number of vacation days	893
Employment status	1773
Ð¡ontract duration	823
Main language at work	36
Company size	47
Company type	91
Have you lost your job due to the coronavirus outbreak?	1776
Have you been forced to have a shorter working week (Kurzarbeit)? If yes, how many hours per week	2636
Have you received additional monetary support from your employer due to Work From Home? If yes, how much in 2020 in EUR	2547

Data segmentation

The data can be segmented with respect to features like Contract duration, Employment status and Seniority level of the Organization. The imperative way to segment the dataset is by splitting the observations corresponding to the Year of Survey taken and Age group.

Data imbalance

The data is slightly imbalanced as we have almost 84% of the respondents are Male and 43% of the survey responses were from Berlin city from Germany. Since this survey was conducted throughout Germany for the purpose of recognizing salary patterns of IT professionals, this data imbalance is legitimate.

Data correlation

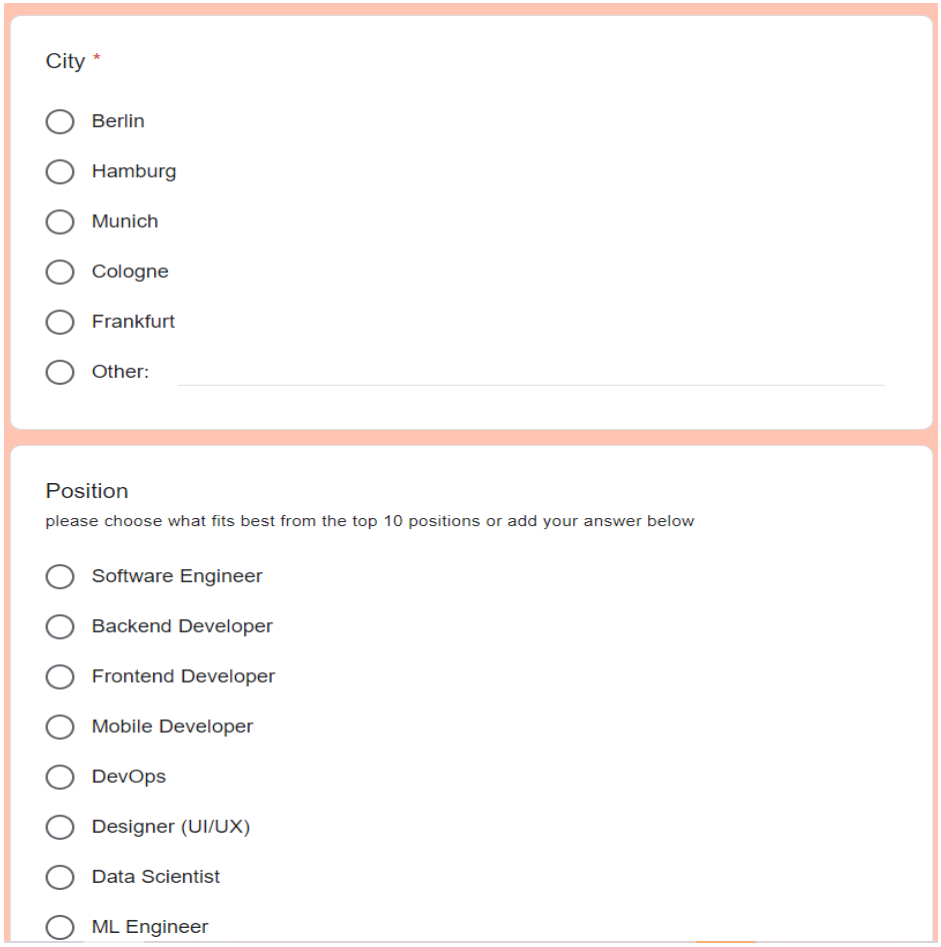
The current gross salary and the salary one year ago of the respondents are positively correlated other than the same features of the dataset and a negative correlation can be spotted between other features of the dataset.

Data collection

This survey data was collected through Microsoft forms for three consecutive years 2018, 2019 and 2020 by "Viktor Shcherban'' and "Sergey Vasilyev". This anonymous survey made respondents answer 23 questions regarding their corporate life. As we know that all had to go through a pandemic. During the initial months of 2020 which eventually snatched many respondent jobs since the market was completely down and data contains this as a question which is addressed. This dataset was spotted from "Kaggle".

Dataset source - https://www.kaggle.com/datasets/parulpandey/2020-it-salary-survey-for-eu-region
Survey link - https://docs.google.com/forms/d/e/1FAIpQLSdPDpjEN98tazCLOQ7xxgK84DZeanC8wI_akPyKOeW3HwBhuA/viewform

Here are a few anonymous questions from the survey.



Total years of experience
gained in all countries of residence, e.g. 5

Your answer

Years of experience in Germany
e.g. 3

Your answer

Seniority level

- ◯ Junior
- ◯ Middle
- ◯ Senior
- ◯ Lead
- ◯ Head
- ◯ Other:

Your main technology / programming language
e.g. Java

Corona crisis related questions

Have you lost your job due to the coronavirus outbreak?

- ◯ Yes
- ◯ No
- ◯ Other:

Have you been forced to have a shorter working week (Kurzarbeit)? If yes, how many hours per week
number between 0 and 40, e.g. 30

Your answer

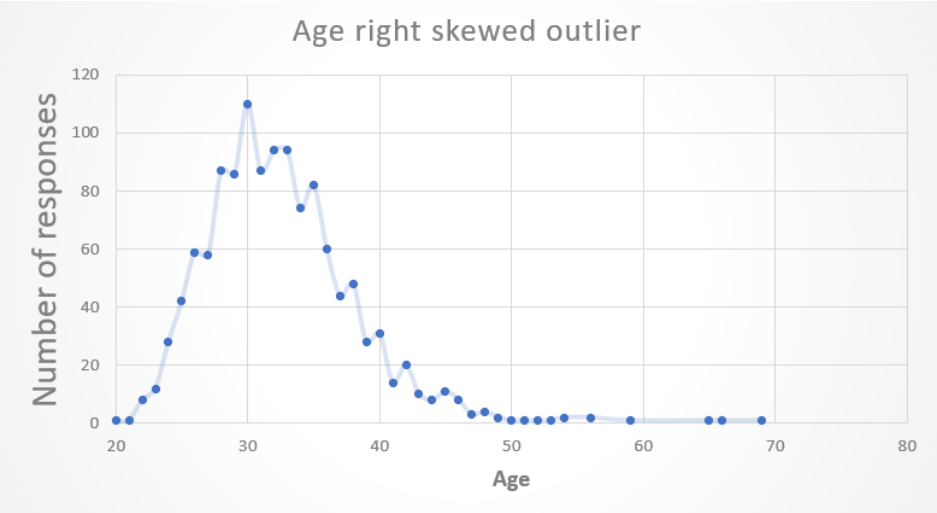
Have you received additional monetary support from your employer due to Work From Home? If yes, how much in 2020 in EUR
rough brutto sum in euro, e.g. 500

Your answer

Submit Clear form

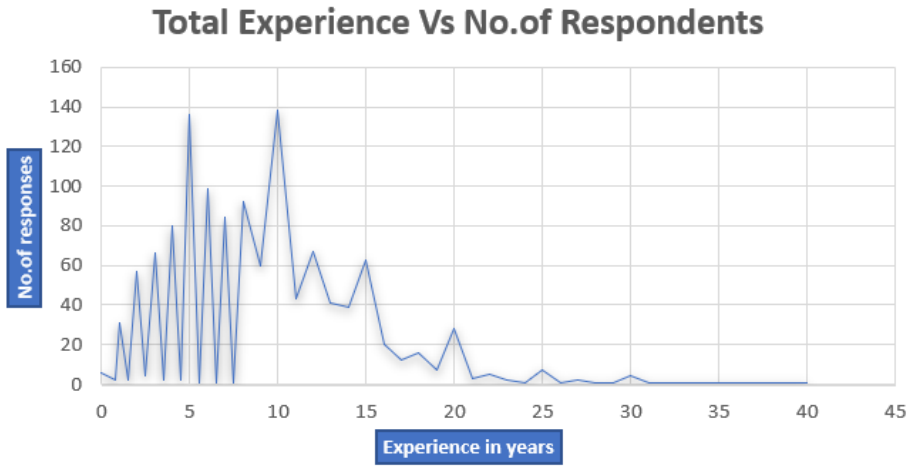
Outliers

- Age outlier



There is a right skewed outlier when it comes to Age feature since we had minimal responses from people above 50 years of age. Since most of the employees begin their career at the age of 20, There would be a left-skewed outlier that is redundant when it comes to real-world data of IT professionals.

- Total experience of the respondent



Most of the respondents who took the IT salary survey fall under less than 20 years of experience. We can recognize a right-skewed outlier from this chart as people who work more than 20 years are not ready to take up the survey. This can be neglected since majority of the respondents lie in the first set of categories.

Inclusion Criteria

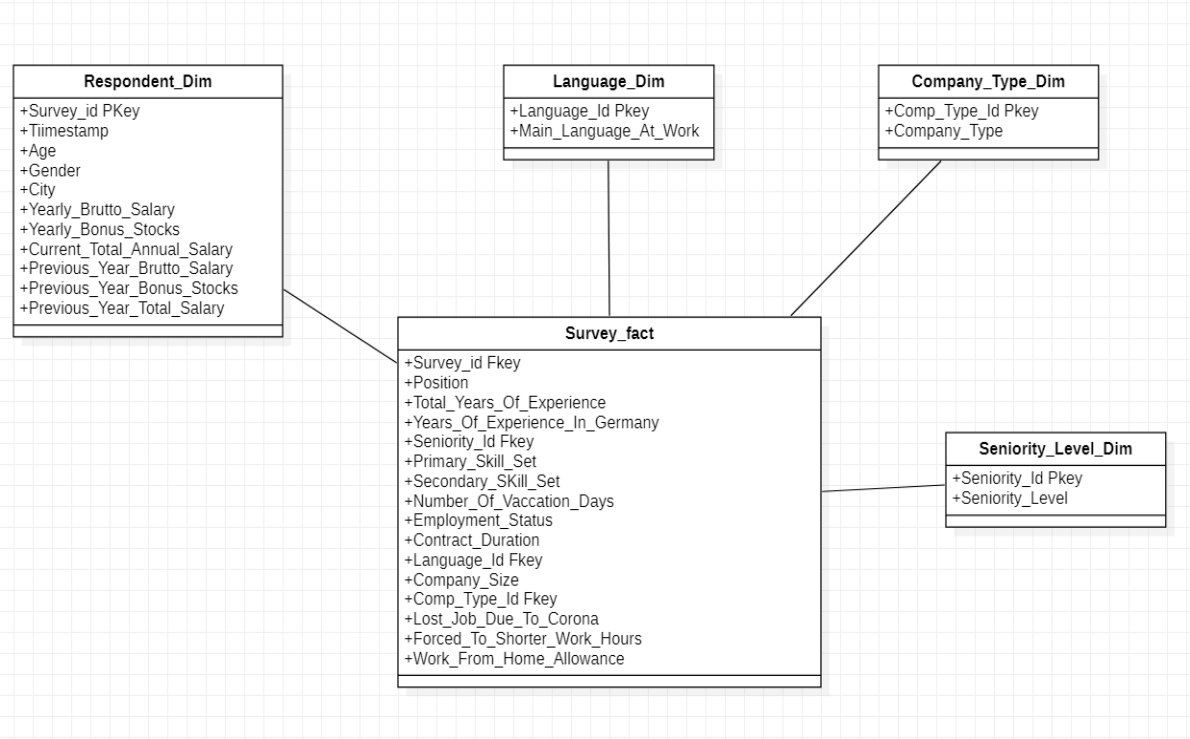
Geographically, the dataset is based on Germany dated from 2018-2020. We are planning to add few unique columns like Survery_id, Total_Annual_salary (Including yearly+bonus+stocks), Previous_Year_Total_Salary and make use of these columns segregating fact and dimension tables. The inclusion criteria for the dataset are

- Gender
- Age
- Position
- Primary skill set
- Yearly Gross salary

Schema diagram

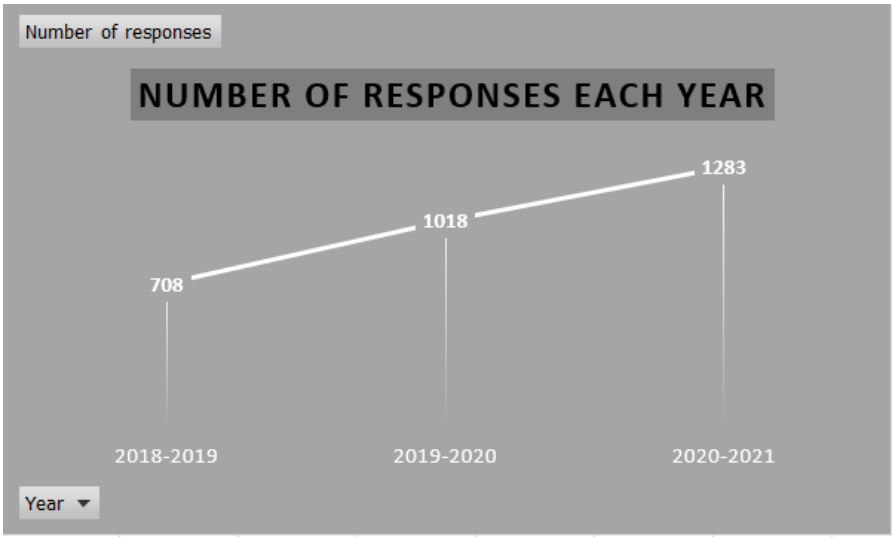
The Schema diagram shows the different table names and the connections between them. The Survey_fact table is the main table which has connections with all other tables with the help of foreign keys in which are primary keys in their respective tables. The "Respondent_Dim", "Language_Dim", "Company_Type_Dim" and "Seniority_Level_Dim" are the other tables.

The "Survey_id" in "Respondent_Dim", "Language_Id" in "Language_Dim", "Comp_Type_Id" in "Company_Type_Dim" and "Seniority_Id" in "Seniority_Level_Dim" are the primary keys and foreign keys in "Survey_fact" table



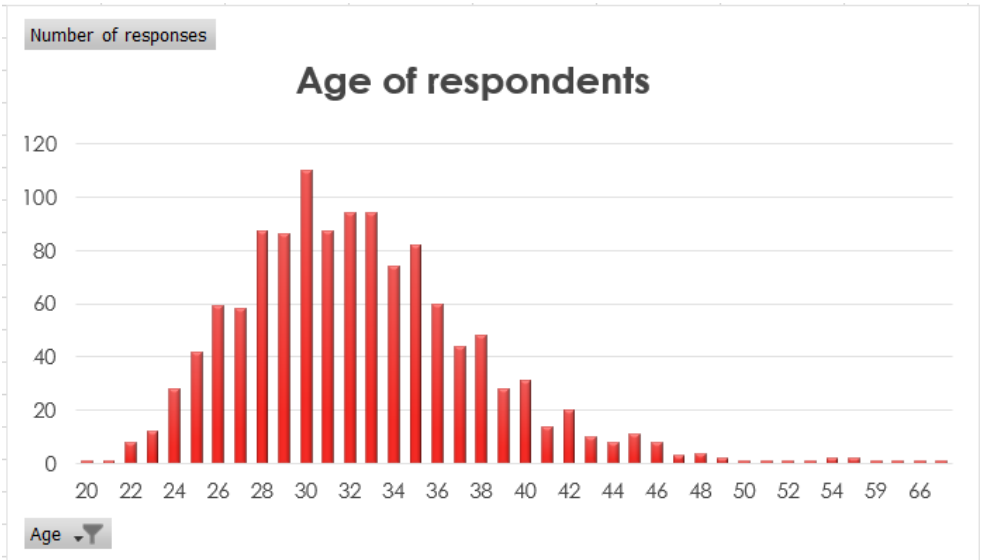
Preliminary Visualizations

- IT professional's participation in the survey



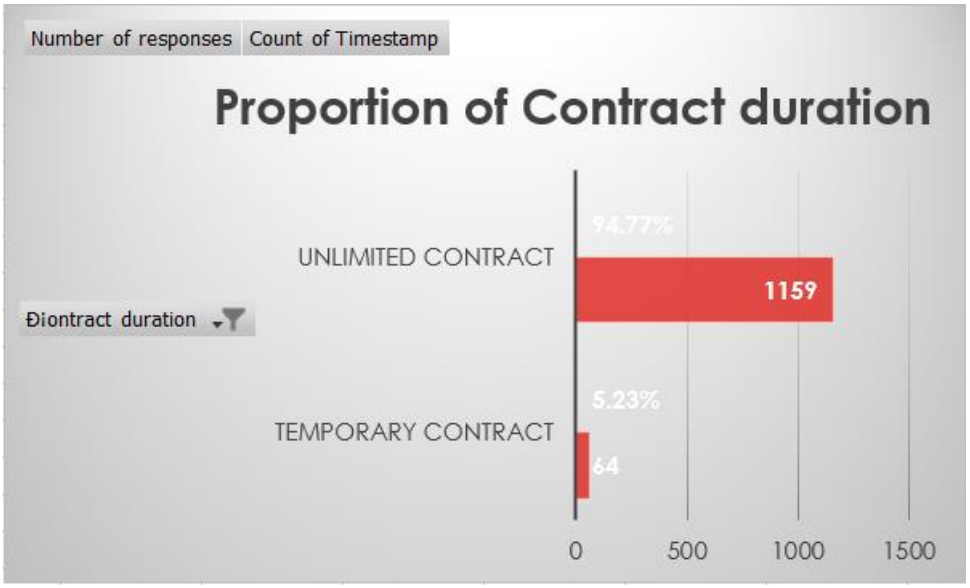
The number of people participating in the Information technology salary survey every year seems to be gradually increasing. The number of respondents every year surge by quarter.

- Age of respondents Vs Number of responses (2020)



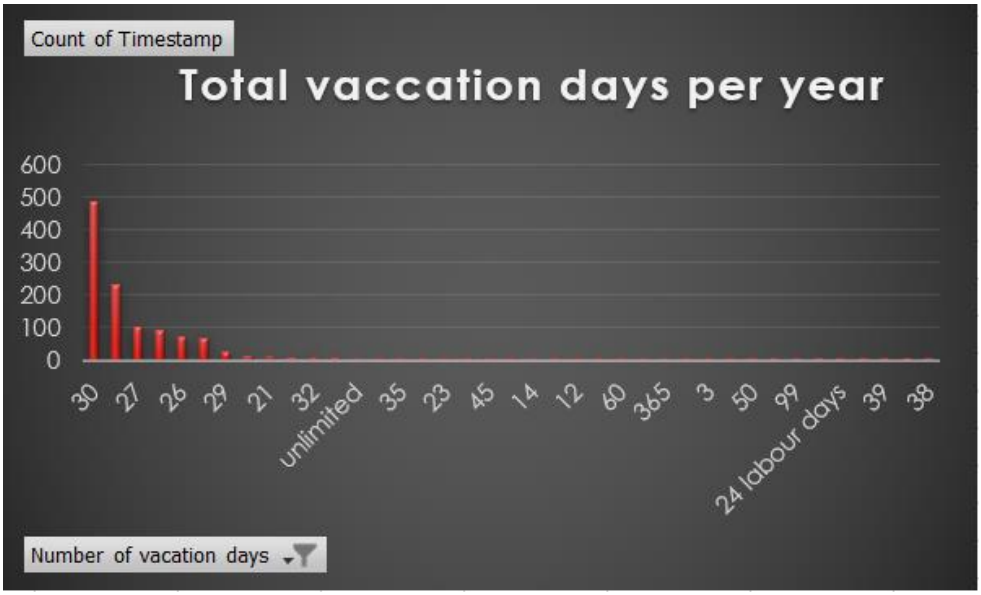
The below chart conveys Age group between 24-38 are the active participants of the survey. The respondents aged 30 contributed 9% of the total responses which being the top contributor.

- The proportion of Contract type of the respondents (2020)



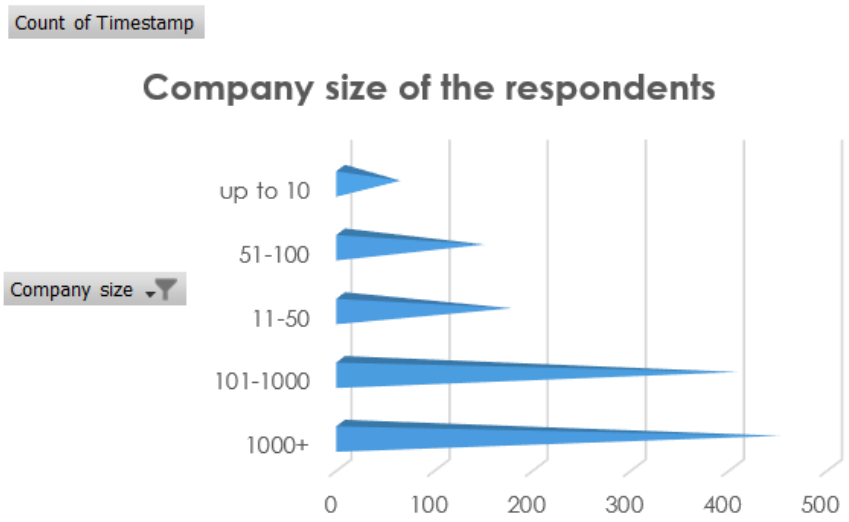
From the above graph, most of the respondents are permanent workers. 95% of the IT professionals who took the surveys have an unlimited contract with their firm and 5% of the respondents are Contractors.

- The frequency of vacation days per year (2020)



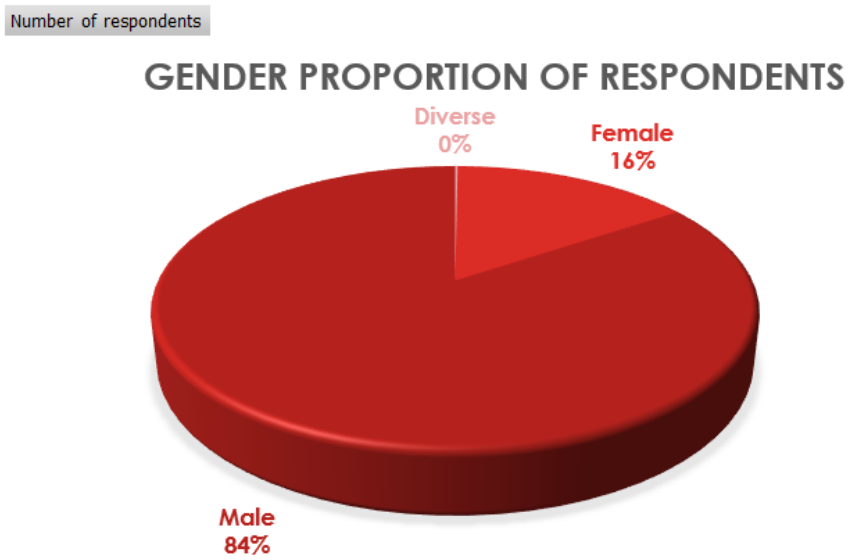
Most of the employees get 30 paid annual vacation days per year contributing about 7 times those who get 26 days per year from the entire responses of the 2020 survey.

- Company size Vs Number of responses (2019)



There are very few respondents who work in start-ups that fall under company size less than 10 and almost half of the respondents work in a reputed firm. Twenty-five percent of respondents work for companies with 50 employees.

- Gender proportion of the respondents



More than the 3rd quartile of the responses is from Male and 16% of the total respondents are female. Diverse people seem to be very less in number contributing less than 0.5% of the total responses.

Conclusion

The Analysis will be helpful to the new employee and getting a decent-paying job nowadays is pretty much impossible. The same goes for experienced employees. By answering most of the hypothetical questions that arise when seeking employment in a corporate setting, as well as offering insights to the staffing firms about the Information Technology sector, as well as to Human Resource professionals in the same field.

So, they can assess their candidates based on their level of work experience and waive off other required skill sets to help them land their dream job.
It is the purpose of this study to estimate the competitive value of an IT skillset based on several factors such as years of experience, location, and salary.

References

- https://www.kaggle.com/datasets/mfaisalqureshi/hr-analytics-and-job-prediction -- all the information related to the dataset & data description.
- https://www.kaggle.com/datasets/krismurphy01/data-lab -- Business model and proposal
- https://www.kaggle.com/datasets/qusaybtoush1990/average-salary-jobs -- Exploratory data Analysis & Data Visualization
- https://www.kaggle.com/datasets/mohamedgamalmahmoud/salary-analysis -- Data Cleaning.