

# Optimizing Recruitment: A Data-Driven Approach

an Analysis of Recruitment Channels and  
their Impact on Employee Recruitment  
in Company XYZ

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# Introduction

## Problem:

- Many organizations struggle with inefficient and ineffective recruitment processes.

## Objective:

- To analyze recruitment data and provide data-driven insights to optimize hiring strategies.

## Key Points:

- Analyze the performance of different recruitment channels
- Identify the most effective recruitment strategies for different job roles and job level
- Provide actionable recommendations to improve recruitment outcomes



# Business Questions

## How effective are our current recruitment channels?

- Which channels yield the highest quality hires?
- Which channels are the most cost-effective?
- Which channels have the shortest time-to-hire?

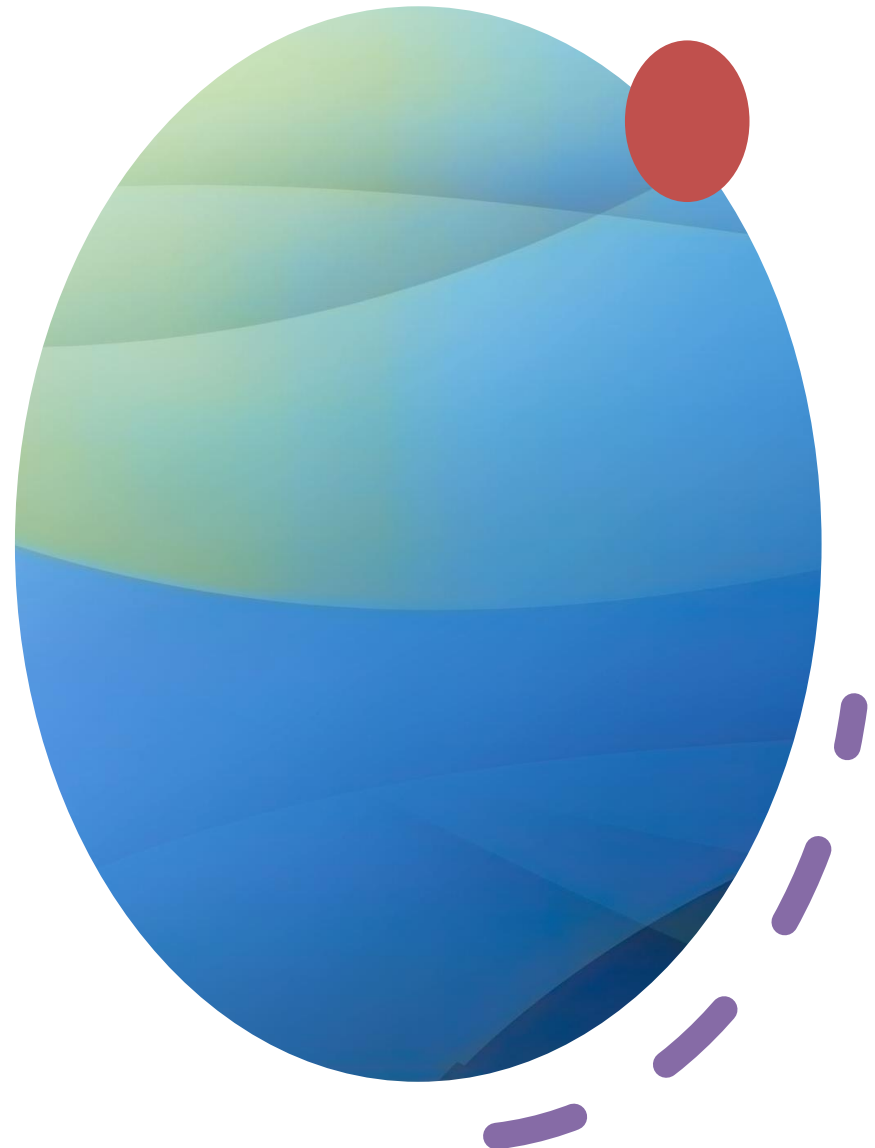
## Which recruitment channels are most effective for specific job roles?

- How can we optimize our sourcing strategies for technical, sales, and marketing roles?
- What is the best way to attract and hire top talent for leadership positions?

## What are the most in-demand skills for different job levels?

- What skills are essential for entry-level, mid-level, and senior-level positions?

## Which recruitment channels provide the highest ROI?



# Methodology



## Data Time Frame:

The data time frame is 3 years (2020-2023).

The dataset is synthetic and does not correspond to any institution.



## Data Cleaning and Preparation:

Cleaned and standardized the data to ensure accuracy and consistency.

Handled missing values and outliers using appropriate techniques.

Transformed and aggregated data for analysis (create additional columns: ROI, Conversion Rate based on existing columns)

Convert hire\_date data type into datetime



## Exploratory Data Analysis (EDA):

Conducted exploratory data analysis to understand the underlying patterns and trends in the data.

Visualized data using various techniques, including line chart, pie charts, heatmap, wordcloud, and bar charts.

Identified key insights among different variables.



## Tools Used:

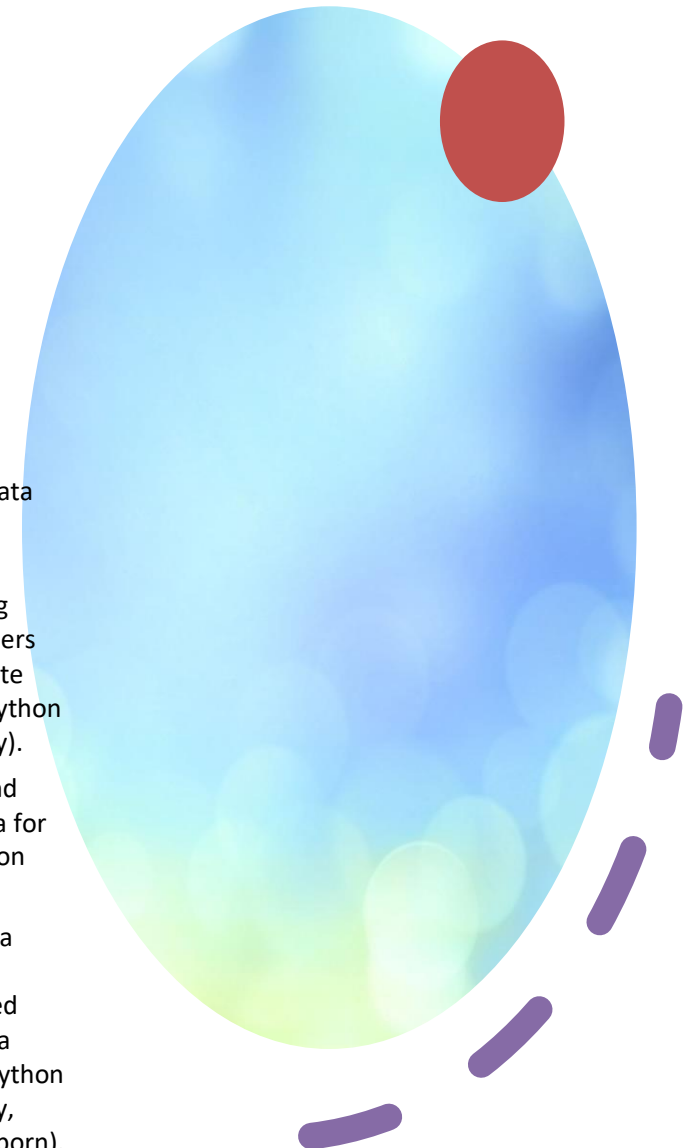
Excel, SQL for data cleaning and preparation

Handled missing values and outliers using appropriate techniques in Python (Pandas, NumPy).

Transformed and aggregated data for analysis in Python (Pandas).

Exploratory Data Analysis (EDA):Conducted exploratory data analysis using Python (Pandas, NumPy, Matplotlib, Seaborn).

Visualized data using Power BI



# Dataset Overview

The dataset includes the following columns:

- candidate\_id
- recruitment\_channel (Job Boards, Social Media, Employee Referral, Agencies, Company Website)
- application\_date
- cost\_per\_hire
- hire\_date
- job\_level (Entry, Mid, Senior)
- department (HR, IT, Marketing, Sales, Finance)
- job\_title
- salary
- education\_level
- years\_of\_experience
- skills
- performance\_score
- bonus
- work\_location
- age
- retention\_period
- time\_to\_hire\_days

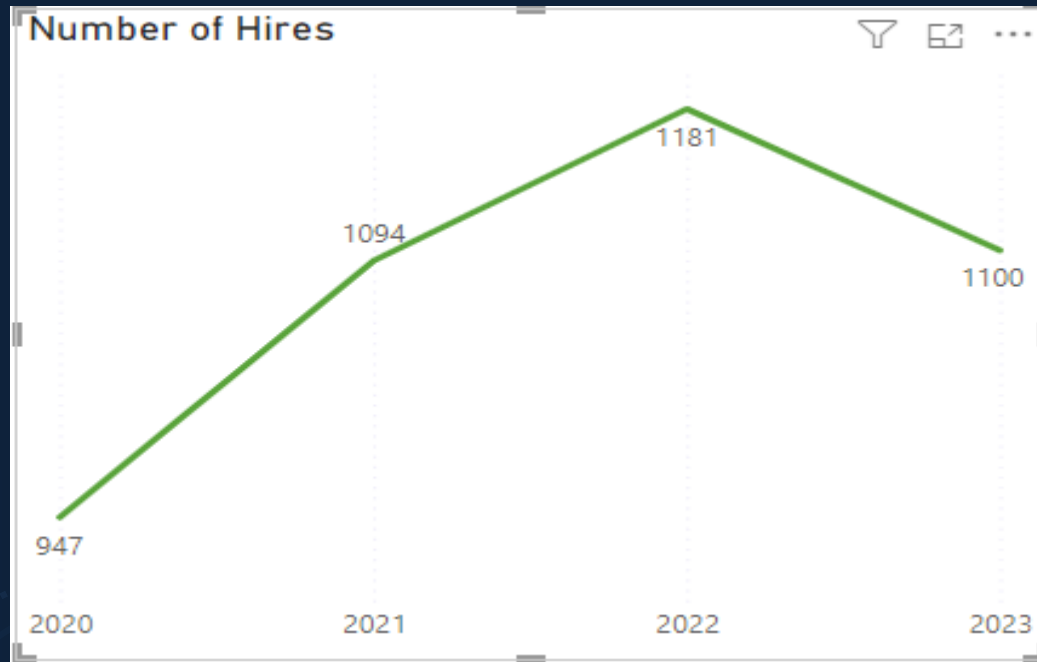
The dataset is synthetic and made close to actual condition for data analysis practice purposes.



# Exploratory Data Analysis (EDA)

- **Basic Figures:**
  - Number of Hires Overtime
  - Proportion of Hires by Channel
  - Proportion of Hires by Job Level
  - Top 5 Hires by Job Titles
- **Hiring Quality:**
  - Average Retention Period by Channel
  - Conversion Rate by Channel
  - Skills in Demand
- **Hiring Efficiency:**
  - Average Cost per Hire by Channel
  - ROI by Channel
  - Average Time-to-Hire by Channel



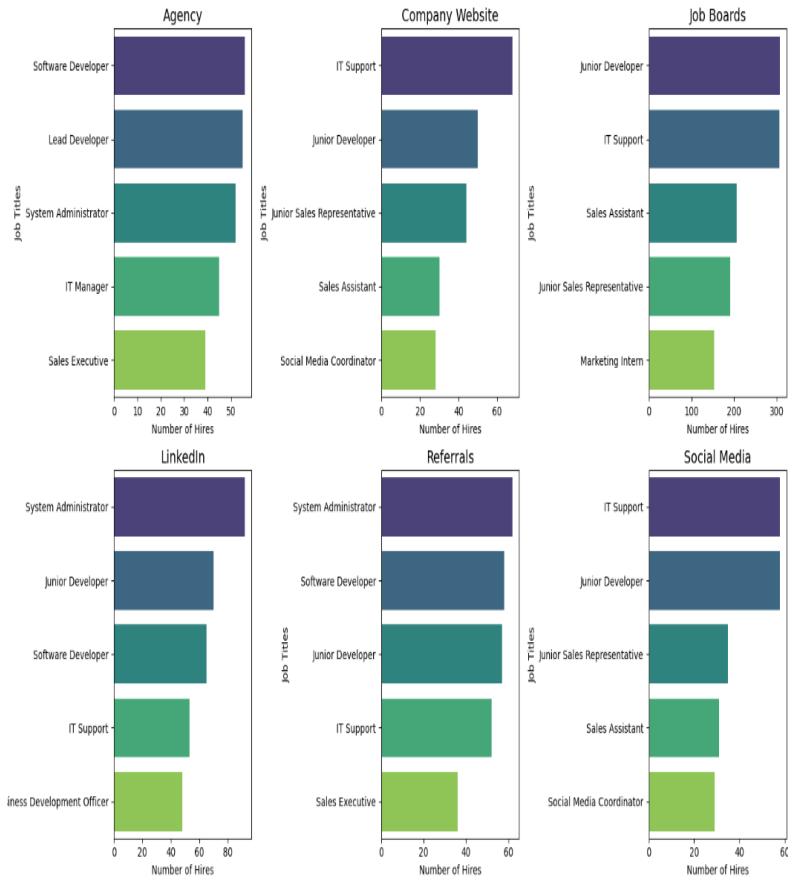


## Hiring Trend Overtime (2020-2023)

- **Hiring Peak in 2022:** The company experienced a significant hiring surge in 2022, reaching the highest point in the number of hires during the observed period.
- **Hiring Decline in 2023:** Following the peak in 2022, there was a noticeable drop in the number of hires in 2023, suggesting a potential shift in hiring strategies or business needs.

# Top-5 Hires by Channel

Top 5 Job Titles Hired by Recruitment Channel



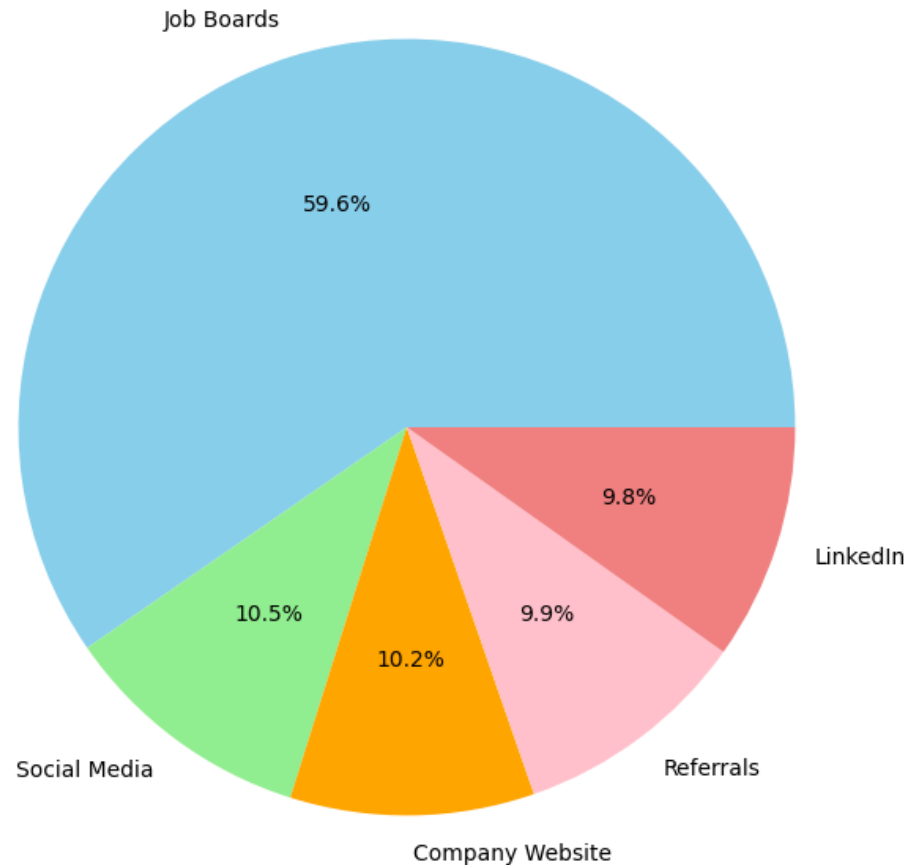
- Job Boards Lead in Hiring Volume:**  
 The most effective channel for sourcing candidates across various job titles, consistently leading in the number of hires for most positions, particularly entry level. This suggests that job boards are a reliable channel to manage
- Referrals and Social Media Have Limited Impact:**  
 While referrals and social media can be effective in certain cases, they might not be the primary drivers of hiring across the board.
- Agencies and Company Websites Focus on Technical Roles:**  
 More effective in hiring technical roles like Software Developers, Lead Developers, and System Administrators. This suggests that these channels might be valuable for sourcing specialized technical talent.
- LinkedIn is Strong for IT and Sales Roles:**  
 A significant source of hires for IT and Sales roles, particularly IT Support, Junior Developer, and Sales Executive positions. This highlights the importance of LinkedIn in attracting professionals in these fields.
- Referrals Are Effective for Specific Roles:**  
 Effective in filling IT Support and Junior Developer positions. This highlights the power of employee referrals in attracting quality candidates for these roles.



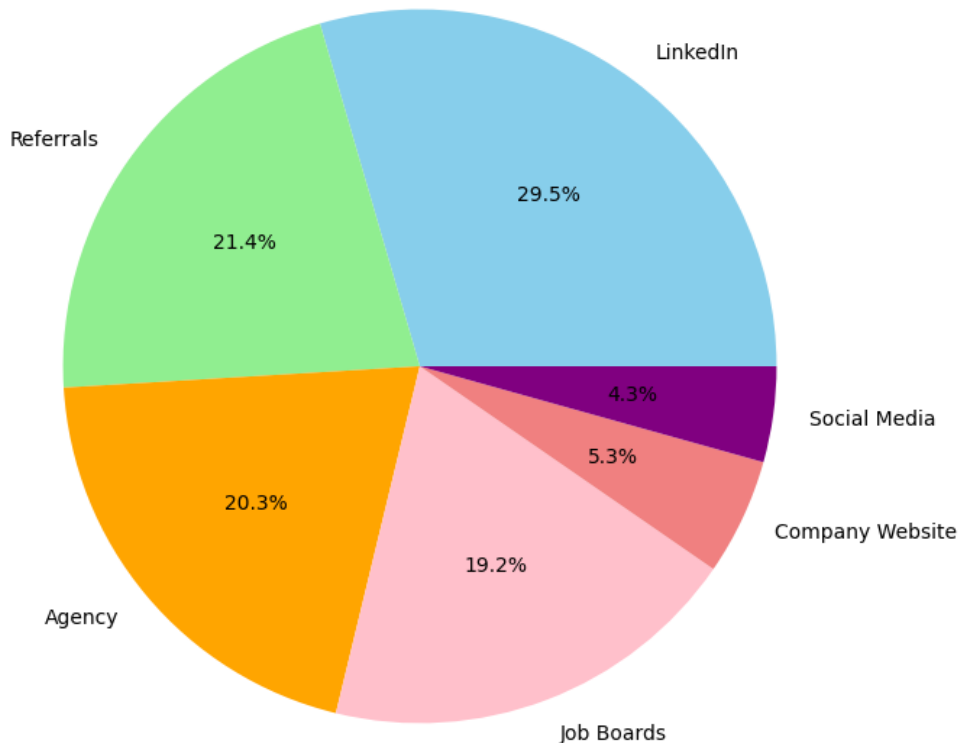
# Proportion of Entry-Level Hires by Channel

- **Job Boards Dominate Entry-Level Hiring:**  
Job boards are the most effective channel for sourcing entry-level hires, accounting for nearly 60% of all entry-level hires. This suggests that job boards are a reliable and efficient source of entry-level talent.
- **Social Media and Company Websites Play a Minor Role:**  
Social media and company websites contribute only a small percentage to entry-level hiring, with less than 11% of hires coming from these channels. This indicates that these channels might be less effective for attracting entry-level talent compared to job boards and referrals.

Proportion of Entry-Level Hires by Recruitment Channel



Proportion of Mid-Level Hires by Recruitment Channel



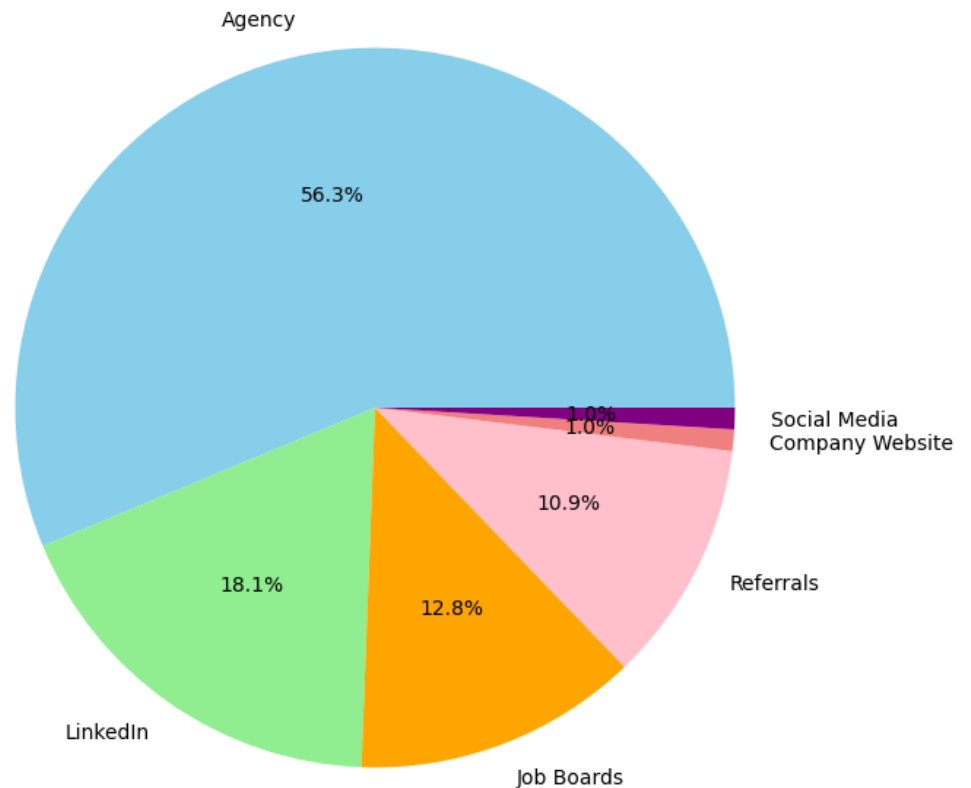
## Proportion of Mid-Level Hires by Channel

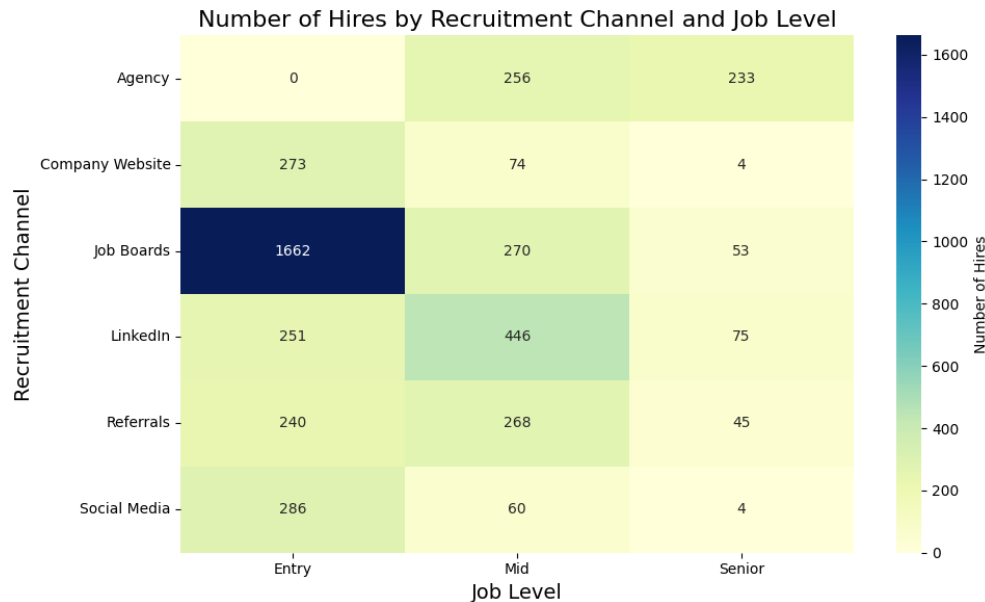
- **LinkedIn Leads in Mid-Level Hires:**  
LinkedIn is the most effective channel for sourcing mid-level hires, accounting for nearly 30% of mid-level hires. This highlights the importance of LinkedIn in attracting mid-career professionals.
- **Referrals and Agency are Significant Sources:**  
Referrals and agencies also play a significant role in mid-level hiring, contributing 21.4% and 20.3% respectively. This suggests that employee referrals and agency partnerships are valuable strategies for mid-level recruitment.

# Proportion of Senior Level Hires by Channel

- **Agencies Dominate Senior-Level Hires:**  
Agencies are the primary source of senior-level hires, accounting for over half (56.3%) of all senior-level hires. This suggests that agencies are highly effective in sourcing experienced talent at the senior level.
- **Social Media and Company Website are Minimal Sources:**  
Social media and the company website contribute very little to senior-level hiring. This indicates that these channels might be less effective for attracting senior-level talent.

Proportion of Senior-Level Hires by Recruitment Channel

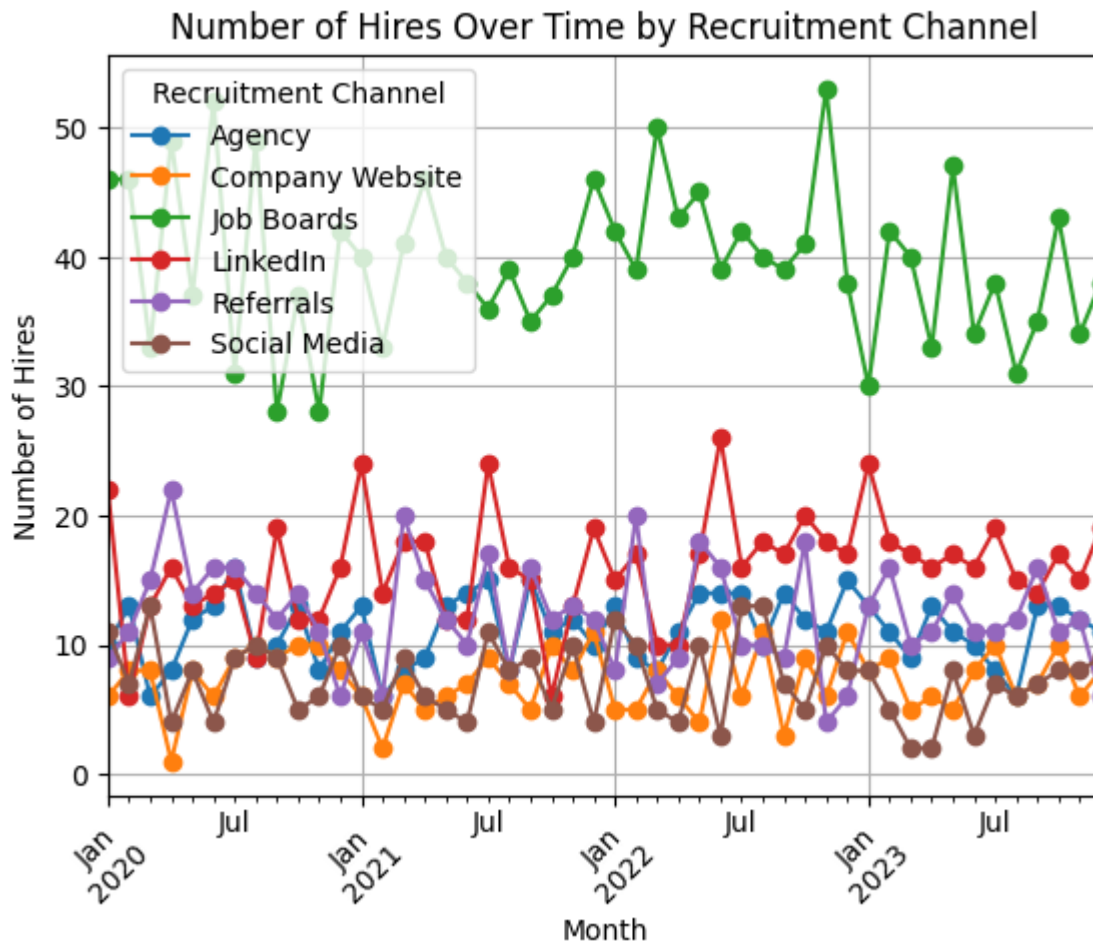




# Number of Hires by Channel

- **Job Boards Lead in Entry-Level Hires:**  
Job boards are the most effective channel for sourcing entry-level hires, as evidenced by the significantly higher number of hires compared to other channels.
- **Referrals Dominate Mid and Senior Hires:**  
Referrals are the primary source of hires for mid and senior-level positions across all recruitment channels. This highlights the effectiveness of employee referrals in attracting experienced talent.

# Number of Hires Overtime



- **Job Boards Lead in Consistency:**  
Job boards consistently generate a steady stream of hires throughout the year, with minimal fluctuations. This suggests that job boards are a reliable source of candidates year-round.
- **LinkedIn and Referrals Show Seasonal Variation:**  
Both LinkedIn and referrals exhibit some seasonality in hiring. There are periods of increased activity followed by periods of decline. This might be influenced by factors like hiring cycles or company-specific initiatives.

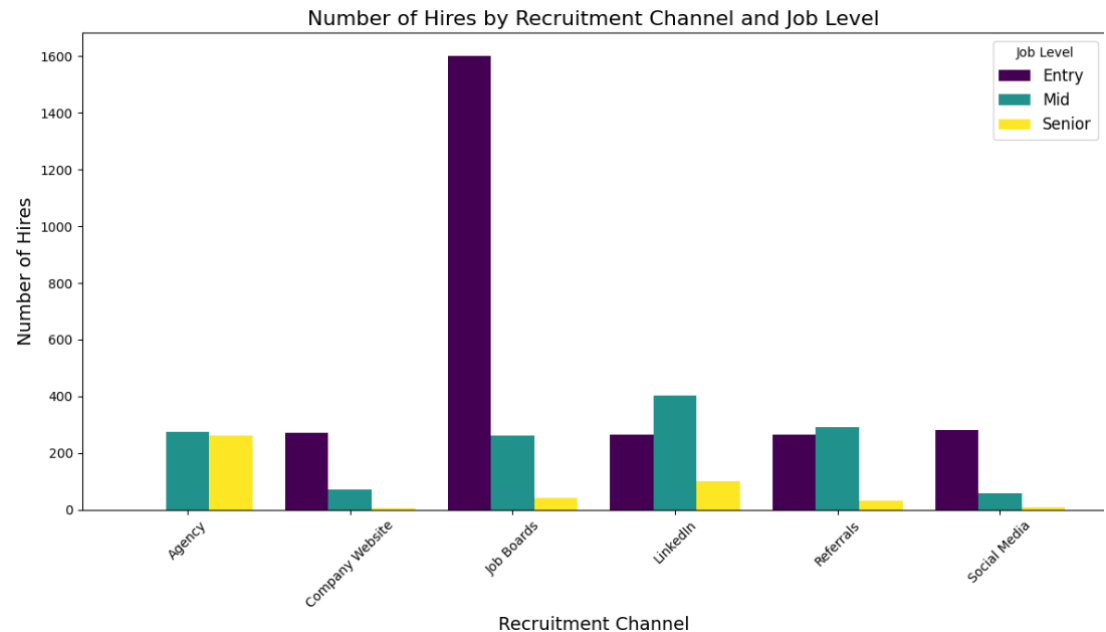
# Number of Hires by Channel and Job Level

- **Job Boards Lead in Entry-Level Hires:**

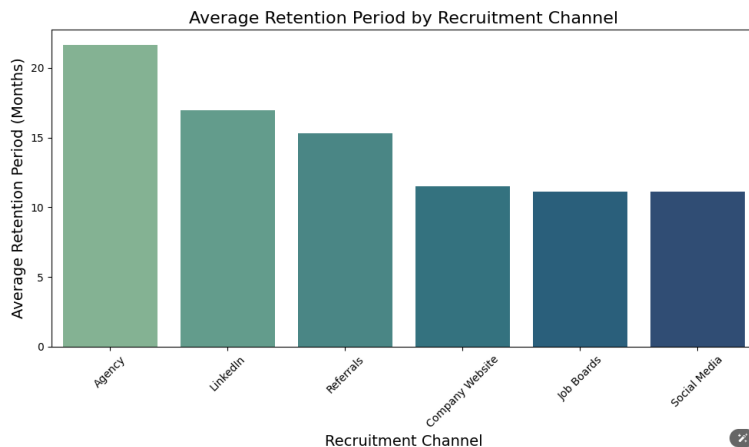
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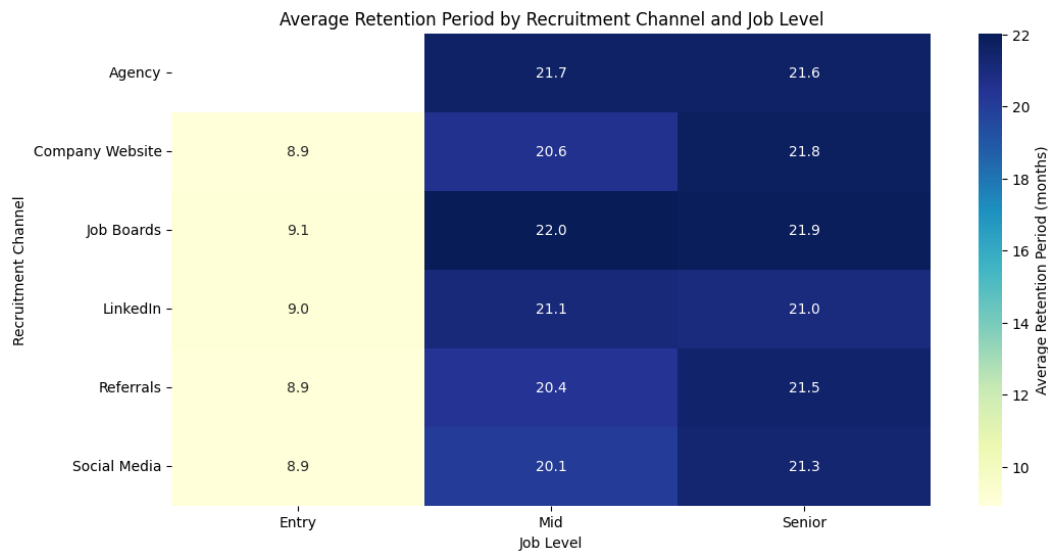
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# Hiring Quality: Average Retention Period



- **Referrals Lead to Longer Retention:**  
Employees hired through referrals tend to stay with the company longer compared to those hired through other channels. This suggests that referrals might be a valuable source of high-quality hires.
- **Agency Hires Have the Shortest Retention:**  
Employees hired through agencies have the shortest average retention period, indicating potential challenges with fit or long-term engagement with hires from this channel.



## Hiring Quality: Average Retention Period

- **Referrals Lead to Longer Retention:**  
Employees hired through referrals tend to stay with the company longer compared to those hired through other channels, regardless of job level. This suggests that referrals might be a valuable source of high-quality hires across all job levels.
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## Skills for Mid



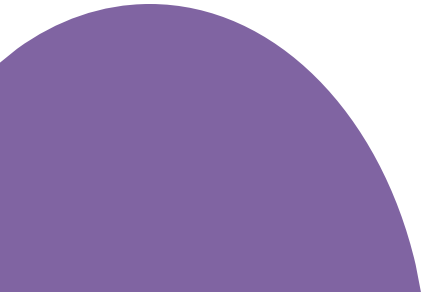
# Top 5 Skills in Demand for Mid Level

- Here are the top 5 most demanded skills for Mid-level positions:
  1. Project Management:
  2. Technical Skills: Programming languages like Python and Java, as well as database management skills, are highly sought after.
  3. Sales and Marketing:
  4. Strategic Thinking
  5. Financial Analysis: Skills in financial analysis, payroll, and tax compliance are also important for mid-level positions.

# mand vel

Senior-level

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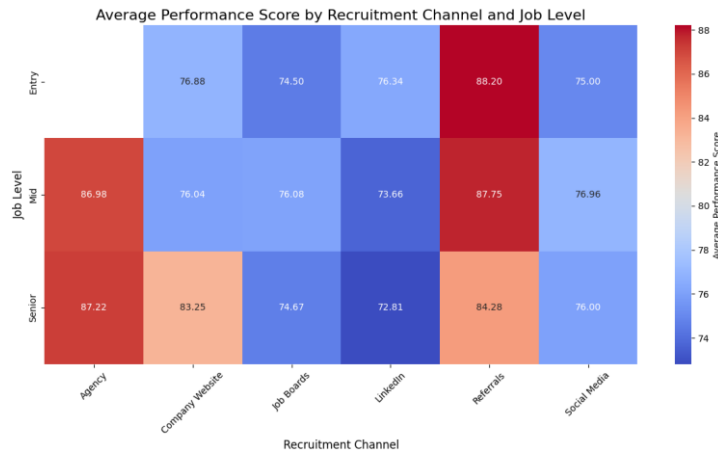


1. **Cloud Computing:**
2. **AI and Data Analytics:** Skills related to AI, data analytics, and big data are highly sought after at the senior level.
3. **Leadership and Management:** Terms like "leadership," "project management," and "account management" indicate a need for strong leadership and management abilities.
4. **Strategic Thinking:** Skills in strategy, market expansion, and financial planning are crucial for senior-level roles.
5. **Cybersecurity:** With the increasing importance of cybersecurity, skills in this area are becoming more and more valuable at the senior level.

1. Customer Service
2. Troubleshooting
3. Software Knowledge
4. Communication Skills
5. Data Entry

# Top 5 Skills in Demand for Entry Level Hires

# Hiring Quality: Average Performance Score of Hires by Channel



- Employees hired through **Referrals** tend to be high-performing, regardless of their job level.
- **Agencies** might be more effective in sourcing entry-level talent compared to mid and senior-level talent.
- **Job boards** might be more effective for sourcing entry-level talent compared to senior-level talent.
- **LinkedIn** and **Social Media** have similar average performance scores across all job levels.
- **Company websites** might not be the most effective channel for sourcing high-performing mid-level talent
- **Agencies** might not be the most effective channel for sourcing high-performing senior-level talent.



# Hiring Quality:

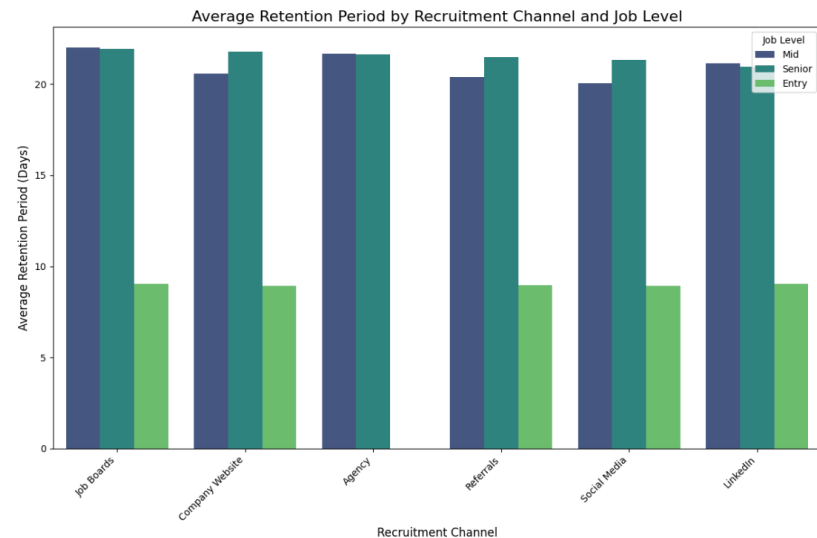
## Average Retention Period

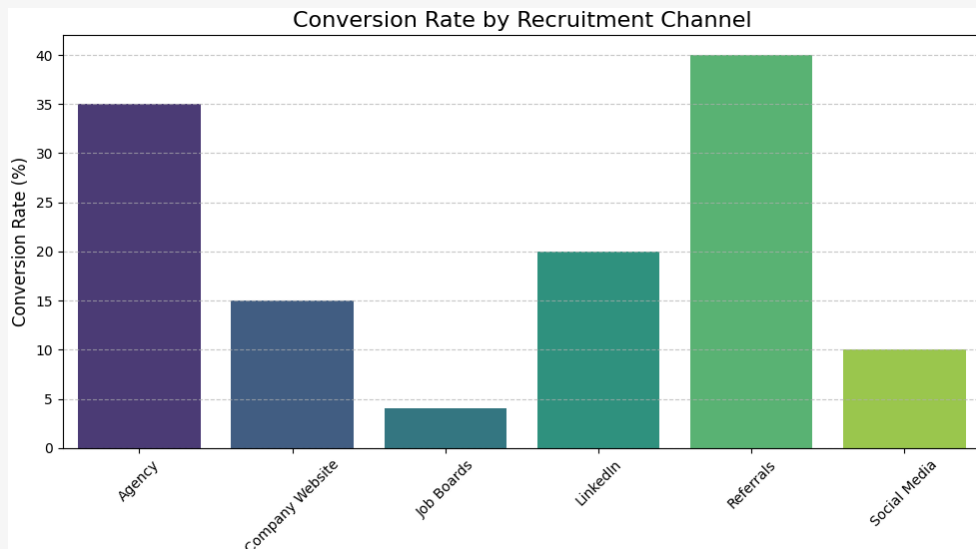
### Referrals Lead to Longer Retention:

- Employees hired through referrals tend to stay with the company longer compared to those hired through other channels, regardless of job level. This suggests that referrals might be a valuable source of high-quality hires across all job levels.

### Agency Hires Have the Shortest Retention:

- Employees hired through agencies have the shortest average retention period, indicating potential challenges with fit or long-term engagement with hires from this channel, especially at the entry level.





## Hiring Quality: Conversation Rate (%)

- Referrals Lead to the Highest Conversion Rate:  
Referrals have the highest conversion rate among all recruitment channels, indicating that referred candidates are more likely to convert into hires. This suggests that employee referrals are a highly effective recruitment strategy.
- Social Media Has the Lowest Conversion Rate:  
Social media has the lowest conversion rate, suggesting that it might be less effective in generating high-quality candidates who convert into hires. This could be due to various factors such as competition, noise, or difficulty in targeting the right audience.

# Hiring Efficiency:

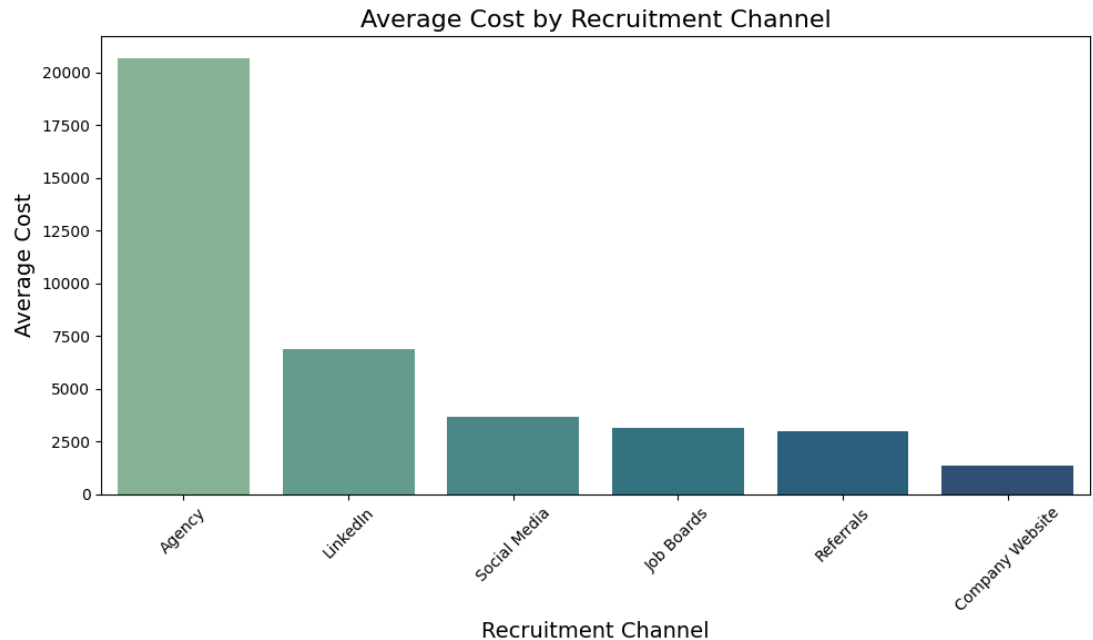
## Average Cost per Hire

- **Agency Hires are the Most Expensive:**

Hiring through agencies has the highest average cost per hire compared to other recruitment channels. This suggests that agencies might be a more expensive option for sourcing candidates.

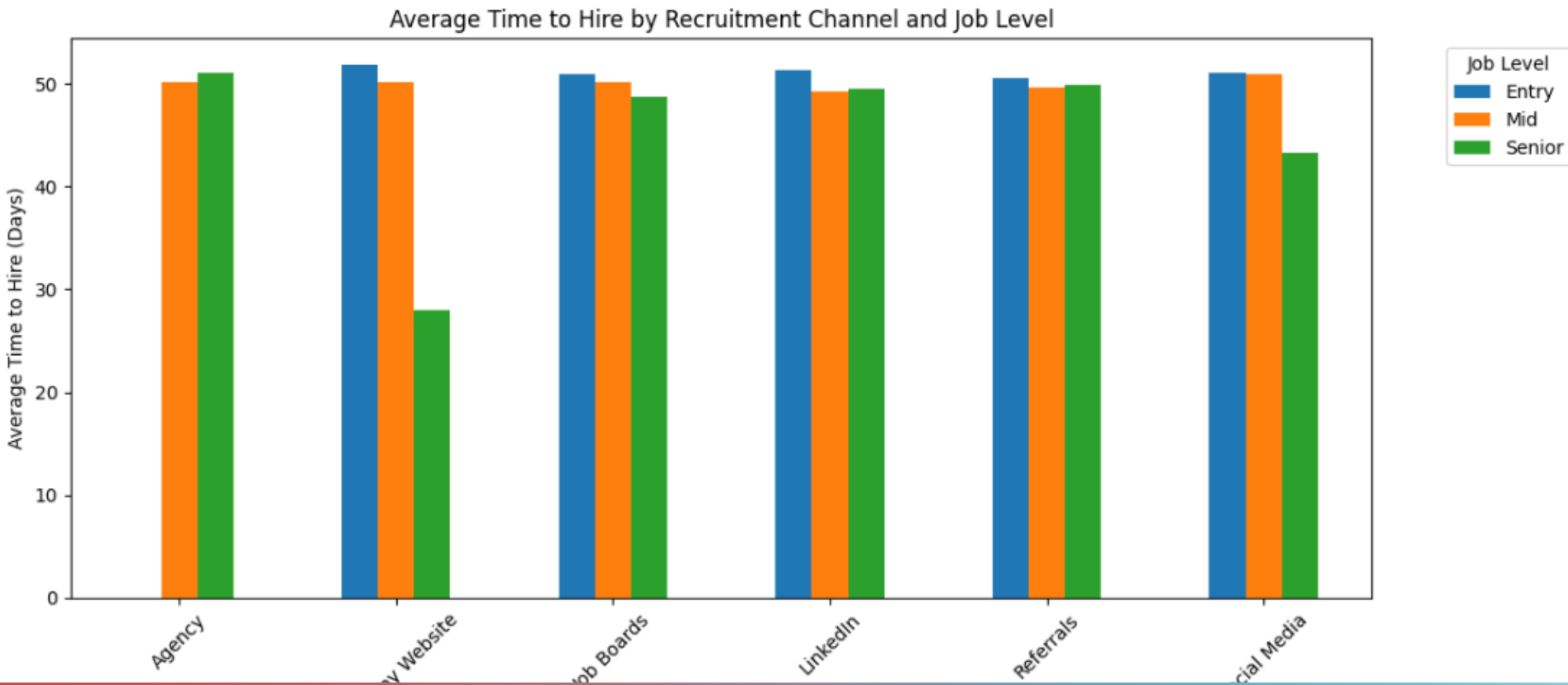
- **Referrals and Company Website are the Most Cost-Effective:**

Hiring through referrals and company website has the lowest average cost per hire, indicating that these channels might be more efficient and affordable options for recruitment.



# Hiring Efficiency: Average Time to Hire

- Referrals and Social Media are the Fastest Channels:  
Referrals and social media consistently have the shortest average time to hire across all job levels. This indicates that these channels might be more efficient in moving candidates through the hiring process.
- Agencies Take Longer for Mid and Senior Levels:  
Agencies tend to have longer average time to hire for mid and senior-level positions compared to other channels. This might be due to factors like complex screening processes or longer lead times in sourcing experienced talent through agencies.

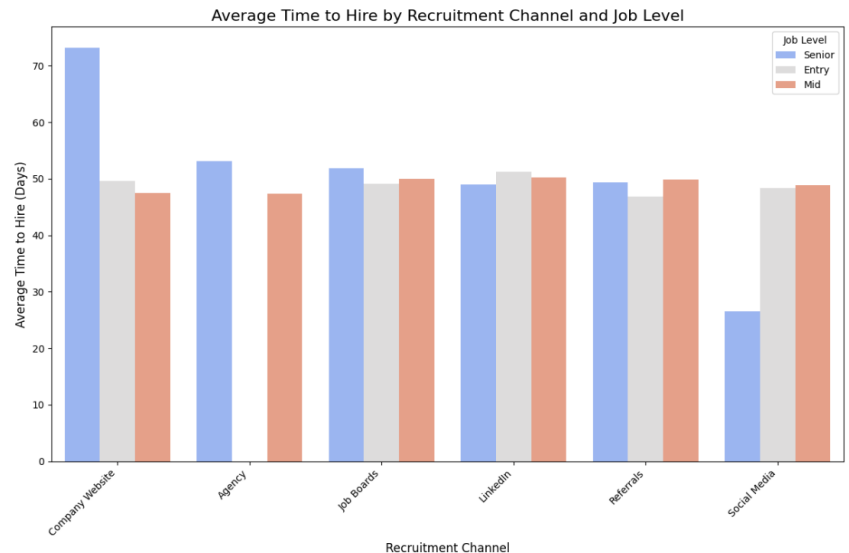




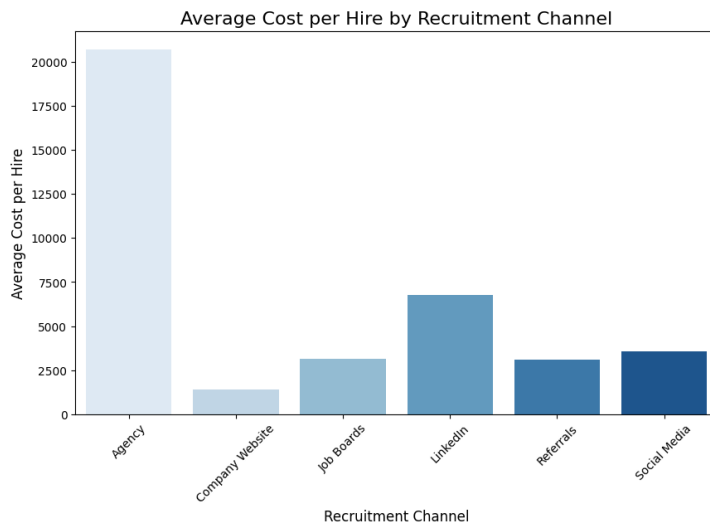
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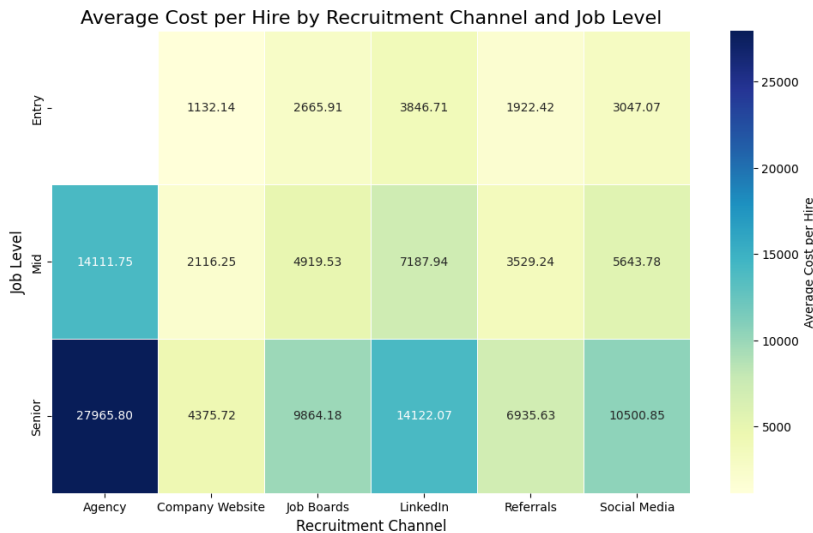
# Hiring Efficiency: Average Cost per Hire



- Agency Hires are the Most Expensive
- Referrals and Company Website are the Most Cost-Effective

# Hiring Efficiency:

## Average Cost per Hire



In terms of entry level and mid level positions, social media is a more affordable option for sourcing candidates

# Hiring Efficiency: Average ROI

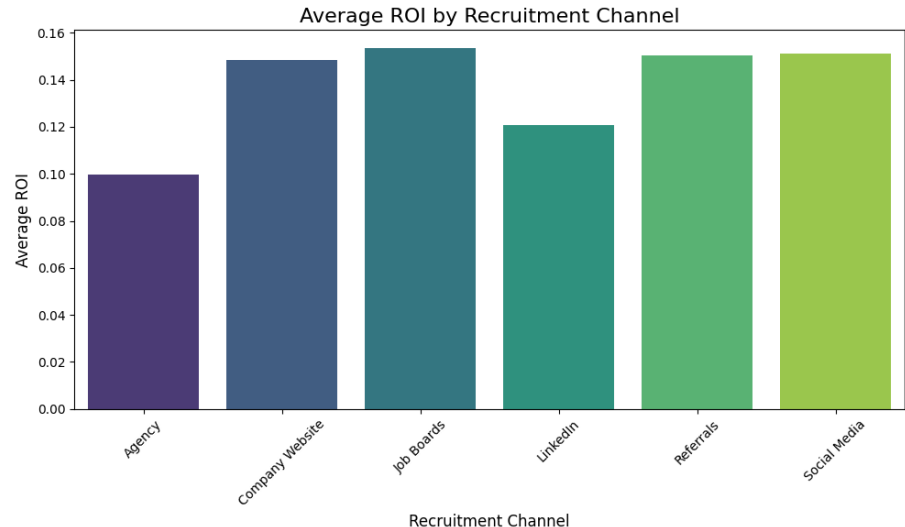
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## Referrals and Social Media Lead in ROI:

- Referrals and Social Media have the highest average ROI compared to other recruitment channels. This suggests that these channels might be more effective in generating a higher return on investment.

## Agency Hires Have the Lowest ROI:

- Agency hires have the lowest average ROI, indicating that while agencies might be effective in sourcing candidates, they might not be the most cost-effective option in terms of the return on investment.



# More Insights on Job and Skills Trend

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## **IT and Technical Roles:**

- **Strong Demand:** There is a consistent demand for IT professionals, including software developers, system administrators, and IT support roles.
- **Specialized Skills:** The demand for specialized skills like cloud computing, AI, and cybersecurity is increasing, especially for senior-level positions.

## **Sales and Marketing Roles:**

- **Steady Demand:** Sales and marketing roles, including sales executives, sales representatives, and marketing coordinators, are consistently in demand.
- **Digital Marketing Focus:** There is a growing emphasis on digital marketing skills, such as content marketing, social media marketing, and SEO.

## **Business Development Roles:**

- **Increasing Importance:** Business development roles, such as business development officers, are becoming more important as companies expand their operations and seek new opportunities.

These trends might vary depending on specific industries and geographic locations.



A decorative graphic on the left side of the slide consisting of four vertical bars of varying heights and widths, colored in a dark purple shade.

# Conclusions

- **Referral Programs are a Goldmine:** Employee referrals consistently outperformed other channels in terms of conversion rates, time-to-hire, and employee retention. Investing in referral programs can significantly boost recruitment efforts.
  - **Job Boards Remain a Reliable Source:** Job boards continue to be a reliable and efficient way to source candidates, especially for entry-level and mid-level positions.
  - **LinkedIn's Impact Varies:** LinkedIn's effectiveness varies by job role, proving most beneficial for IT and Sales roles.
  - **Agencies: A Costly Yet Specialized Tool:** Agencies can be a valuable resource for sourcing specialized talent, especially for technical roles or senior-level positions. However, their high cost should be carefully weighed against the potential benefits.
  - **Social Media's Limited Role:** While social media can be useful for branding and engagement, it is not a major source of hires for most roles.
-

# Recommendations

## **Prioritize Referral Programs:**

- Implement a robust referral program with attractive incentives.
- Streamline the referral process to make it easy for employees to refer candidates.
- Foster a referral culture within the organization.

## **Leverage Job Boards Strategically:**

- Optimize job postings to attract qualified candidates.
- Target the right job boards for specific roles.
- Monitor the performance of job postings and adjust the strategy as needed.

## **Utilize LinkedIn Effectively:**

- Build a strong company page on LinkedIn.
- Engage with the LinkedIn community and share relevant content.
- Use LinkedIn's advanced search and recruiting tools.

## **Optimize Agency Partnerships:**

- Establish strong relationships with reputable recruitment agencies.
- Clearly define requirements for each role.
- Monitor agency performance and adjust partnerships as needed.

## **Consider the ROI of Different Channels:**

- Prioritize channels with high ROI, such as referrals and social media.
- Carefully evaluate the cost-benefit analysis of using agencies.

# Next Steps

1

- Integrate insights into the recruitment strategy.



2

- Continuously monitor recruitment channel performance.



3

- Invest in high-performing channels to improve hiring efficiency.



# Appendices

- The data analysis asset (python files) is accessible in [github](#)
- The screenshots of the interactive dashboard (Power BI) is accessible in the following pages

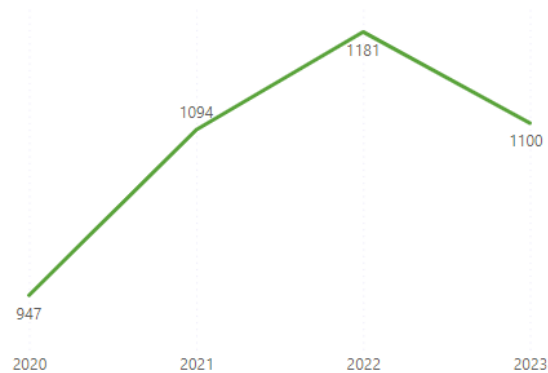
## DASHBOARD OF HIRING CHANNEL ANALYSIS

Basic Figures

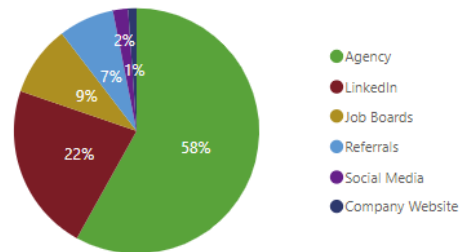
Hiring Quality

Hiring Efficiency

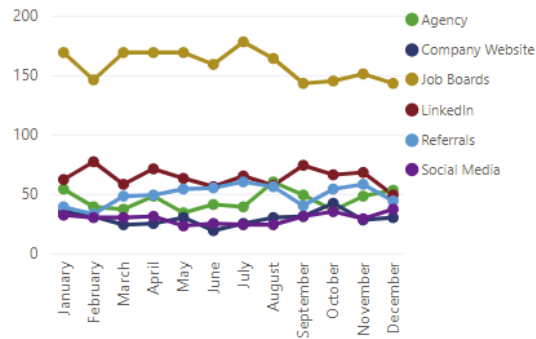
Number of Hires



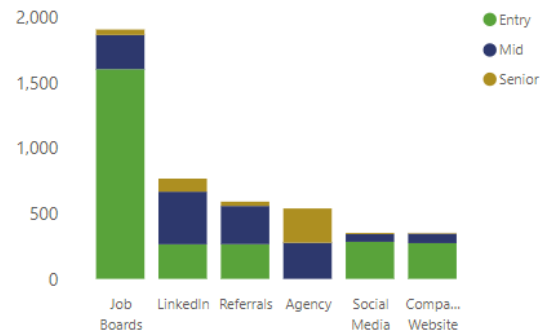
Proportion of Hires by Channel



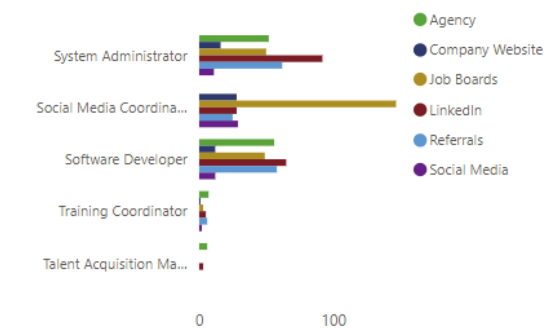
Number of Hires Overtime



Number of Hires by Channel, Job Level



Top 5 Hires by Job Title



Year

- Select all
- 2020
- 2021
- 2022
- 2023

Job Level

- Select all
- Entry
- Mid
- Senior

Department

- Select all
- Finance
- HR
- IT
- Marketing
- Sales

Channel

- Select all
- Agency
- Company Website
- Job Boards
- LinkedIn
- Referrals
- Social Media

Clear all filters

## DASHBOARD OF HIRING CHANNEL ANALYSIS

Basic Figures

Hiring Quality

Hiring Efficiency

Skills in Demand



Year

- ☐ Select all
- ☐ 2020
- ☐ 2021
- ☐ 2022
- ☐ 2023

Job Level

- ☐ Select all
- ☐ Entry
- ☐ Mid
- ☐ Senior

Department

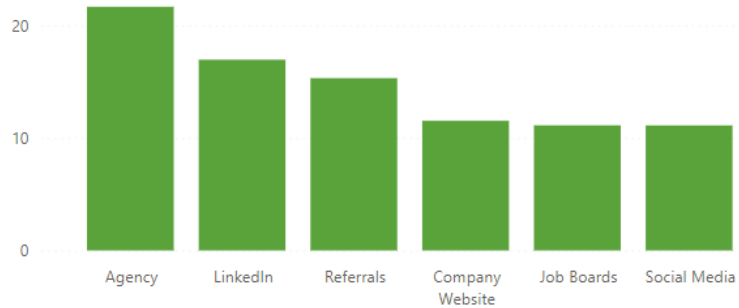
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- ☐ HR
- ☐ IT
- ☐ Marketing
- ☐ Sales

Channel

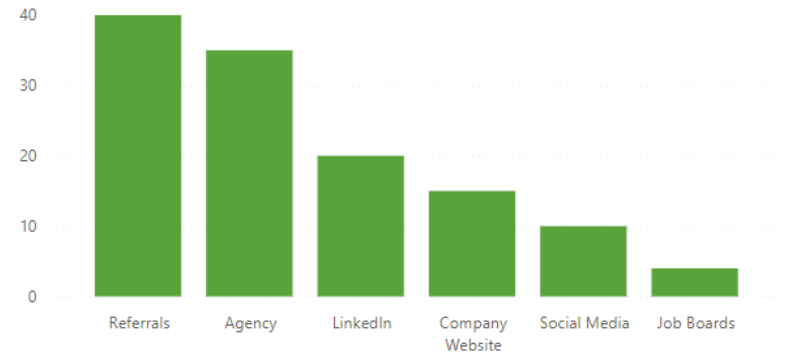
- ☐ Select all
- ☐ Agency
- ☐ Company Website
- ☐ Job Boards
- ☐ LinkedIn
- ☐ Referrals
- ☐ Social Media

Clear all filters

Average Retention Period (in Months) by Channel



Conversion Rate (%) by Channel



## DASHBOARD OF HIRING CHANNEL ANALYSIS

Basic Figures

Hiring Quality

Hiring Efficiency

Year

☐ Select all  
☐ 2020  
☐ 2021  
☐ 2022  
☐ 2023

Job Level

☐ Select all  
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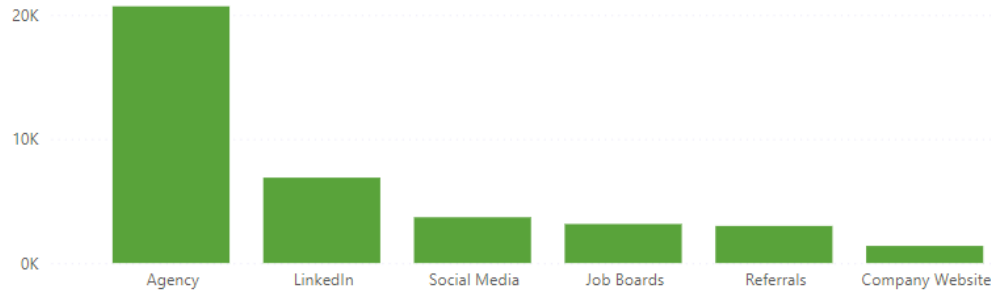
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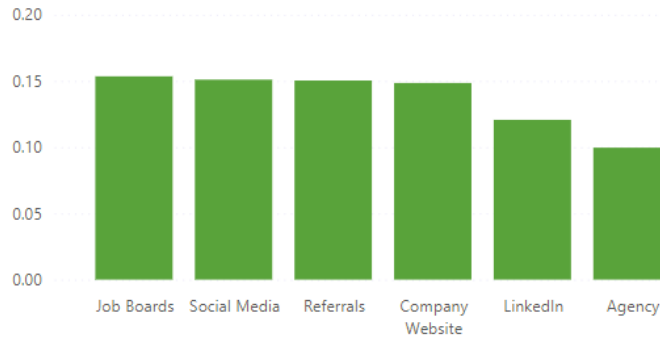
☐ Select all  
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☐ Company Website  
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☐ LinkedIn  
☐ Referrals  
☐ Social Media

Clear all filters

Average Cost per Hire by Channel



ROI by Channel



Average Time-to-Hire (in days) by Channel

