

# INVESTIGATING EQUITY IN REMOTE SALARIES IN THE DATA SCIENCE FIELD USING DATA ANALYSIS TECHNIQUES

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## ABSTRACT

Numerous roles within the Information Technology sector have transitioned to remote working in the aftermath of the COVID-19 pandemic. This research presents a comprehensive analysis of salary trends in the Information Technology sector, data science field from 2020 to 2023, with a special focus on the impact of remote working. The primary objective is to explore how remote working influences salary structures in the data science field by examining a range of job-related variables. A quantitative research approach combining exploratory data analysis and statistical analysis was employed in finding insights on a publicly available dataset acquired from Kaggle. Findings of this research conclude that experience significantly influences salary in the Information Technology sector, data science field, overshadowing factors like company size and remote working types. It was also revealed that remote working constituted a substantial portion of the employment structure, reflecting the data science field shift towards flexible work arrangements. While remote working is increasingly popular, its impact on salaries is less pronounced than expected. For stakeholders in the Information Technology sector, data science field, this research highlights the importance of considering experience and geographical location in salary structuring and suggests a growing trend towards remote working, necessitating adjustments in employment practices and policies.

*Keywords: Remote Salaries, Equity, Data Analysis, Data Science, Quantitative*

## INTRODUCTION

The COVID-19 pandemic has caused a significant transformation in the nature of work, particularly in the data science industry since increased functions are being performed remotely (PricewaterhouseCoopers (PWC), 2021). This research examined the current state of salary equity in this evolving environment from 2020 to 2023, with a focus on the impact of remote working on salary structures in the Information Technology sector (IT), data science field. The impact of remote working on pay has been less significant than expected, despite its growing popularity. Previous studies (Pabilonia & Vernon, 2023), show that remote workers frequently make more money than their colleagues who work in offices; nevertheless, the extent of this wage premium varies between industries and geographical areas (Brinatti et al., 2023). This discrepancy raises important questions about equity and fairness in salary, making this research crucial for stakeholders in the IT, data science field. The purpose of this research was to address the knowledge gap regarding the impact of remote working on salary structures. Understanding these dynamics is essential for ensuring fair and equitable salaries in the IT sector increasingly leaning towards remote working operations. By exploring these dynamics, the research aimed to provide insights to guide more equitable salary structures, accommodating the shift towards remote working and its complex implications for salary structures (Deloitte, 2021). This is particularly important as companies navigate the post-COVID-19 pandemic world, where remote working is likely to remain prevalent.

This research examined a wide array of job-related variables to study their impact on salary. It provides a perceptive viewpoint on the relationship between remote working and salary structures in the IT, data science field and is aimed at a broad readership, which includes IT practitioners, companies, academicians, and IT sector observers.

By providing stakeholders with evidence-based insights for strategic decision-making and policy creation within the IT, data science field, this research seeks to make a substantial contribution to the current conversation on employment practices specifically salary in the IT data science field this the digital era.

Primary objectives of this research were:

- 1) Examining the effect of different job-related factors on remote working salary structures.
- 2) Exploring the long-term trends shaping remote working policies and their effects on salary equity within the IT sector.

These objectives will be accomplished by providing answers to the research questions listed below.

- I. How do different job factors affect remote working salary in the IT data science field?
- II. What strategic adjustments do companies need to make to adapt to the evolving norms of remote working and salary structures?

The remainder of the article discusses the Literature Review followed by Methodology, Results and Discussion, Conclusion and Recommendations.

## LITERATURE REVIEW

The shift towards remote working has profoundly transformed workforce dynamics, particularly within the IT sector, data science field, influencing salary structures and employment practices (PWC, 2021). This literature review explored existing research on the impact of remote working on salary to identify congruences and disparities.

### Who are the Remote Workers

Remote workers can be categorised based on the percentage of their working hours spent working remotely. According to Absolute IT Recruitment (2023), there are different categories of involvement that define remote working: totally remote workers spend over 80% of their working time away from their company's office premises, partly remote worker or hybrid workers allocate half of their daily work at home, while non-remote workers spend less than 20% of their working hours remotely (Absolute IT Recruitment, 2023).

Similarly, Barrero et al., (2023) define remote workers as those who spend one day or more per week working at home with further distinctions between fully remote workers (100% of working hours remote working) and hybrid workers (partially remote working) (Brynjolfsson, et al., 2020). Deloitte (2021) also recognises the importance of these categories in adapting corporate strategies to manage remote working efficiently and equitably.

The categorisation helps to delineate the extent of remote working engagement, which is fundamental for understanding its impact on salary structures and employment practices in the IT, data science field. This structured approach aligns with the literature's emphasis on the varying degrees of remote working and their respective implications on workforce dynamics and salary strategies (Brynjolfsson, et al., 2020; Emanuel et al., 2021).

### Transformation of Workforce Dynamics

The COVID-19 pandemic accelerated a substantial shift, establishing remote working as a permanent aspect for a substantial portion of the labour market (PWC, 2021). Companies are currently confronted with the task of ensuring continuous connectivity and cultivating a culture that encourages professional growth in a decentralised setting (PWC, 2021). The prevalence of remote working has experienced a significant surge from 2019 to 2023 (Barrero et al., 2023) This phenomenon not only signifies the influence of the COVID-19 pandemic but also a more extensive transformation in workplace culture and the embracing of technology that has occurred over several decades (Barrero et al., 2023). Video-calling software and Cloud storage technologies have made it easier to move to remote working (Deloitte, 2021). These tools are essential for daily operations in areas like the IT, data science field (Deloitte, 2021). These alterations need a reassessment of corporate tactics for efficiently managing a geographically dispersed workforce, which in turn affects the structure and adjustment of salary in accordance with these emerging standards (Deloitte, 2021).

Sectors that have digital and communication technology, such as those used in the IT, data science field, are more inclined to implement remote working practices (Barrero et al., 2023). Thus, the IT, data science field has a distinct benefit in utilising remote workers to gain a competitive edge in hiring and optimising salaries (Barrero et al., 2023); Remote working in the IT, data science field has multifaceted effects. Data science roles are well-suited for remote working arrangements due to their strong correlation with computer use, educational requirements, and pay levels (Barrero et al., 2023). Data scientists who can utilise remote working to access job opportunities in many different markets may experience an improvement in their salary prospects through this alignment.

### Remote Working's Effect on Salaries

The shift towards flexibility in the labour market challenges traditional salary structures, as remote working becomes increasingly valued over location (Pabilonia & Vernon, 2023). During the COVID-19 pandemic, remote workers earned, on average, 14.2% more than their office-based counterparts, highlighting potential salary disparities across different sectors and job types. This trend, predating the COVID-19 pandemic, accelerated as remote salaries grew faster, particularly in

fields like management, computer science, and legal professions (Pabilonia & Vernon, 2023). These salary premiums reflect the economic benefits of remote working—cost savings and enhanced productivity—that companies are beginning to share with workers in competitive sectors like the IT, data science field (Pabilonia & Vernon, 2023).

The salary for remote working is greatly impacted by the economic realities of the specific location, even though the employment market is global in nature (Brinatti et al., 2023). This research finds that remote salaries are higher in regions with higher income per capita, indicating that local labour market conditions continue to play a crucial role in determining remote salaries globally (Brinatti et al., 2023). Furthermore, the remote working trend has a substantial impact on salary trends by increasing the diversity of applicants from different geographic locations, this can lead to a moderation in salary growth due to increased competition among job seekers (Hansen, et al., 2023). An analysis conducted by Hansen et al., (2023) examined more than 250 million job posts and revealed that the prevalence of remote working in job advertisements increased by over threefold in the United States and by fivefold in English-speaking nations such as Australia, Canada, New Zealand, and the United Kingdom between 2019 and early 2023; Nevertheless, the implementation of remote working differs among industries, with finance, insurance, and IT witnessing more significant rates than others (Hansen et al., 2023). This suggests that salary trends are affected unevenly across various sectors and geographies.

The moderation of salary-growth pressures has been encouraged by how remote working offers advantages (Barrero et al., 2022). The switch to performing duties away from the traditional office setting comes with a host of benefits for workers that do not involve salary. Instead, these are partly passed on through lowered wage increments (Barrero et al., 2022). The scale at which this dynamic operates helps to understand why there has been an unanticipated squeezing of salaries especially among low salary earners whose salary reduction was less compared to colleagues earning higher salaries (Barrero et al., 2022). This refined interpretation provides a contrast between the idea that compensation structure has changed because of remote working while salary adjustment due to it is complex slash not direct but subject to wider economic issues coupled with company owner's needs.

### **Professional Experience and Salaries**

The notable rise in salaries in New Zealand's IT sector is primarily caused by a shortage of skilled workers, which is further intensified by global events and local economic circumstances (Absolute IT Recruitment, 2023). Despite the presence of uncertainties, there is a strong demand for IT specialists, which is causing salaries to increase (Absolute IT Recruitment, 2023). This trend is like what is happening in the IT, data science field, where specialised skills, especially in remote working environments, are being rewarded with higher salaries (Absolute IT Recruitment, 2023). Professional experience is becoming increasingly crucial in determining salary expectations, surpassing the importance of qualifications. Research conducted by Chen & Li (2023) emphasises that differences in salary are mainly determined by factors related to experience rather than academic qualifications, highlighting the importance of practical skills in the labour market.

Moreover, Flynn (2023) noted that there is a general movement towards valuing hands-on knowledge compared to academic qualification in many fields of which the IT, data science field is one of them. Similarly, research conducted by Burtch Works (2022) indicated that hiring managers are increasingly looking for workers who have been in the industry for long periods as well as having specialised abilities rather than holding higher qualifications, which reinforces experience in pay matters. The PayScale's 2023 Compensation Best Practices Report further upholds this position by observing how work experience significantly impacts on salary growth particularly within technological roles given the high demand for professionals despite market instability.

### **Adjustments in Salary Structures**

To accommodate remote working, companies are adjusting their salary plans to reflect local cost of living (Deloitte, 2021). This illustrates the complex relationship between remote working and salary. Remote working may not inevitably lead to higher salaries, as salary modifications depend on experience and job market conditions (Deloitte, 2021; Martin et al., 2018). This adaption illustrates how local economic conditions and sector-specific needs affect salaries for remote working.

To reflect shifting work arrangements, companies are targeting equal and competitive salaries across geographies and employment positions (Deloitte, 2021). Fair practices must be incorporated into remote working legislation to keep up with its ever-changing nature (Deloitte, 2021). Remote working has a major impact on IT sector workforce and salary. To ensure justice and modify remote working policies, understanding the variables that cause these variations is crucial.

## **METHODOLOGY**

This research uses secondary data related to the IT, data science field income patterns from 2020 to 2023 which was acquired from Kaggle with the author's permission. The dataset -Data Science Salaries 2023 (RANDOMARNAB, 2023), is licensed 'as is' without warranties of any kind. The origin of this dataset is from <https://aijobs.net/salaries/> where actual salaries of professionals and employers globally have been anonymously aggregated in real time weekly for use in academic research such as Data Science Salary Analysis by Obi (2024). This indicates that this particular data set is suitable to explore patterns in the IT, data science field salaries other researchers have used it for the same purpose.

This dataset includes variables like geographic location, job roles, company size, and professional experience. After carefully analysing the variables and data, it was concluded that the dataset was suitable for the intended purpose. A meticulous data cleansing procedure was conducted to guarantee that the data was prepared to a condition for analysis. This involved using Power Query for tasks such as verifying the absence of empty or erroneous values, standardising header names for consistency, aligning data types (e.g., converting salary figures into a uniform currency format), removing irrelevant data, replacing abbreviations with full terms, and reordering columns for clarity. Further enhancements were made in Microsoft (MS) Excel, including encoding variables for regression analysis, categorising job titles, and adding columns for remote working types and country names for geographical analyses. Table 1 describes the variables of the cleaned dataset.

**Table 1: The Classification of Final Set of Variables After Data Wrangling**

| VARIABLE              | DATA TYPE            | LEVELS OF MEASUREMENT |
|-----------------------|----------------------|-----------------------|
| Work Year             | Numerical/Discrete   | Quantitative/Interval |
| Company Size          | Categorical          | Qualitative/Ordinal   |
| Company Size Value    | Numerical/Continuous | Quantitative/Level    |
| Job Title             | Categorical          | Qualitative/Nominal   |
| Job Title by Category | Categorical          | Qualitative/Nominal   |
| Experience            | Categorical          | Qualitative/Ordinal   |
| Experience Value      | Numerical/Continuous | Quantitative/Level    |
| Employment Type       | Categorical          | Qualitative/Nominal   |
| Salary in USD         | Numerical/Continuous | Quantitative/Ratio    |
| Employee Residence    | Categorical          | Qualitative/Nominal   |
| Company Location      | Categorical          | Qualitative/Nominal   |
| Country Full Name     | Categorical          | Qualitative/Nominal   |
| Domestic/Int'l        | Categorical          | Qualitative/Nominal   |
| Domestic/Int'l Remote | Categorical          | Qualitative/Nominal   |
| Remote Ratio          | Numerical/Continuous | Quantitative/Ratio    |
| Remote Types          | Categorical          | Qualitative/Nominal   |

It was decided to use quantitative data analysis methods as the primary data analysis methodology as the selected dataset. Exploratory data analysis techniques were used to identify patterns, behaviours, and relationships. Moreover, diagnostic analysis using statistical testing was conducted to assess the statistical significance of identified trends.

## RESULTS AND DISCUSSION

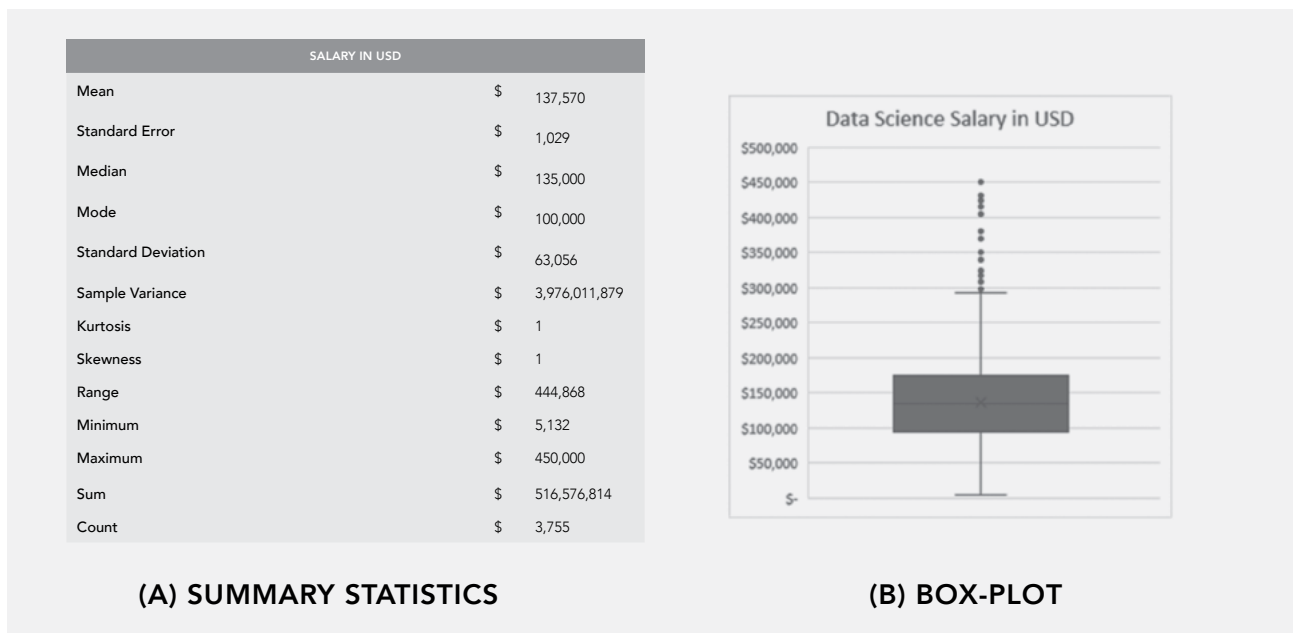
### How do different job factors affect remote working salaries in the IT, data science field?

To answer the research question, different job-related factors have been analysed: experience level, role in the company, type of work schedule among other factors. The objective of our thorough examination is to obtain a better understanding of what factors lead to how much one earns within the IT, data science field which is becoming increasingly important nowadays.

#### Experience

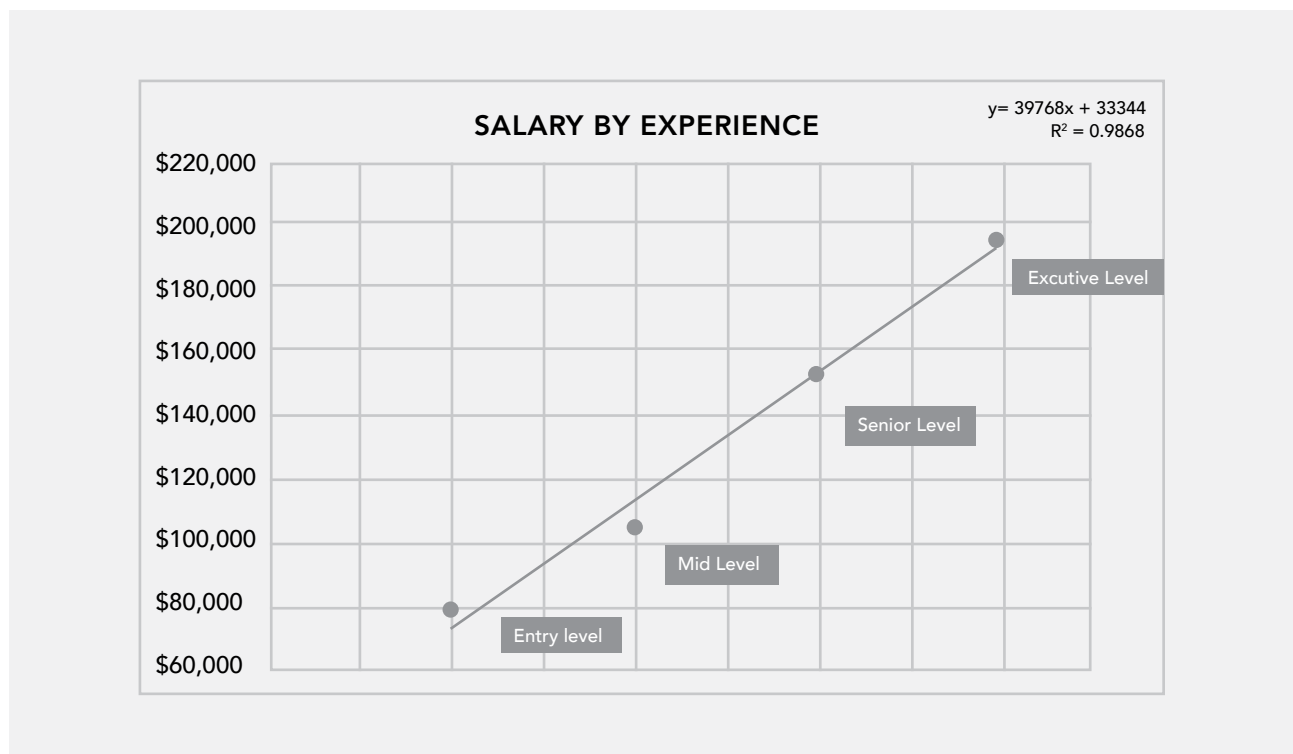
This dataset is for IT, data science field job salaries spanning 2020 to 2023. As shown in Figure 1 (a) (in USD), it has an average of around \$137,570, which is remarkably close to the median of \$135,000: this means that it is evenly distributed. The most common salary is \$100,000. However, there is a considerable amount of variation, with the lowest and highest salaries differing by \$444,868. From Figure 1 (b), the salary distribution specifically for the IT, data science field roles can be seen: again, the median is \$150,000, the most common being between \$100,000 and \$200,000. There are several outliers beyond this range, indicating that a few are paid much more. The average income is \$137,570, reflecting a stable field and aligns with the range from \$130,000 to \$171,000 base salaries for IT, data scientists (Glassdoor, 2023). There are 66 outliers in the dataset earning over \$290,000, 64 being Senior to Executive level. This may indicate that experience is a key variable in determining the salary.

Figure 1: Summary Statistics of Salary in USD.



To evaluate the statistical significance of the relationships revealed during the exploratory analysis, diagnostic analysis was performed using linear regression and ANOVA tests.

Figure 2: Regression Analysis Between Salary and Experience



The regression analysis reveals a robust positive relationship between experience and salary. As experience increases, the salary also goes up because each additional level of experience significantly boosts the average salary by \$39,768. This connection explains a vast portion of variance with a considerably high R-squared of 0.987. This number implies that the relationship accounts for almost 99% of the variability in salary, making the effect of experience highly practical. The p-value is 0.0066, which is less than the alpha level of 0.05, proving that the results are not due to chance. In conclusion, the analysis indicates that the IT, data scientist's salary is highly influenced by experience, which was precisely ascertained by the exploratory analysis. This finding aligns with other research indicating that experience significantly influences salary in the IT, data science field (Mogan, 2022; Glassdoor, 2023).

Figure 3: Regression Analysis Output -- Salary vs Experience

| REGRESSION STATISTICS |             |
|-----------------------|-------------|
| Multiple R            | 0.993375918 |
| R Square              | 0.986795715 |
| Adjusted R Squa       | 0.980193573 |
| Standard Error        | 7273.552005 |
| Observations          | 4           |

| ANOVA      |    |             |             |         |                |
|------------|----|-------------|-------------|---------|----------------|
|            | df | SS          | MS          | F       | Significance F |
| Regression | 1  | 7907432087  | 7907432087  | 149.466 | 0.006624082    |
| Residual   | 2  | 105809117.5 | 52904558.77 |         |                |
| Total      | 3  | 8013241204  |             |         |                |

|            | Coefficients | Standard Error | t Stat      | P-Value  | Lower 95%    | Upper 95%   | Lower 95.0%  | Upper 95.0% |
|------------|--------------|----------------|-------------|----------|--------------|-------------|--------------|-------------|
| Intercept  | 33343.78903  | 8908.245515    | 3.743025377 | 0.064543 | -4985.297854 | 71672.87591 | -4985.297854 | 71672.87591 |
| Experience | 39767.90688  | 3252.831344    | 12.22562828 | 0.006624 | 25772.10321  | 53763.71054 | 25772.10321  | 53763.71054 |

| RESIDUAL OUTPUT |             |             |                    |
|-----------------|-------------|-------------|--------------------|
| Observation     |             | Residuals   | Standard Residuals |
| 1               | 73111.6959  | 5434.588471 | 0.915094077        |
| 2               | 112879.6028 | -8353.66365 | -1.406617662       |
| 3               | 152647.5097 | 403.5618861 | 0.067953092        |
| 4               | 192415.4165 | 2515.513292 | 0.423570492        |

| PROBABILITY OUTPUT |                          |
|--------------------|--------------------------|
| Percentile         | Average of Salary in USD |
| 12.5               | \$ 78,546                |
| 37.5               | \$ 104,526               |
| 62.5               | \$ 153,051               |
| 87.5               | \$ 194,931               |

In summary, experience emerged as a significant determinant of salary in the IT, data science field. The regression analysis shows a robust positive relationship between experience and salary, with an R-squared value of 0.987, indicating that nearly 99% of the salary variability can be explained by experience. Therefore, it could be inferred that the IT data scientists' earnings increase considerably once they accumulate more experience irrespective of their employment status.

### Job Roles

Figure 4 reveals that senior-level professionals dominate the IT, data science field, suggesting a preference for experienced IT, data scientists. Entry-level and executive roles are smaller. This indicates that experience level plays a significant role in the IT, data science field (Morgan, 2022) and has the potential for higher-level salaries.

Figure 4: Experience Level Distribution

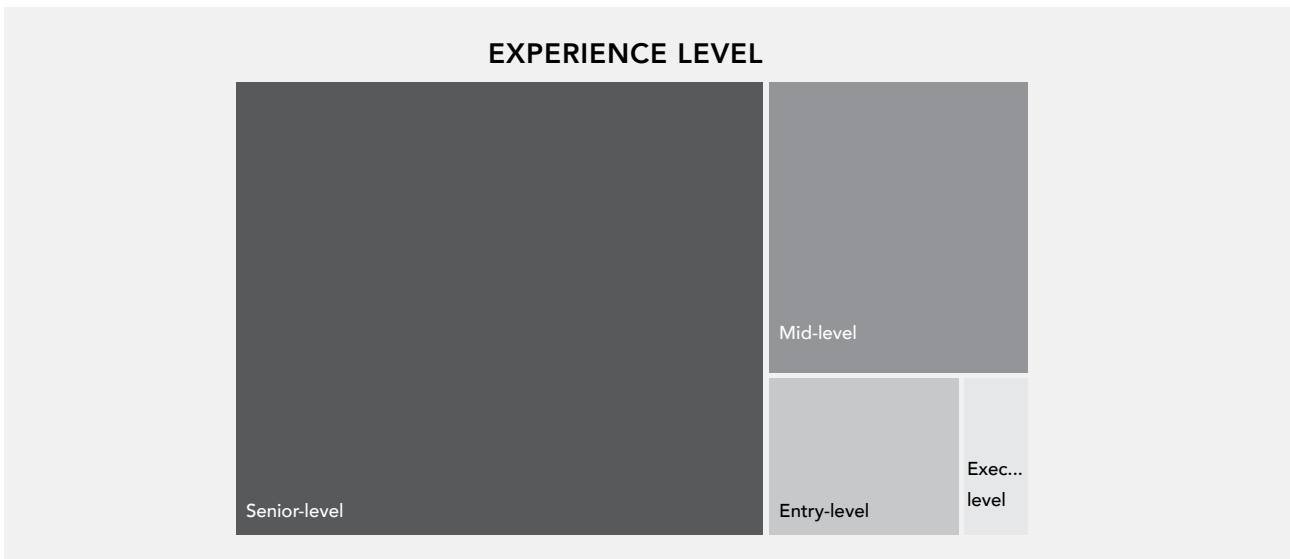


Figure 5 illustrates that in the IT, data science field, the highest salaries are held by the positions of executives together with Artificial Intelligence (AI) and Machine Learning Engineer roles. The persistence of this trend confirms the high application value of experience and narrowly specialised skills in this area. As for the average salary of first-year workers, it is lower, which is quite typical for most industries, where beginners receive less salary compared to more experienced professionals.

Figure 5. Average Salary by Job Categories and Experience.

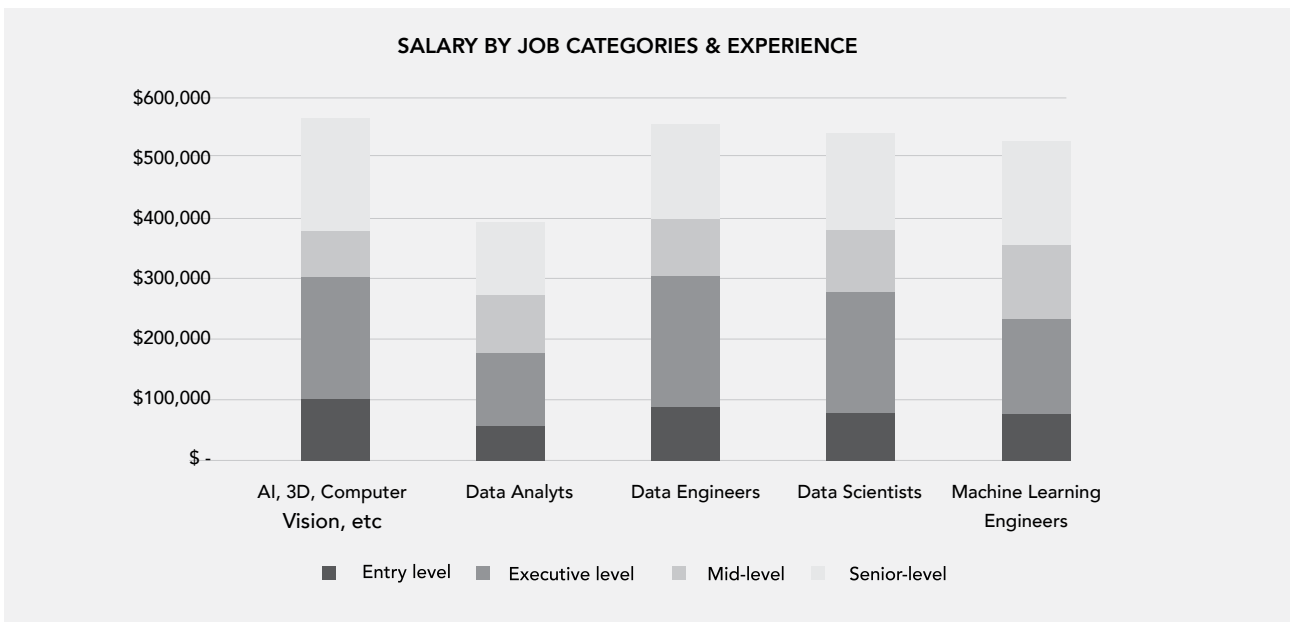


Figure 6 illustrates the distribution of the top ten IT, data science field roles segmented by work arrangement: remote working, on-site, and hybrid. For remote working positions, the role of Data Engineer appears to be the most common, with Data Scientist closely following. On the other end of the spectrum the role with the least remote working representation is Research Engineer, being particularly prevalent in on-site working arrangements.

Figure 6. Top Ten Data Science Jobs

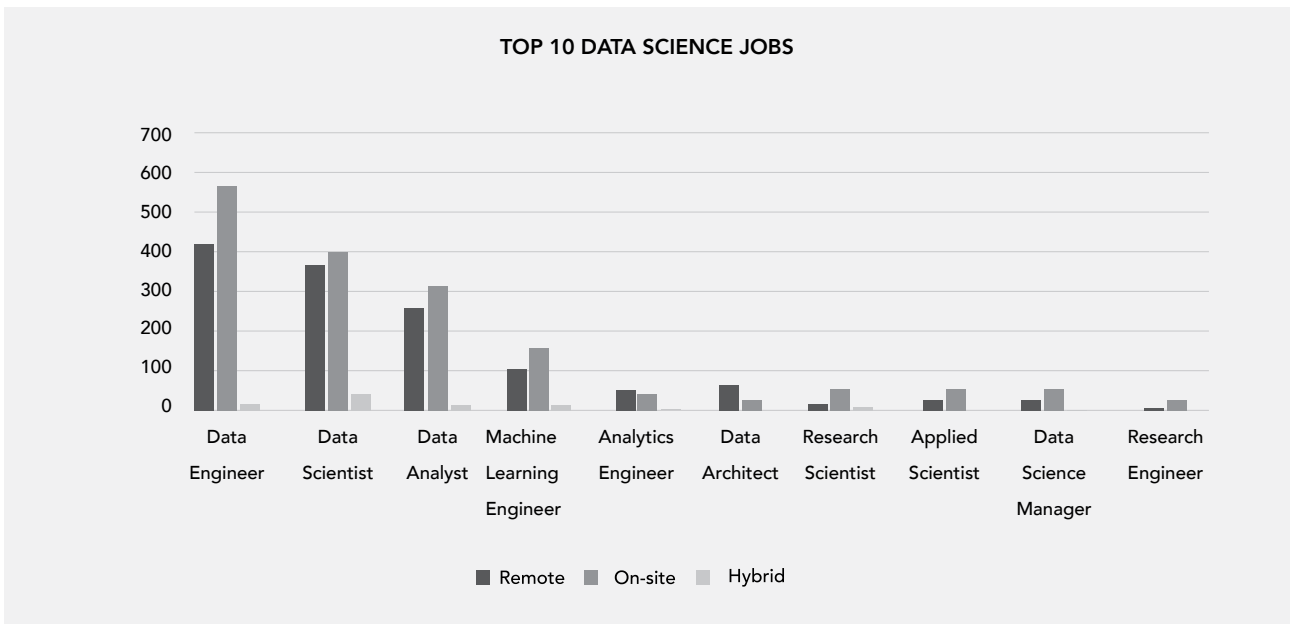
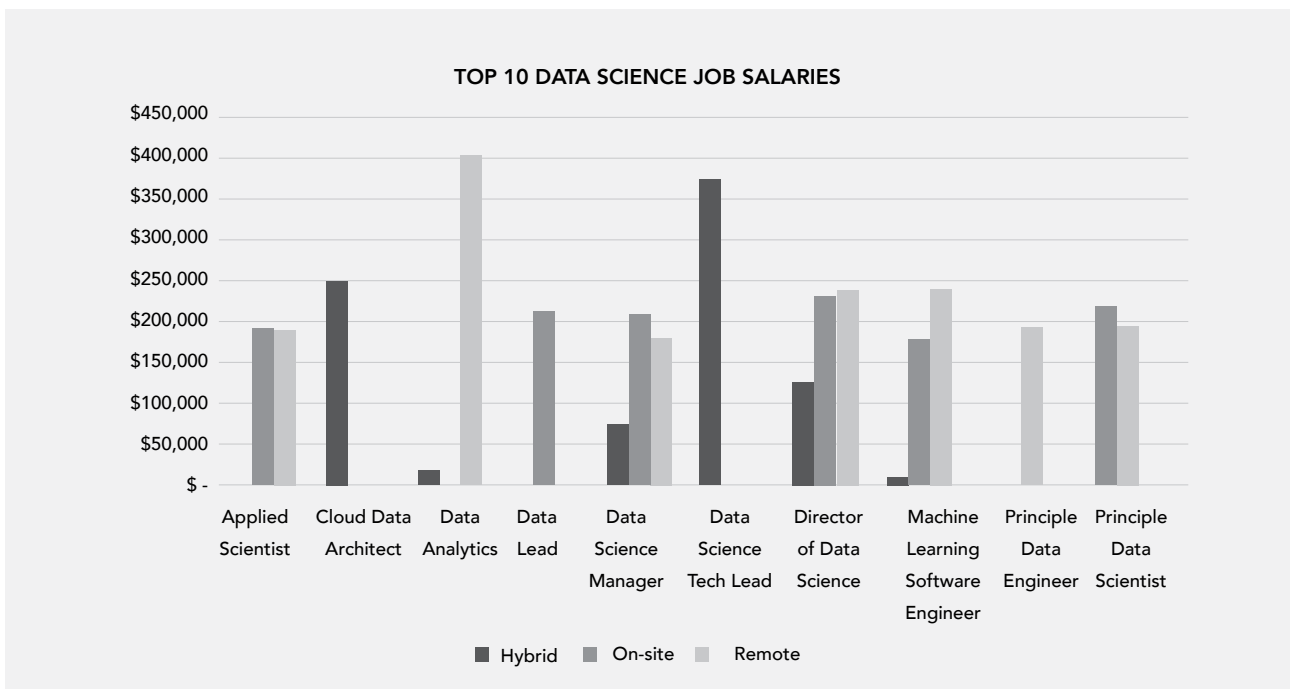


Figure 7 displays the top ten IT, data science field job salaries, categorised by work arrangements. Applied Scientist, Data Science Manager, and Principal Data Scientist roles earn higher salaries for being on-site than for remote working positions. Thus, it can be suggested that the leadership and high-responsibility roles receive a premium when being in-the-office. As such, the presence of highly paid on-site jobs may mean that some positions require being physically present. Among remote positions, the highest salaries are for Data Analytics Lead with the following role with the highest salary for remote job is Machine Learning Software Engineer.

Figure 7. Top Ten Data Science Job Salaries



In general, the dataset indicates that the Senior Level Professionals dominate the IT, data science field and most of them are paid better than their entry level or executive role counterparts. Among remote workers, Data Engineers and Data Scientists are some of the most commonly sought-after positions. Only very few remote workers opt for positions like Data Science Manager or Research Engineer, which are normally not remote workers, even though such positions come with lower pay.

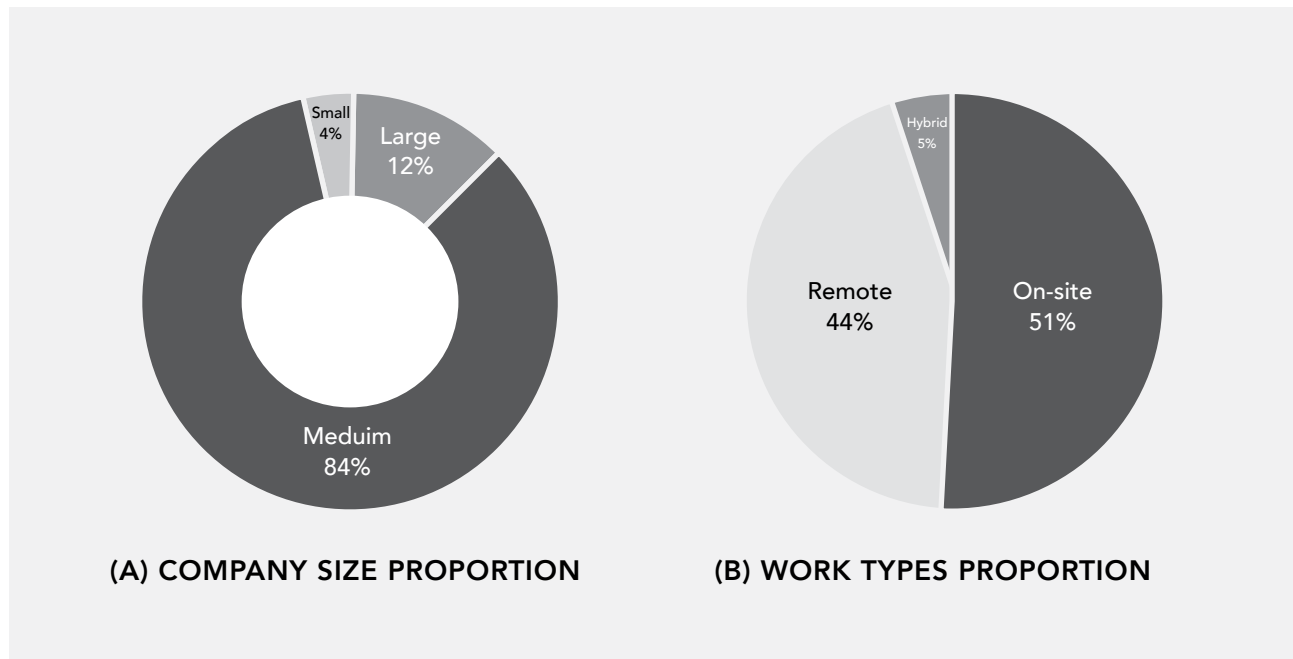


## Work Arrangements

Figure 8(a) indicates that medium-sized companies make up to 84% of the workforce of IT data science specialists while 12% work in large companies and as little as 4% work in small companies. Smaller companies are less promising as they lack resources to carry out payrolls to data scientists who may have more limited job roles (Dragova, 2020).

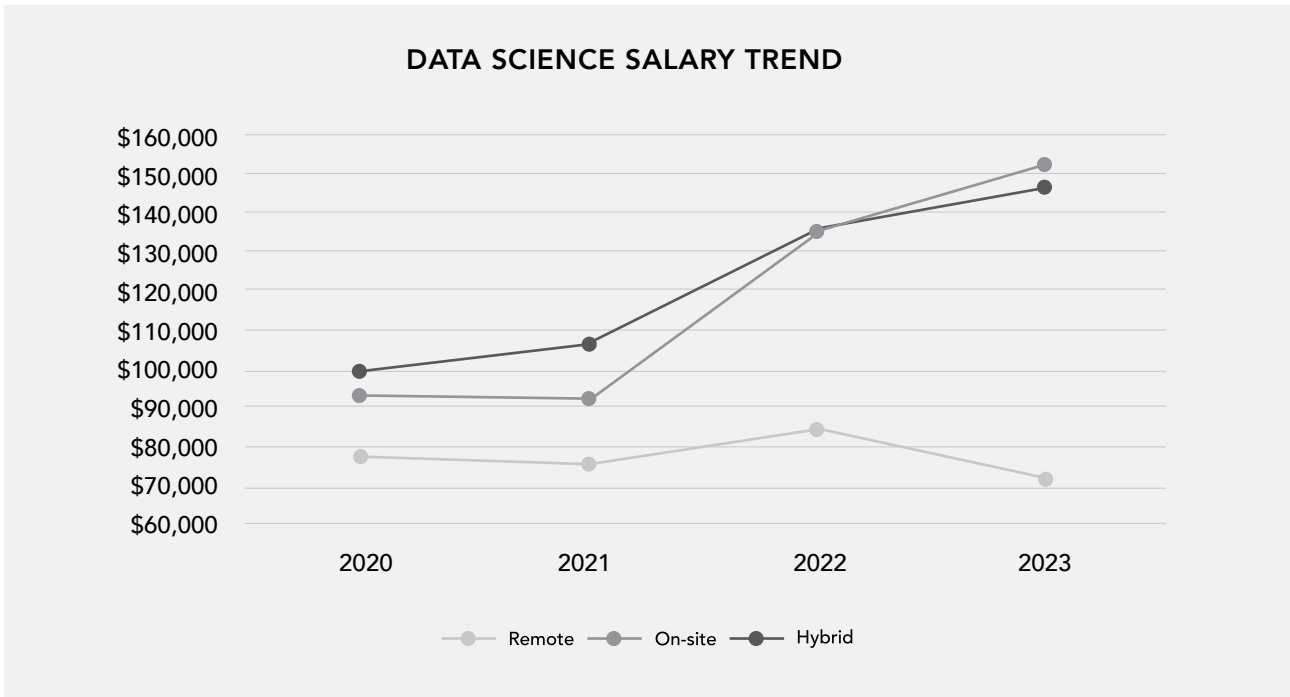
According to Figure 8(b), a traditional on-site job is slightly preferable for the representatives of the three job roles studied, with 51% of professionals working in this mode. Remote working implying flexibility accounts for 44% due to the availability of remote working tools and technology and the emergence of the COVID-19 pandemic. Hybrid work arrangements are less common at 5%. From 2018 to 2021, fully remote workers increased fourfold, from 6% to 26.7%. In 2023, 27% of United States workers worked remotely, signalling a significant trend (Flynn, 2023).

Figure 8. Work Types and Company Size Proportion



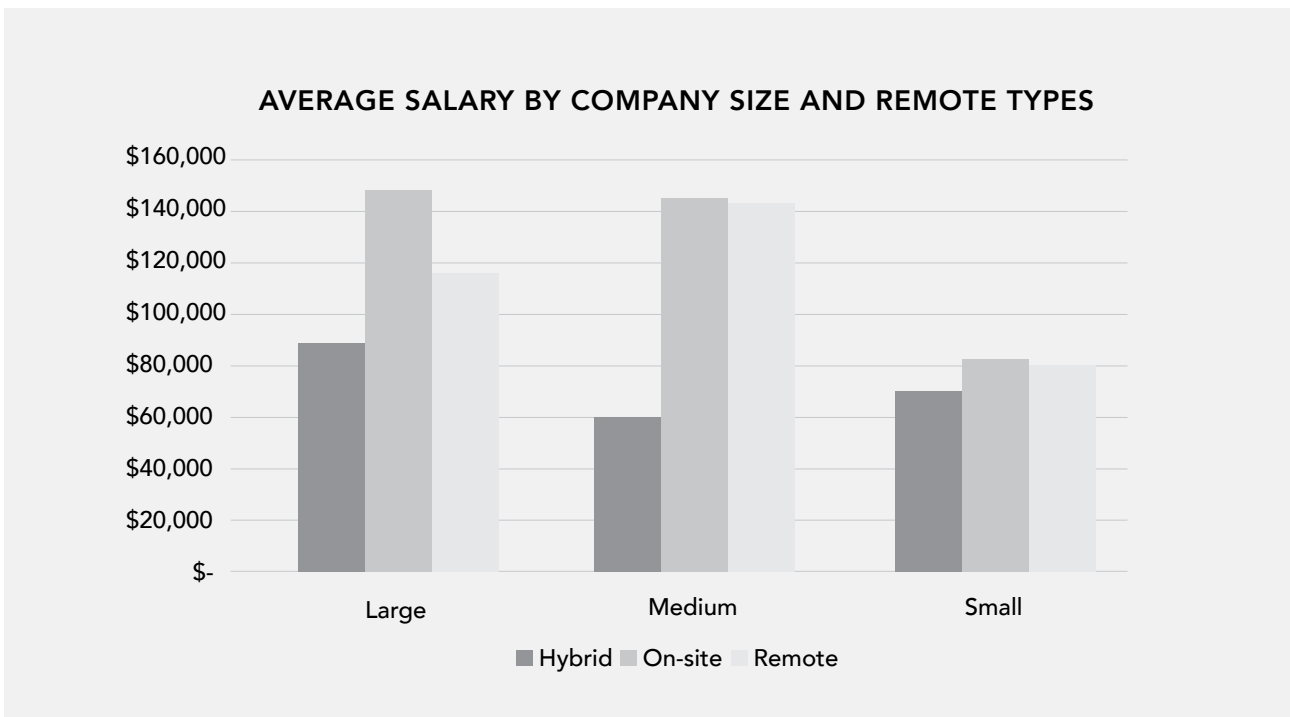
According to Figure 9 the IT, data science field average salary trends between the years 2020-2023 as seen within this analysis show that the average salaries at both on-site and remote working have increased significantly which means they were converging by around \$150,000 in 2023. However, remote working salaries exceeded on-site salaries at the beginning of 2022 probably because of changing dynamics in remote working environments and competition between the remote working IT, data science field jobs (Burtch Works, 2022). As remote working employment opportunities grew more popular, corporations scrambled over themselves trying to lure the most skilled workers using various means such as paying higher salaries to telecommuters for such positions. As a result of these practices, remote positions became better paid relative to on-site roles, surpassing them in certain cases due to fierce competition and the dimensions of remote employment flexibility.

Figure 9. Data Science Salary Trend



Based on Figure 10, the highest average salaries, especially for the remote arrangement, are paid in medium companies. Surprisingly, large companies can only afford to pay higher salaries for the on-site arrangement. At the same time, it might be suggested that medium companies have the potential for higher average salaries. The results for the small companies are quite expected as they cannot afford to pay high average salaries.

Figure 10. Average Salary by Company Size and Remote Types



The ANOVA test results from Figure 11 indicate that there is no statistically significant difference in salaries across small, medium, and large companies, as the p-value is 1, which exceeds the common significance levels (0.05, 0.01). Therefore, we fail to reject the null hypothesis that there is no variation in salary due to company size.

Figure 11. ANOVA Single Factor -- Salary vs Company Size

| SUMMARY |       |           |             |            |
|---------|-------|-----------|-------------|------------|
| Groups  | Count | Sum       | Average     | Variance   |
| Small   | 3755  | 516576814 | 137570.3899 | 3976011879 |
| Medium  | 3755  | 516576814 | 137570.3899 | 3976011879 |
| Total   | 3755  | 516576814 | 137570.3899 | 3976011879 |

| ANOVA               |             |       |            |             |         |            |
|---------------------|-------------|-------|------------|-------------|---------|------------|
| Source of Variation | SS          | df    | MS         | F           | P-Value | F crit     |
| Between Groups      | 0.8828125   | 2     | 0.44140625 | 1.11017E-10 | 1       | 2.99652929 |
| Within Groups       | 4.47778E+13 | 11262 | 3976011879 |             |         |            |
| Total               | 4.47778E+13 | 11264 |            |             |         |            |

From Figure 12, it is evident that there is a statistically significant difference in salaries based on work type. A p-value of 0 is less than the commonly applied threshold of 0.05, allowing to reject the null hypothesis that the groups do not experience differences in their average salaries. The F-value is also much greater than the F-crit value, indicating that the work arrangement has a significant effect on salaries.

Figure 12. ANOVA Single Factor -- Salary vs Work Type

| SUMMARY  |       |           |             |            |
|----------|-------|-----------|-------------|------------|
| Groups   | Count | Sum       | Average     | Variance   |
| Remote   | 1643  | 224239027 | 136481.4528 | 4016201478 |
| Combined | 189   | 14817730  | 78400.68783 | 3760894653 |
| On-site  | 1923  | 277520057 | 144316.2023 | 3576036515 |

| ANOVA               |             |      |             |             |         |             |
|---------------------|-------------|------|-------------|-------------|---------|-------------|
| Source of Variation | SS          | df   | MS          | F           | P-Value | F crit      |
| Between Groups      | 7.51155E+11 | 2    | 3.75578E+11 | 99.41362049 | 0       | 2.998125448 |
| Within Groups       | 1.41748E+13 | 3752 | 3777929959  |             |         |             |
| Total               | 1.49259E+13 | 3754 |             |             |         |             |

To summarise, the data shows the salaries of fully remote workers who put in over 80% of their hours remotely. The proportion is on the rise and will catch up with those located on-site at \$150,000 per year by 2023. The trend underlines an increasing recognition and regard for telecommuting within the IT, data science field. Despite recent increases in working-from-home opportunities, most data professionals still have little preference for virtual work setups and continue to gravitate towards conventional office-based jobs if given such opportunities (Deloitte, 2021). Nevertheless, many individuals dealing in data have embraced flexibility associated with telecommuting hence bringing about a massive expansion in offsite-based employment and partially shared employment schemes.

**What are the strategic adjustments companies should make in order to conform to the changing norms of remote working and salary structures?**

We will suggest the following strategic changes after analysing the results from research question one to help companies embrace the changing remote work and wage dynamics in data science better.

**Flexible Salary Structures**

Companies ought to develop salary structures, which are adjustable depending on the local cost of living and factor in the

dynamics of remote working. In this way, the worker is given fair pay no matter where they operate. This approach ensures that workers are fairly compensated regardless of their work location (Deloitte, 2021).

### **Experience-Based Salary**

To attract and retain talent in the IT data science sector, employers need to emphasise experience when structuring salaries rather than focusing more on educational qualifications. This would also attract and retain top performers in the industry (PWC, 2021; Morgan, 2022).

### **Remote Working Policies**

A thorough remote working policy should be created by companies as a way of promoting professional development among workers who are scattered in different locations. These policies should be specific about what constitutes remote working, provide for self-advancement and provide for equal pay among workers (Deloitte, 2021).

### **Geographical Considerations**

Considering that remote working provides access to global talent pools, companies should consider local salary scales and economic conditions in developing their salary structures (Brinatti et al., 2023; PWC, 2021).

## **CONCLUSION AND RECOMMENDATIONS**

The results of this investigation leave no room for interpretation: experience is a much more important salary determinant than both a company size and mode of working. This observation is critical for the IT, data science field workers striving to receive the highest salaries they can: relying on this concept, they should focus on accumulating more relevant experience and skillsets.

### **How do different job factors affect remote working salaries in the IT, data science field?**

In the field of IT data science, salaries are driven up by experience whereby the correlation between salary and years is quite positive to the extent that it accounts for nearly 99% variability in the former. The highest salaries within this field are executives and AI specialists. Most of them belong to senior levels. Experience is particularly significant for all professionals on the one hand while also considerably affecting those at an entry level on the other hand. Salaries for on-site and remote working workers experienced substantial growth from 2022 to 2023, reaching a similar level of around \$150,000. In certain instances, remote working salaries have surpassed on-site salaries due to competitive factors. Medium-sized companies typically provide higher average salaries for remote working, whereas large companies tend to prioritise on-site working environments, which are linked to more lucrative salaries. In contrast, small companies struggle to provide competitive salaries.

### **What are the strategic adjustments companies should make to conform to the changing norms of remote working and salary structures?**

To keep up with the constant changes in remote working job patterns and salary structures, companies should work on creating flexible salary packages that vary dependent on local costs of living as well as remote working requirements so that everyone gets paid fairly, regardless of where they are located. It is important to design salary structures with more weight on skills which come through practising than having higher qualification for better results in the job market. This includes creating detailed policies around working remotely for career growth opportunities, defining what qualifies working off-site; alongside such opportunities allowing for their personal growth; all these measures ensure salary equity. Moreover, as part of salary structuring, companies need to consider what is happening within their locations regarding salary structures and economic climates to tap into global human resources affordably.

Our findings on the impact of remote working in the IT, data science field revealed that while remote work in data science may result in higher compensation and greater flexibility, there is very little difference between the salary of remote working and non-remote working IT data scientists. It is important for professionals to obtain skills that are in demand and choose where to work remotely based on the possibility of earning more income. To be fair and attract a diverse talent pool companies need to match salaries with experience and prevailing local salary trends. This can be achieved through startup companies hiring the best professionals inexpensively. In addition, the IT sector would improve competitiveness by developing flexible remote working policies, engaging in partnerships with educational establishments and advising students concerning salary negotiation and career planning. It is possible that open salary policies together with telecommuting improve organisational commitment and promote knowledge sharing. In conclusion, even though the current research offers important findings concerning the salary structure within the IT sector of the data science field, the dynamic characters of employment and technology are likely to affect this specification further. As such, it could be beneficial for additional investigations analysing alterations to be conducted later on, particularly to explore how these changes impact key areas within the IT sector, such as data science and remote working dynamics, as well as the evolving trends in salaries across these fields.

## REFERENCES

- Absolute IT Recruitment. (2023). *Job Market Salary Report 2023*. Retrieved from Absolute IT Recruitment: <https://absoluteit.co.nz/wp-content/uploads/2023/03/Absolute-IT-Job-Market-Salary-Report-2023.pdf>
- Barrero, J. M., Bloom, N., & Davis, S. J. (2023, September). *The Evolution of Working from Home*. Retrieved from SSRN: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4564075](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4564075)
- Barrero, J., Bloom, N., Davis, S. J., Meyer, B., & Mihaylov, E. (2022, July). *The Shift to Remote Work Lessens Wage-Growth Pressures*. Retrieved from SSRN: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4153090](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4153090)
- Brinatti, A., Cavallo, A., Cravino, J., & Drenik, A. (2023, May). *The International Price of Remote Work*. Retrieved from SSRN: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3953963](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3953963)
- Brynjolfsson, E., Horton, J. J., Ozimek, A., Rock, D., Sharma, G., & Ye, H.-Y. T. (2020, June). *COVID-19 AND REMOTE WORK: AN EARLY LOOK AT US DATA*. Retrieved from NBER - NATIONAL BUREAU OF ECONOMIC RESEARCH: <https://www.nber.org/papers/w27344>
- Burtch Works (2022, July 15). *How to Overcome the 2022 Data Science & Analytics Hiring Crunch*. Retrieved from Burtch Works: <https://www.burtchworks.com/industry-insights/how-to-overcome-the-2022-data-science-analytics-hiring-crunch>
- Chen, Y., & Li, X. (2023, June). *Salary Prediction Based on the Resumes of the Candidates*. Retrieved from ResearchGate: [https://www.researchgate.net/publication/371566807\\_Salary\\_Prediction\\_Based\\_on\\_the\\_Resumes\\_of\\_the\\_Candidates](https://www.researchgate.net/publication/371566807_Salary_Prediction_Based_on_the_Resumes_of_the_Candidates)
- Deloitte. (2021) *Remote Work: The Road to the Future -- Transformation of the Global Workforce*. Retrieved from Deloitte: <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-remote-work-the-road-to-the-future.pdf>
- Dragova, N. (2020, April 13). *Data science careers - Does company size matter?* Retrieved from Candor: <https://candor.co/articles/career-paths/data-science-careers-does-company-size-matter>
- Emanuel, N., & Harrington, E. (2021, September 4). *'Working' Remotely? Selection, Treatment, and Market Provision of Remote Work (JMP)*. Retrieved from Harvard University: <https://scholar.harvard.edu/eharrington/publications/working-remotely-selection-treatment-and-market-provision-remote-work>
- Flynn, J. (2023, Jun 13). *25 Trending Remote Work Statistics [2023]: Facts, Trends, And Projections*. Retrieved from Zippia: <https://www.zippia.com/advice/remote-work-statistics/>
- Glassdoor. (2023, July). *Salary Details for a Data Scientist at Glassdoor*. Retrieved from Glassdoor: [https://www.glassdoor.com/Salary/Glassdoor-Data-Scientist-Salaries-E100431\\_D\\_KO10,24.htm](https://www.glassdoor.com/Salary/Glassdoor-Data-Scientist-Salaries-E100431_D_KO10,24.htm)
- Hansen, S., Lambert, P. J., Bloom, N., Davis, S. J., Sadun, R., & Taska, B. (2023, March7). *Remote Work across Jobs, Companies, and Space*. Retrieved from SSRN: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4380734](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4380734)
- Martín, I., Mariello, A., Battiti, R., & Hernandez, J. A. (2018, June). *Salary Prediction in the IT Job Market with Few High-Dimensional Samples: A Spanish Case Study*. Retrieved from ResearchGate: [https://www.researchgate.net/publication/327080220\\_Salary\\_Prediction\\_in\\_the\\_IT\\_Job\\_Market\\_with\\_Few\\_High-Dimensional\\_Samples\\_A\\_Spanish\\_Case\\_Study](https://www.researchgate.net/publication/327080220_Salary_Prediction_in_the_IT_Job_Market_with_Few_High-Dimensional_Samples_A_Spanish_Case_Study)
- Morgan, L. (2022, July 15). *The future of data science: Career outlook and industry trends*. Retrieved from techtarget: <https://www.techtarget.com/searchenterprisedi/feature/The-future-of-data-science-jobs>
- Obi, C. (2024). *2023-Data-Science-Salary-Analysis*. Retrieved from <https://github.com/Mayreeobi/2023-Data-Science-Salary-Analysis/tree/main>
- Pabilonia, S. W., & Vernon, V. (2023, September 6). *Remote Work, Wages, and Hours Worked in the United States*. Retrieved from SSRN: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4561618](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4561618)
- PayScale. (2023). *The state of remote work, return to office policies, and geographic pay strategies in 2023*. Retrieved from payscale.com: <https://www.payscale.com/research-and-insights/remote-work/>
- PricewaterhouseCoopers(PWC). (2021, March). *Remote working - employer challenges and how to overcome them*. Retrieved from PWC.co.nz: <https://www.pwc.co.nz/insights-and-publications/2021-publications/remote-working-overcoming-employer-challenges.html>
- RANDOMARNAB. (2023). *Data Science Salaries 2023 -- Salaries of Different Data Science Fields in the Data Science Domain*. Retrieved from Kaggle: <https://www.kaggle.com/datasets/arnabchaki/data-science-salaries-2023>