Programming Languages and Databases: Current and Future Direction

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OUTLINE

- Executive Summary
- Introduction
- Methodology
- Results
  - Visualization – Charts
  - Dashboard
- Discussion
  - Findings & Implications
- Conclusion
- Appendix

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EXECUTIVE SUMMARY

- **Programming Languages:**

- JavaScript dominates current and future programming languages. Python is rising because of the interest in (AI/Data Science) field. Modern tools are replacing traditional programming languages and databases.

- **Database:**

- PostgreSQL is showing an increasing demand for the future. A shift toward modern databases than MySQL.

- **Demographics:**

- Young professional males (25-35) are driving the industry with background in high education degrees. This highlights the need for more diversity.

- **Globally:**

- Tech industry is showing adoption of modern tools across the world.

- **Job Market:**

- Job postings showing demand for modern technology such as web development and cloud-based tools.

INTRODUCTION

What is this report about?

- A data analysis of current and developing trends in programming languages and databases evolving

- Data insights into technology trends for the future

- An examination of the global developers demographics

Who is this report for?

- Decision-makers in technology industry

- Organizations and Development teams

- Recruiters in technology field

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INTRODUCTION

What will readers gain?

- Understanding of current and future tech preferences

- Clear Insights into future technology directions

- Knowledge of developer workforce combination

- Data analysis to support decisions for future strategy

- Information on gaps regarding skills and training needs for the future

METHODOLOGY

Data Sources:

- Stack Overflow Developer Survey 2019

- Two primary datasets:

- Technologies dataset (programming languages and databases)

- Demographics dataset (age, gender, education)

Data Collection Methods:

- Online survey conducted by Stack Overflow

- Global responses from professional developers

- Public dataset from Stack Overflow's annual survey

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METHODOLOGY

Data Analysis Tools:

- IBM Cognos Analytics used for data visualization

- Custom dashboards created for: Technology trends analysis, Developer demographics distribution and Geographic distribution maps

Analysis Process:

- Data normalization and cleaning

- Creation of interactive visualizations

- Identifying trend through visual analytics

- Creating a reference to technology trends and demographic data

METHODOLOGY

Data Visualization:

- Bar charts for technology preferences

- Column charts for Database preferences

- Pie charts for demographic distribution

- Geographic maps for global distribution

- Line chart for Age Distribution

- Tree map chart for Web Frame and platform Frame

- Interactive dashboards for comprehensive views

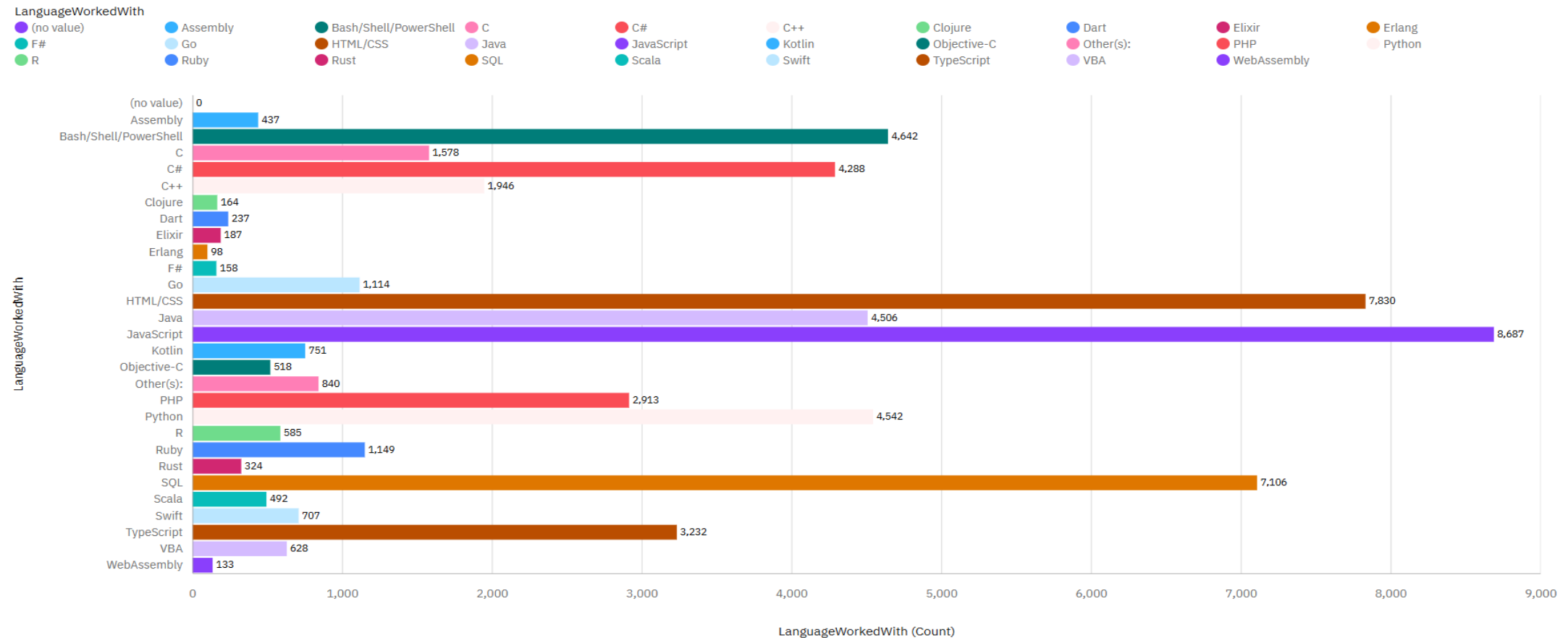- Bar charts for job posting data and popular languages

RESULTS

1. JavaScript is leading with 8,687 current users and remains at the top with 6,630 future users.

2. MySQL dominates with 5,469 users, while PostgreSQL is rising to 4,328 users.

3. 93.5% of developers are males which indicating huge gap, with most aged 25-35 and holding Bachelor's degrees.

4. Traditional languages like Java show significant decline from 4,506 to 2,953 users.

5. MongoDB's becoming popular and growing from 3,016 to 3,649 users, showing interest in NoSQL database solutions.

6. C language shows highest demand with 13,498 job postings, followed by Java with 2,609.

7. Washington DC leads job postings with 5,316 positions, followed by Seattle with 3,375.
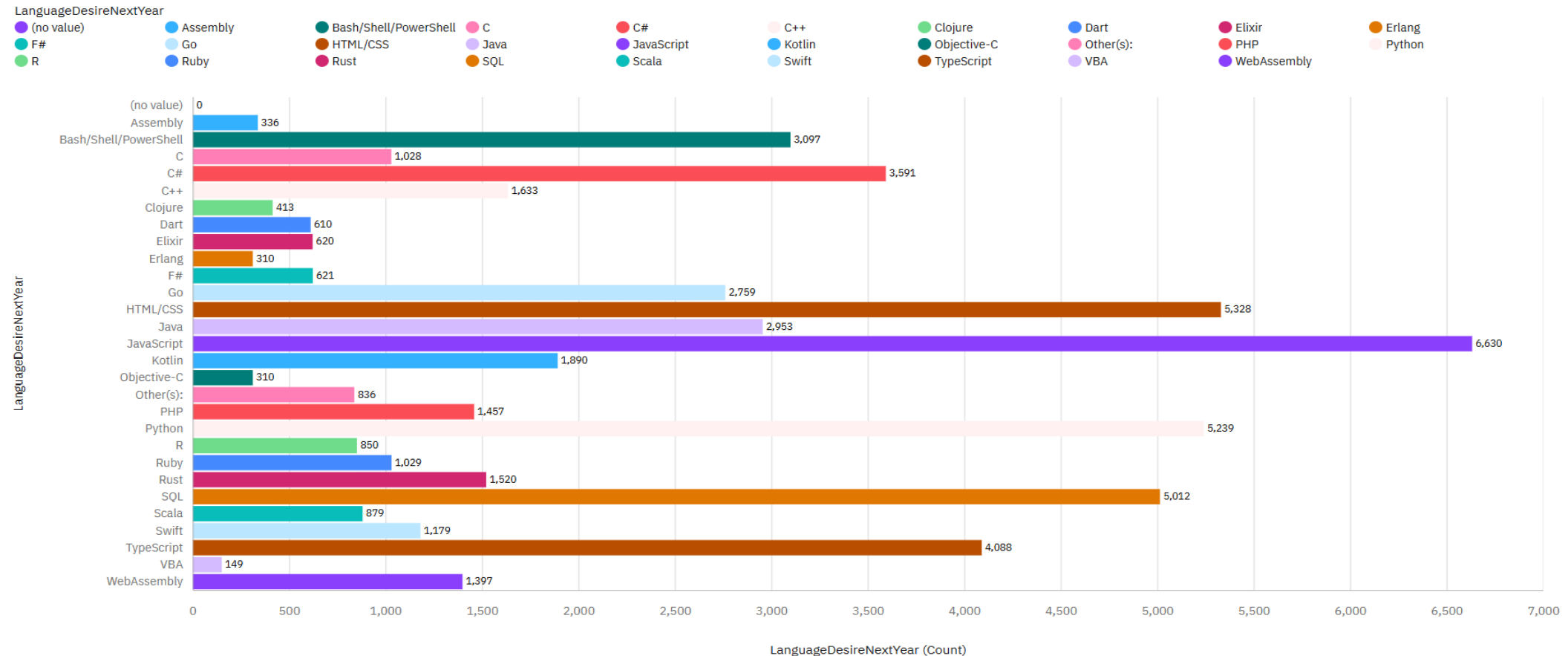
PROGRAMMING LANGUAGE TRENDS Current Year

Top 10 Programming Languages Used

LanguageWorkedWith

- (no value)
- Assembly
- Bash/Shell/PowerShell
- C
- C#
- C++
- Clojure
- Dart
- Elixir
- Erlang
- F#
- Go
- HTML/CSS
- Java
- JavaScript
- Kotlin
- Objective-C
- Other(s):
- PHP
- Python
- R
- Ruby
- Rust
- SQL
- Scala
- Swift
- TypeScript
- VBA
- WebAssembly

LanguageWorkedWith	Count
(no value)	0
Assembly	437
Bash/Shell/PowerShell	4,642
C	1,578
C#	4,288
C++	1,946
Clojure	164
Dart	237
Elixir	187
Erlang	98
F#	158
Go	1,114
HTML/CSS	7,830
Java	4,506
JavaScript	8,687
Kotlin	751
Objective-C	518
Other(s):	840
PHP	2,913
Python	4,542
R	585
Ruby	1,149
Rust	324
SQL	7,106
Scala	492
Swift	707
TypeScript	3,232
VBA	628
WebAssembly	133

LanguageWorkedWith (Count)

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PROGRAMMING LANGUAGE TRENDS Next Year

Top 10 Desired Programming Languages for Next Year

LanguageDesireNextYear

● (no value)	● Assembly	● Bash/Shell/PowerShell	● C	● C#	● C++
● Clojure	● Dart	● Elixir	● Erlang		
● F#	● Go	● HTML/CSS	● Java	● JavaScript	● Kotlin	● Objective-C	● Other(s):	● PHP	● Python
● R	● Ruby	● Rust	● SQL	● Scala	● Swift	● TypeScript	● VBA	● WebAssembly

LanguageDesireNextYear	Count
(no value)	0
Assembly	336
Bash/Shell/PowerShell	3,097
C	1,028
C#	3,591
C++	1,633
Clojure	413
Dart	610
Elixir	620
Erlang	310
F#	621
Go	2,759
HTML/CSS	5,328
Java	2,953
JavaScript	6,630
Kotlin	1,890
Objective-C	310
Other(s):	836
PHP	1,457
Python	5,239
R	850
Ruby	1,029
Rust	1,520
SQL	5,012
Scala	879
Swift	1,179
TypeScript	4,088
VBA	149
WebAssembly	1,397

LanguageDesireNextYear (Count)

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PROGRAMMING LANGUAGE TRENDS - FINDINGS & IMPLICATIONS

Findings

- JavaScript maintains its lead in the current space (8,687 developers) and future interest (6,630 developers).

- Looking at the top languages, there are changes:

- Now: JavaScript still in the lead followed by HTML/CSS, SQL, Python, and Java.

- Python current usage 4,542, rising to 5,239 for future interest.

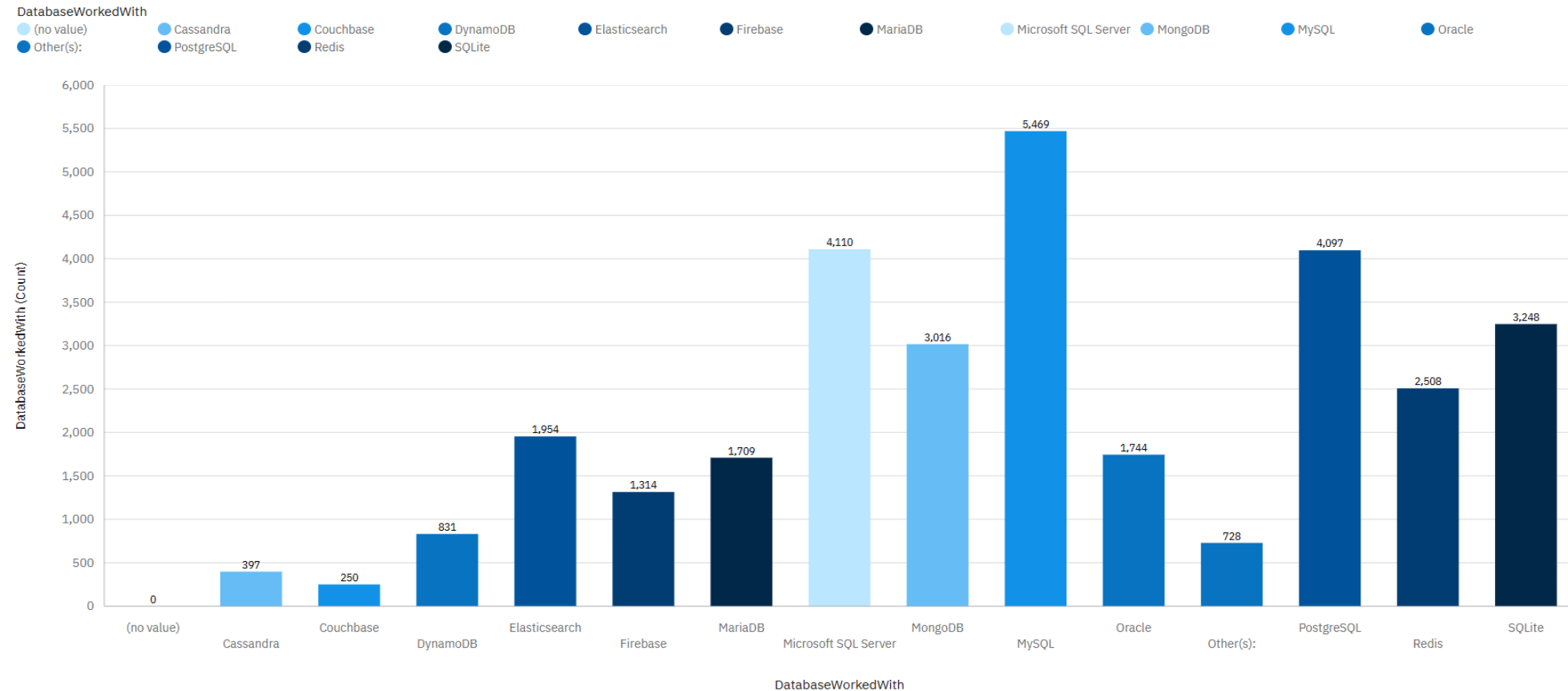- Java shows a significant drop from 4,506 current to 2,953 future users.

- (Bash/Shell/PowerShell) are also becoming less popular.

Implications

- JavaScript is still dominating with increased interest in TypeScript which suggests more approach towards them becoming essential tools.

- JavaScript in the lead means that's it's still a priority as a skill in the programming languages.

- As Python shows more growing this indicates an increased interest in the field of data science, AI and ML.

- The decreased interest in traditional languages like Java and shell indicates a shift towards modern development tools that are effective for the future.

DATABASE TRENDS

Current Year

Top 10 Databases Used

DatabaseWorkedWith

● (no value) ● Cassandra ● Couchbase ● DynamoDB ● Elasticsearch ● Firebase ● MariaDB ● Microsoft SQL Server ● MongoDB ● MySQL ● Oracle
● Other(s): ● PostgreSQL ● Redis ● SQLite

DATABASE TRENDS

Next Year

Top 10 Desired Databases for Next Year

DatabaseDesireNextYear
● (no value)   ● Cassandra   ● Couchbase   ● DynamoDB   ● Elasticsearch   ● Firebase   ● MariaDB   ● Microsoft SQL Server   ● MongoDB   ● MySQL   ● Oracle
● Other(s):   ● PostgreSQL   ● Redis   ● SQLite

Chart — DatabaseDesireNextYear (Count):
- (no value): 0
- Cassandra: 1,003
- Couchbase: 390
- DynamoDB: 1,044
- Elasticsearch: 2,856
- Firebase: 1,650
- MariaDB: 1,385
- Microsoft SQL Server: 2,706
- MongoDB: 3,649
- MySQL: 3,281
- Oracle: 870
- Other(s): 645
- PostgreSQL: 4,328
- Redis: 3,331
- SQLite: 2,437

DatabaseDesireNextYear

DATABASE TRENDS - FINDINGS & IMPLICATIONS

Findings

- MySQL shows it's the most used database right now (5,469 users), but PostgreSQL shows demand for next year (4,328 users).

- MongoDB grows from 3,016 current users to 3,649 users next year, which shows growing interest in NoSQL databases solutions.

- Traditional databases like Oracle are decreasing and shows a dropping from 1,744 current users to 870 users next year.

Implications

- PostgreSQL's rise shows more interesting in demand for powerful database performance for future preferences.

- The growing interest in MongoDB shows that developers are looking for flexible solutions and the need for NoSQL database skills.

- As oracle demand is declining significantly, this shows that developers prefer other alternative database options which will lead businesses to shift for other alternatives.

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DASHBOARD

Technology Survey Dashboard Analysis

Github link

Cognos Dashboard:

Link to Dashboard

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DASHBOARD TAB 1 Current Technology Usage

DASHBOARD TAB 2 Future Technology Trend

Future Technology Trend

Top 10 Desired Programming Languages for Next Year

LanguageDesireNextYear
- (no value)
- Assembly
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- C
- C#
- C++
- Clojure
- Dart
- Elixir
- Erlang
- F#
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- HTML/CSS
- Java
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Top 10 Desired Databases for Next Year

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- (no value)
- Cassandra
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- DynamoDB
- Elasticsearch
- Firebase
- MariaDB
- Microsoft SQL Server
- MongoDB
- MySQL
- Oracle
- Other(s):
- PostgreSQL
- Redis
- SQLite

Platform Preferences for Next Year

PlatformDesireNe...   PlatformDesireNe...
0   5,865   0   5,865

Linux, AWS, Kubernetes, Google Cl..., Slack, Microsof..., Docker, Windows, MacOS, iOS, Heroku, Wo..., Android, Raspberry Pi, Arduino, IBM ..., Oth...

Top 10 Desired Web Frameworks for Next Year

WebFrameDesire...   WebFrameDesireNextYear
0   4,714
- (no value)
- ASP.NET
- Angular/Angular.js
- Django
- Drupal
- Express
- Flask
- Laravel
- Other(s):
- React.js
- Ruby on Rails
- Spring
- Vue.js
- jQuery

React.js, Vue.js, ASP..., Angul..., jQu..., Ex..., S..., D...

DISCUSSION

Keynotes:

- There is a transition towards modern technologies.

- JavaScript and Python leading future programming trends.

- PostgreSQL and MongoDB gaining popularity in database solution field.

- More focus on AI and Machine Learning.

- Developers favouring flexible, cloud-based tools.

- There is a preference for open-source solutions.

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OVERALL FINDINGS & IMPLICATIONS

Findings

- JavaScript dominates programming and PostgreSQL shows rising in databases. While Technology evolution continues, Open-source solutions gaining popularity meanwhile traditional tools like (Java, Oracle) decline.

- Most developers have Bachelor's degrees and are aged 25-35 with good educational background.

- There is a clear movement toward web development with rising interest in Python as AI/data science is booming.

- There is a high gender gap in tech community where male percentage is 93.5%.

Implications

- For more sustainable progress, businesses need to look for new technologies and support their teams with trainings and courses to catch with what's coming.

- Organizations need to prioritize moving from old to new tools and bridge tech skill gaps through team training to keep pace with current development trends in the industry and maintain their progress.

- Organizations needs to improve the diversity in their working environment.

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CONCLUSION

- Tech industry is moving towards modern tools as developers choosing over traditional ones. With JavaScript and PostgreSQL in the lead.

- Young developers are shaping the way toward new perspectives, solutions and AI technologies.

- There is a high gender gap in tech as males are dominating the field. Diversity needs to be addressed.

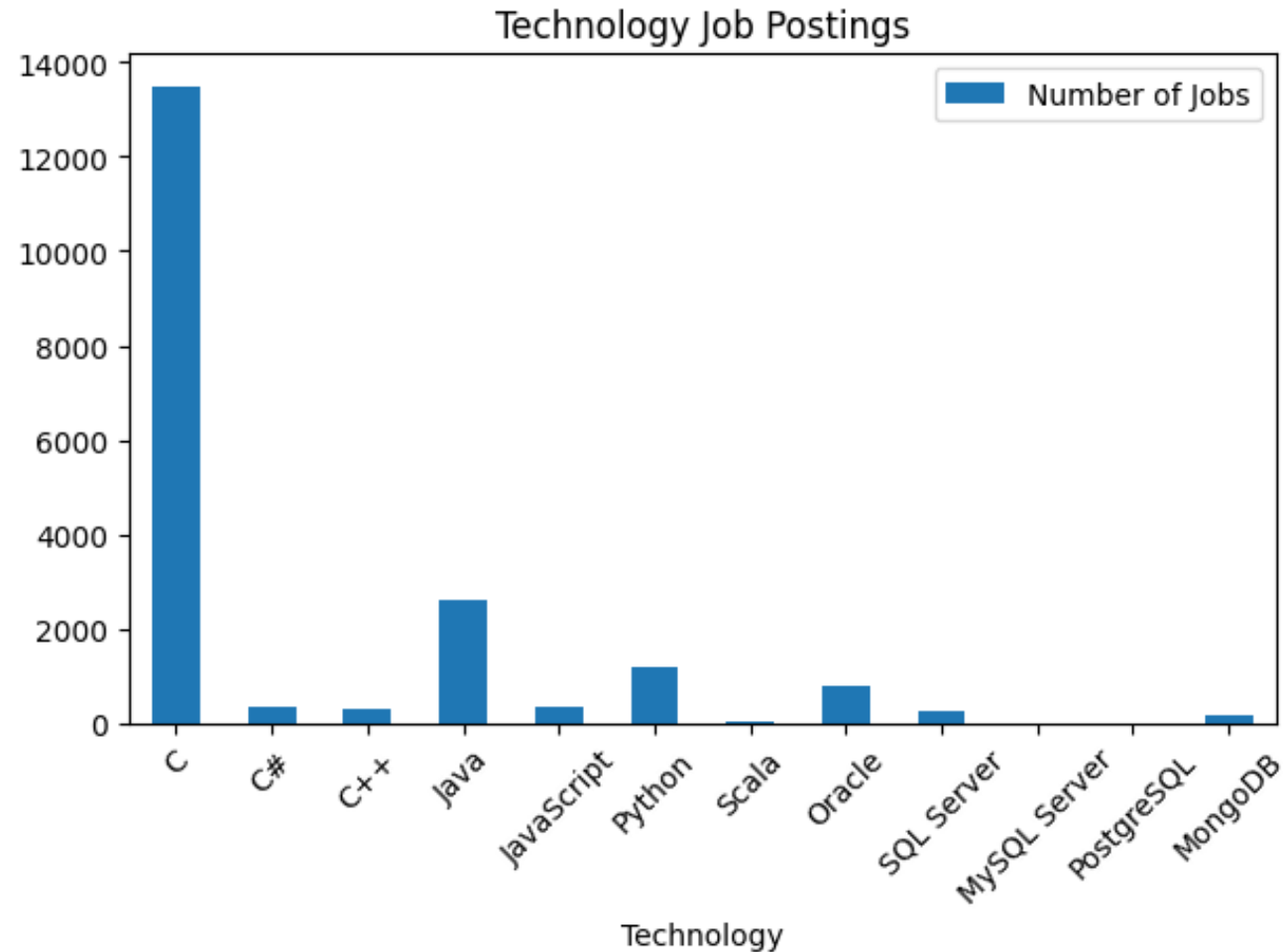- Companies must build skilled development teams to maintain a competitive edge, while adapting to modern tools.

JOB POSTINGS

POPULAR LANGUAGES

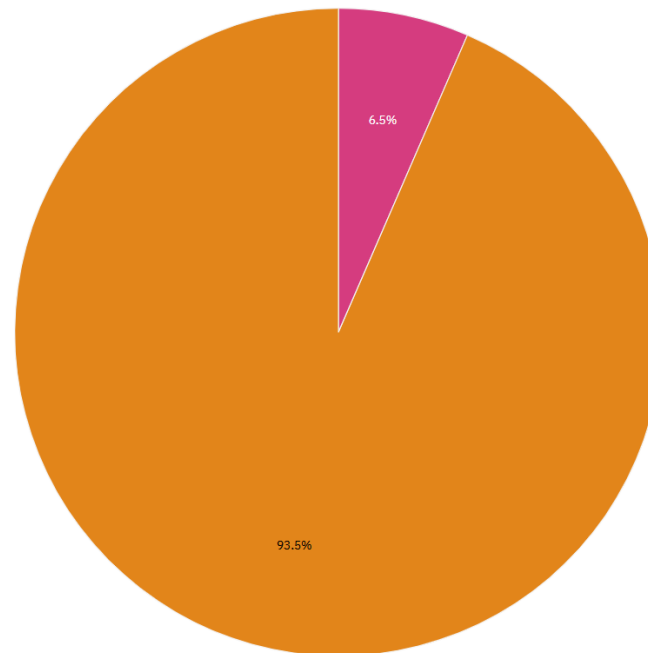Popular Programming Languages by Average Annual Salary
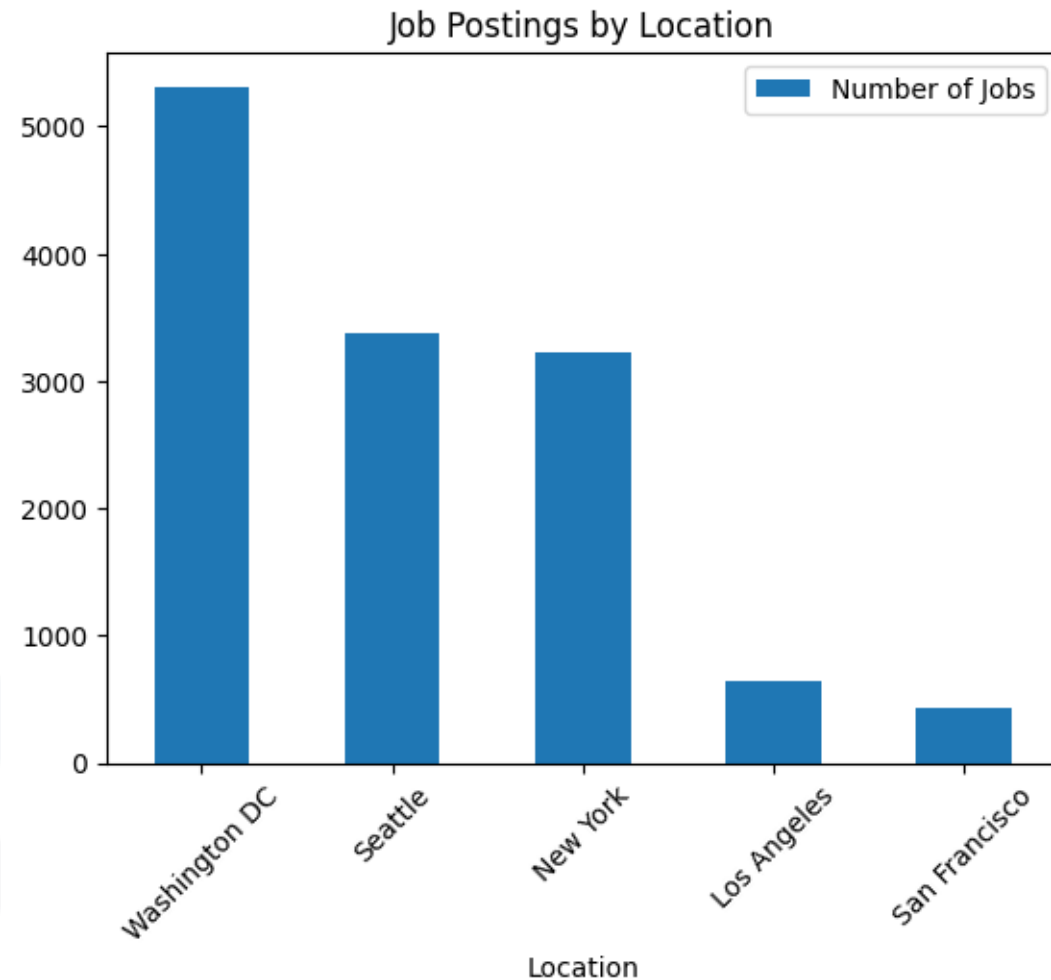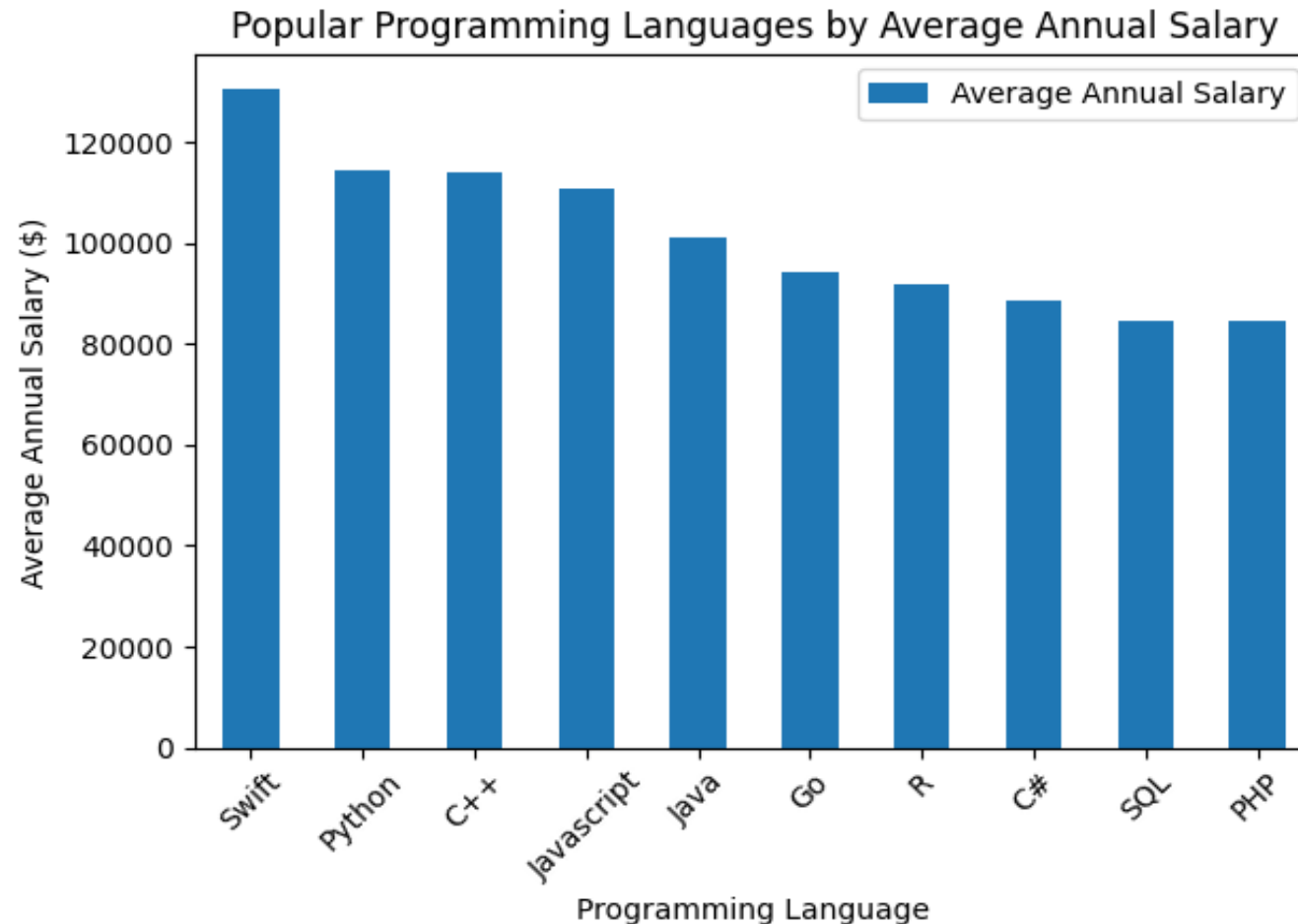
JOB POSTINGS

APPENDIX

Please refer to the Appendix for the complete series of Cognos dashboard visualizations supporting this analysis.
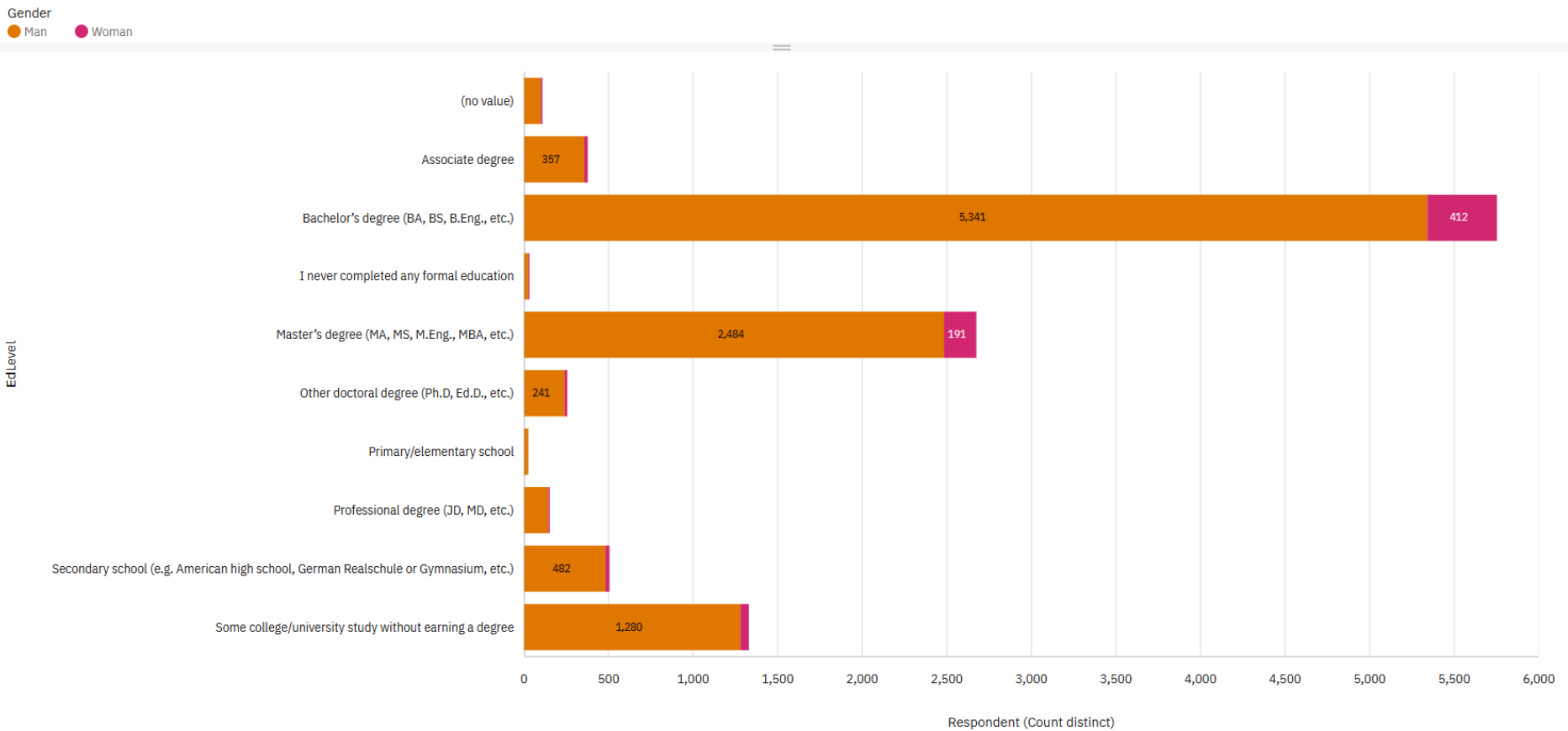
APPENDIX

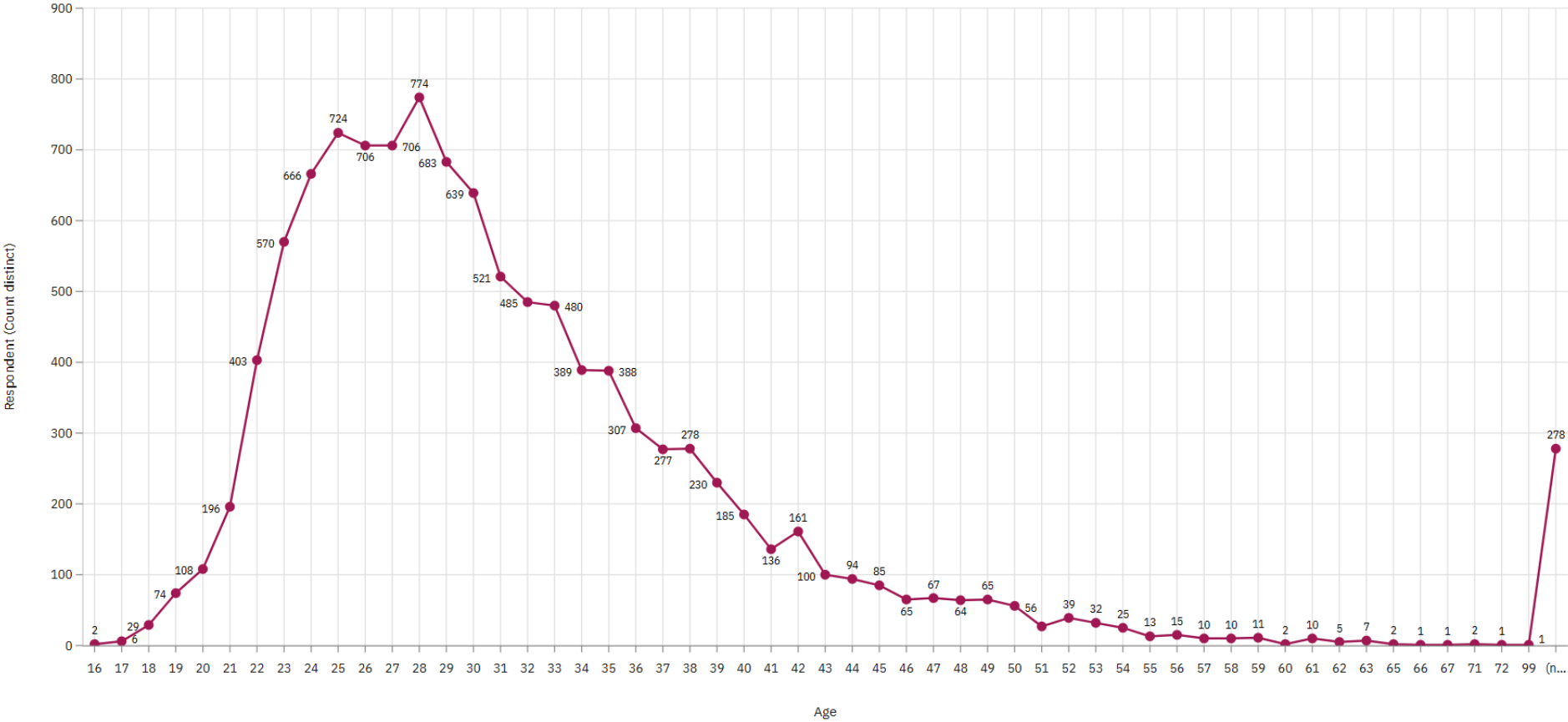**Gender Distribution of Respondents**

Gender
- Woman ● Man

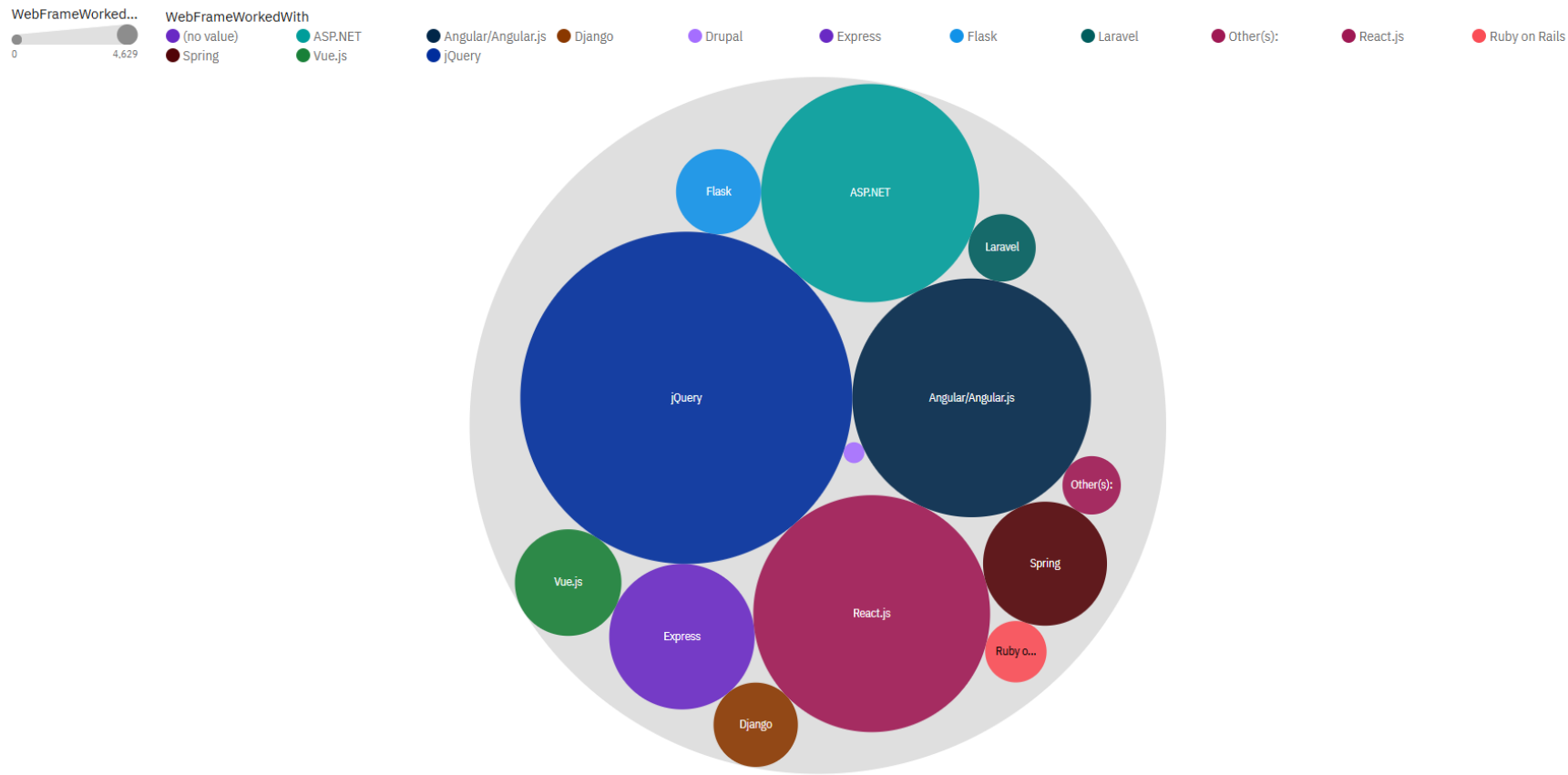

6.5%

93.5%

APPENDIX

Education Level Distribution by Gender
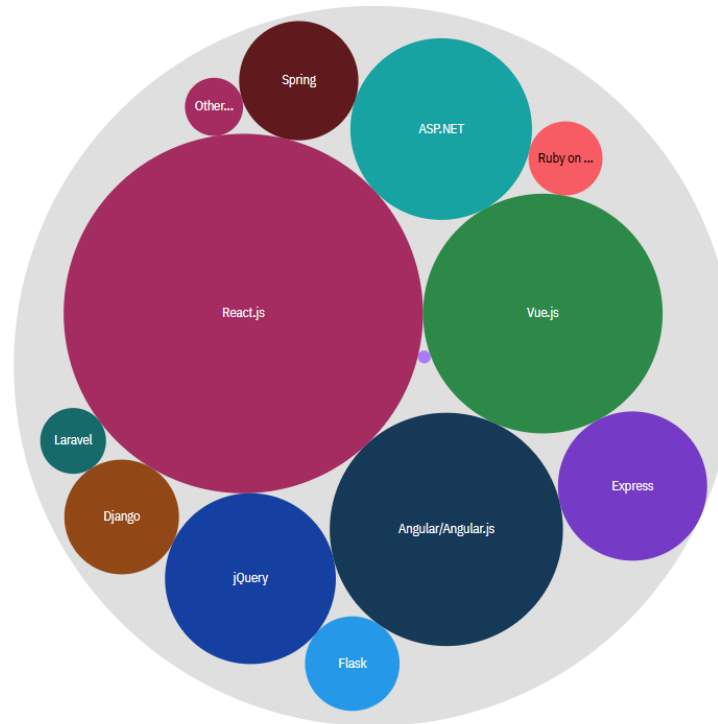
APPENDIX

Age Distribution of Respondents

APPENDIX

Top 10 Used Web Frameworks
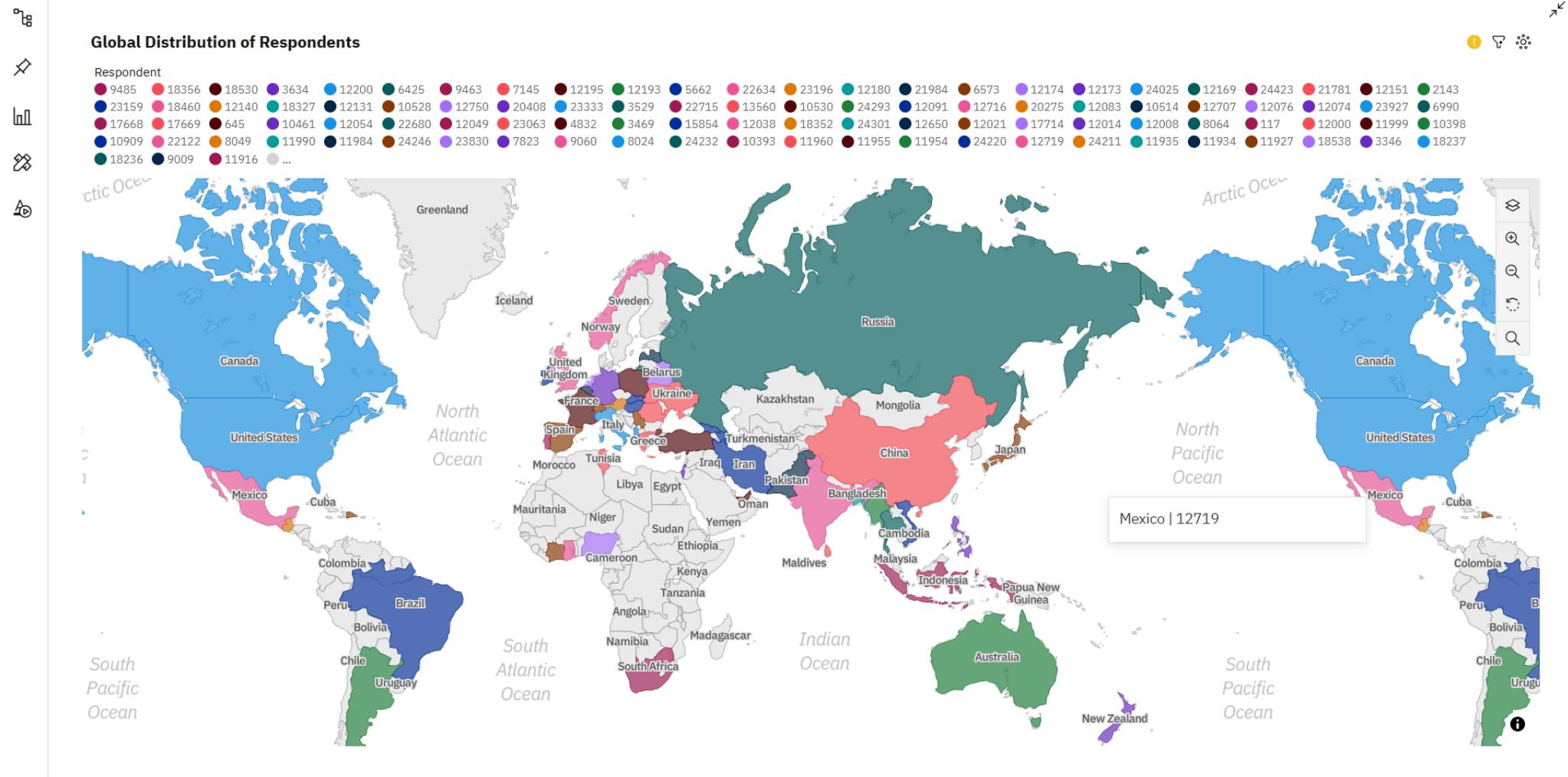
WebFrameWorked...

WebFrameWorkedWith
- (no value) ● ASP.NET ● Angular/Angular.js ● Django ● Drupal ● Express ● Flask ● Laravel ● Other(s): ● React.js ● Ruby on Rails
- Spring ● Vue.js ● jQuery

0   4,629

APPENDIX

APPENDIX

Platform Preferences for Next Year

PlatformDesireNe...   PlatformDesireNe...
0   5,865   0   5,865

Linux	AWS	Kubernetes	Google Cloud Platform	Slack
Docker	Windows	MacOS	Microsoft Azure	Arduino / Heroku
	Android	Raspberry Pi	iOS	WordPress / Other...
				IBM Cloud or Watson

APPENDIX

Global Distribution of Respondents

Thank You!