

SKILLS, NOT JOBS

HOW HIGHER ED CAN CAPITALIZE ON BIG DATA'S DISRUPTIVE MOMENT

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BURNING GLASS TECHNOLOGIES

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New Jersey Big Data Alliance



DATA SCIENCE AND ANALYTICS: A RISING FORCE IN THE JOB MARKET



Of nearly 27 million postings examined in 2017, there were more than **2,000,000** Data Science and Analytics job listings. Some **224,000** were entry level jobs.

By 2020, DSA openings are projected to grow **15%**

DSA jobs remain open **13%** longer than average

DSA jobs advertise average salaries of **\$80,265** – a **\$8,736** premium over all BA+ jobs

IT'S A GLOBAL PHENOMENON



UK



725,000 DSA job listings in 2015, advertising average salaries of **£45,757**

Data Scientists growing **56%** faster than the national average growth



CAN



148,000 DSA job listings in 2015, advertising average salaries of **\$81,988**

Data Scientists growing **179%** faster than the national average growth



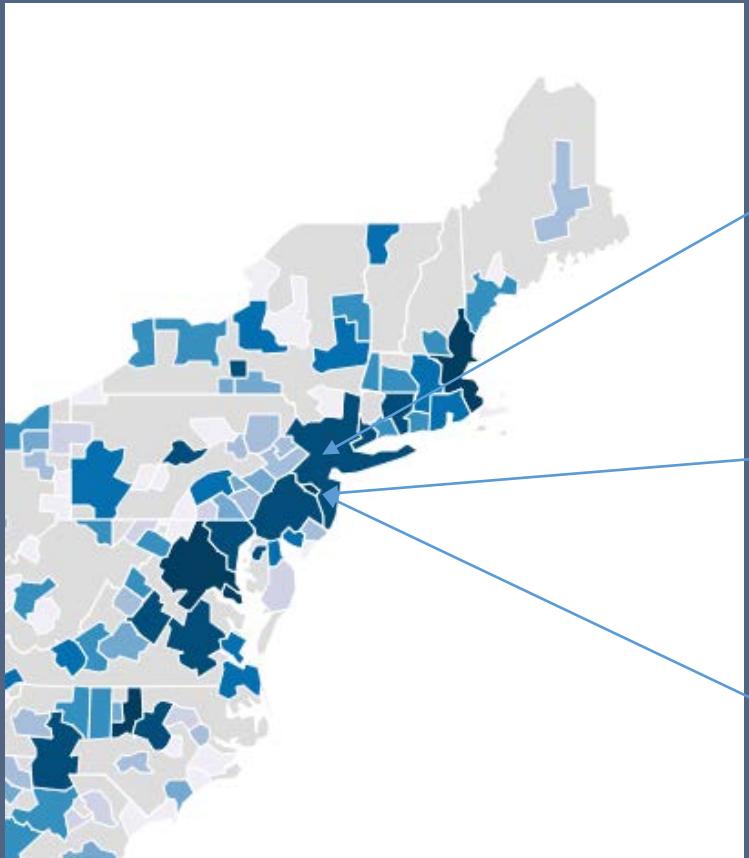
ANZ



113,000 DSA job listings in 2015, advertising average salaries of **\$111,326**

Data Scientists growing **57%** faster than the national average growth

NEW JERSEY IS AT THE CENTER OF THE NORTHEAST DATA CORRIDOR



New York-Newark-Jersey City, NY-NJ-PA

74,157 postings in Last 12 months

84.86 postings per **10,000** people employed, last 12 months

Philadelphia-Camden-Wilmington, PA-NJ-DE-MD

22,210 postings in Last 12 months

84.07 postings per **10,000** people employed, last 12 months

Trenton, NJ

3,984 postings in Last 12 months

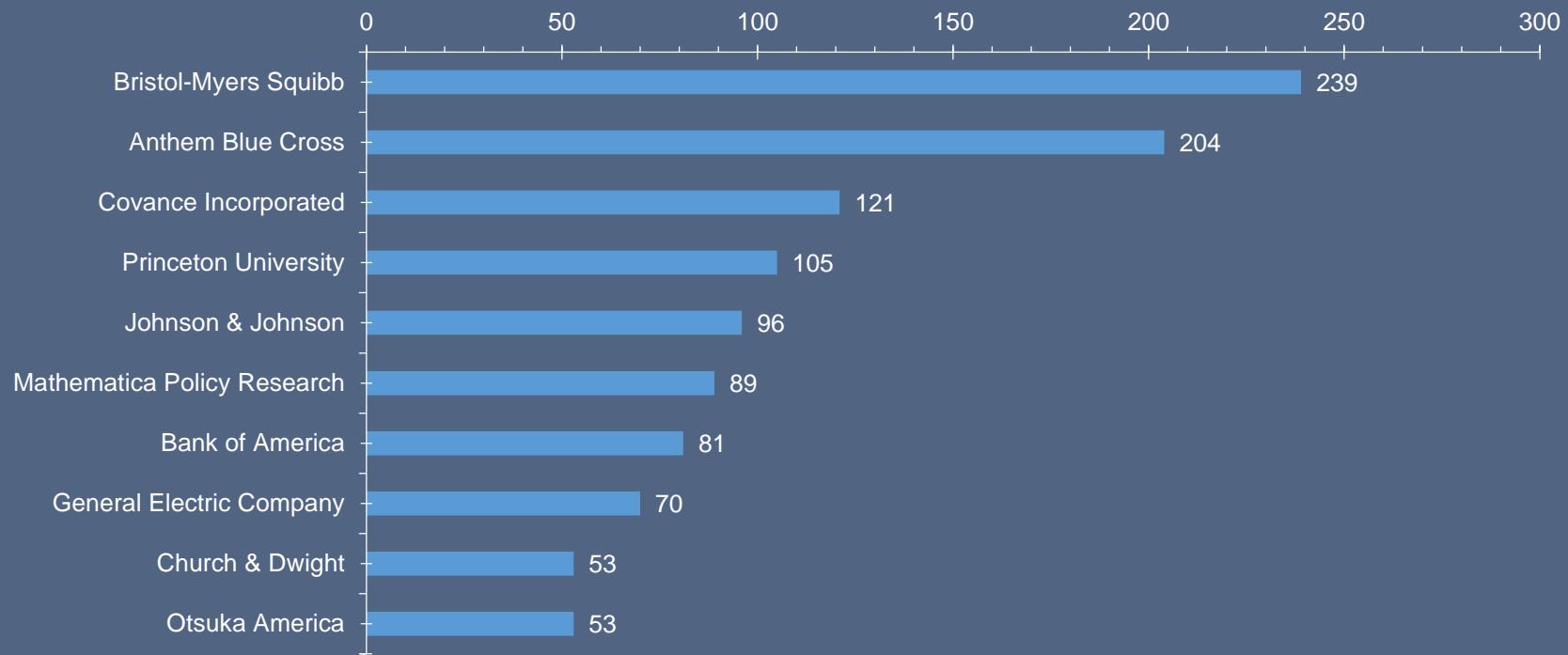
169.42 postings per **10,000** people employed, last 12 months



Much higher demand than average

TRENTON COMPUTES, THE WORLD SALUTES MERCER COUNTY PUNCHES ABOVE ITS WEIGHT IN BIG DATA JOBS

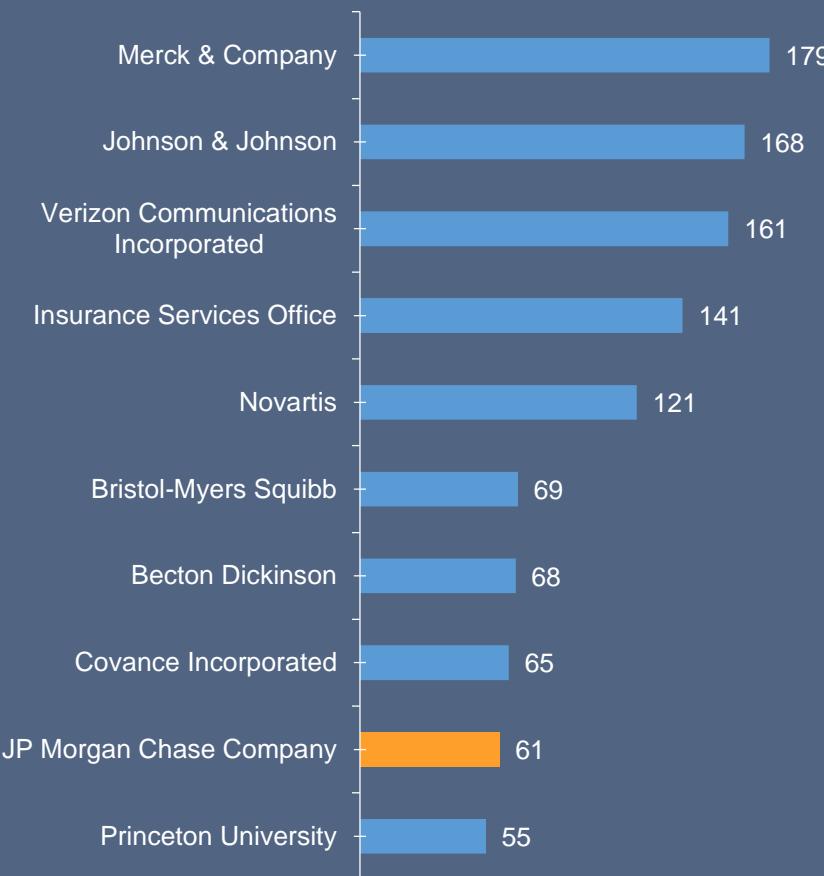
Top Big Data Employers, last 12 months



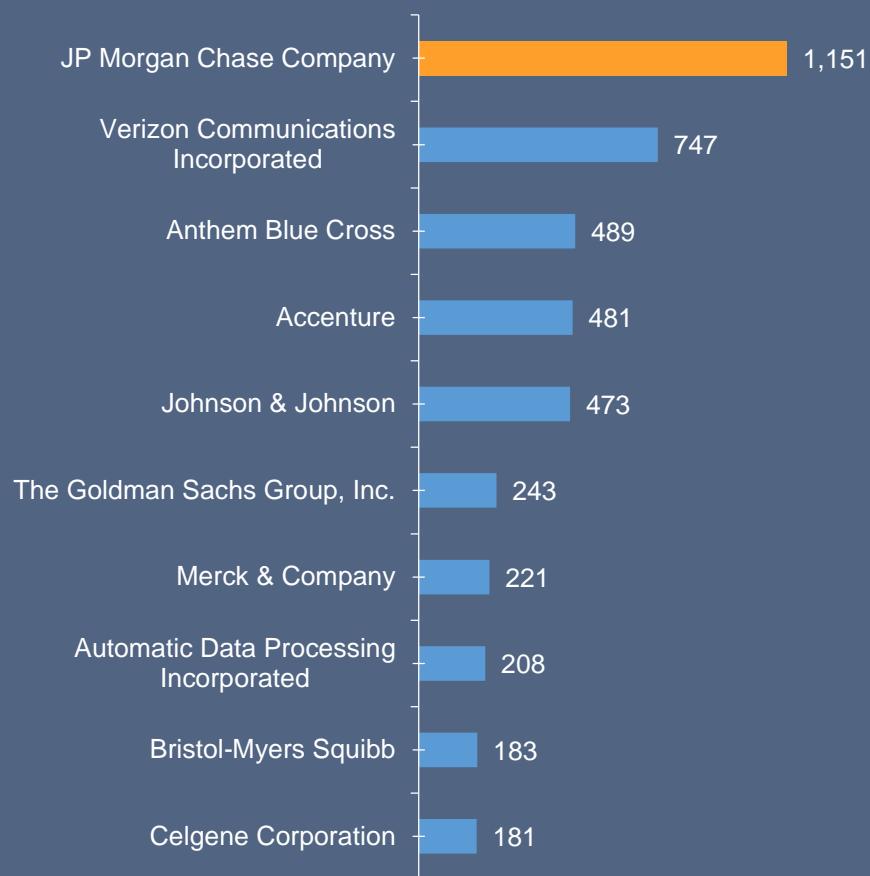
MORE DEMAND, NEW PLAYERS

NJ'S BIG DATA JOB MARKET IS GROWING FAST

NJ Data Science Employers,
2012



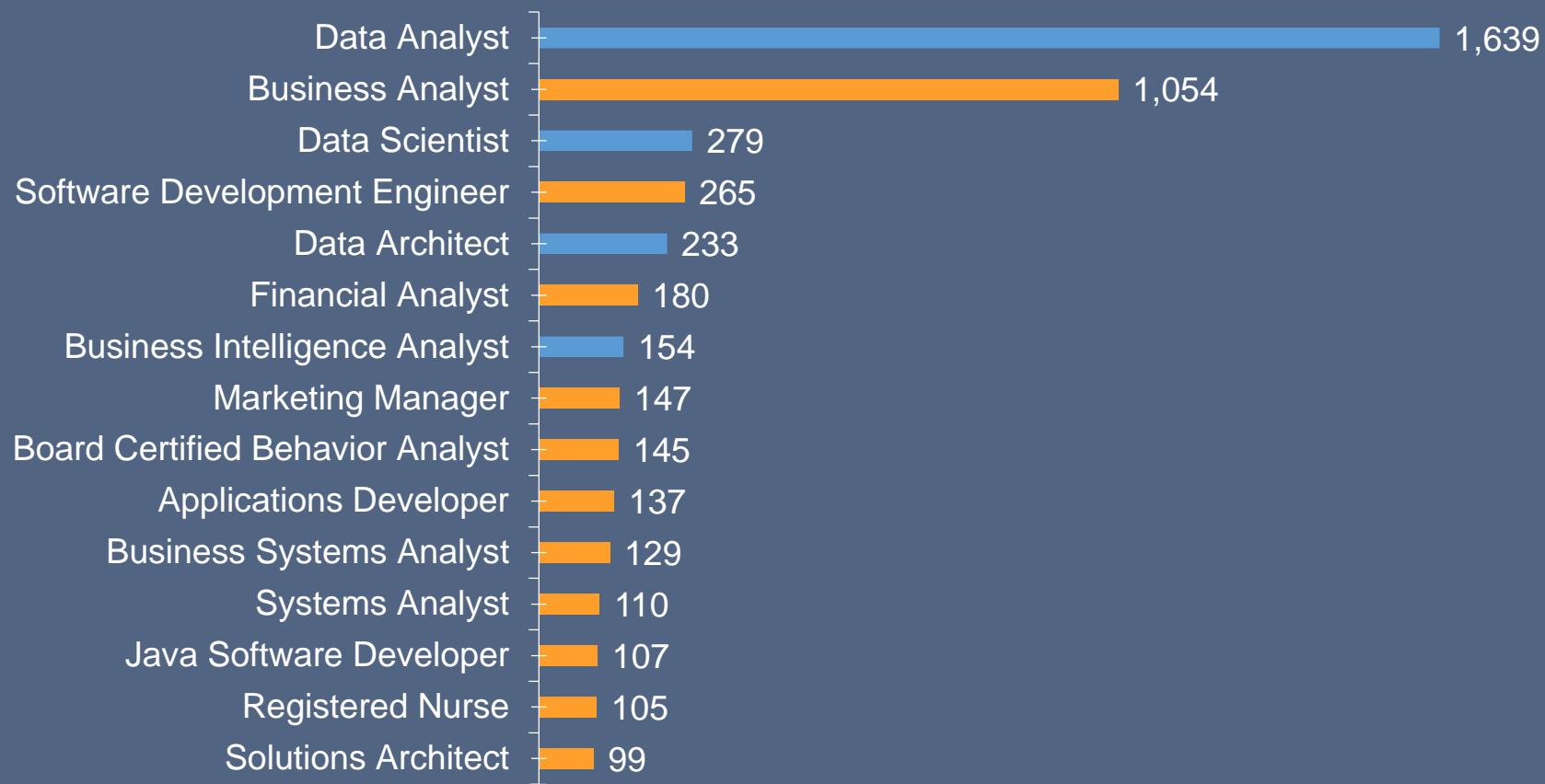
NJ Data Science Employers,
2017



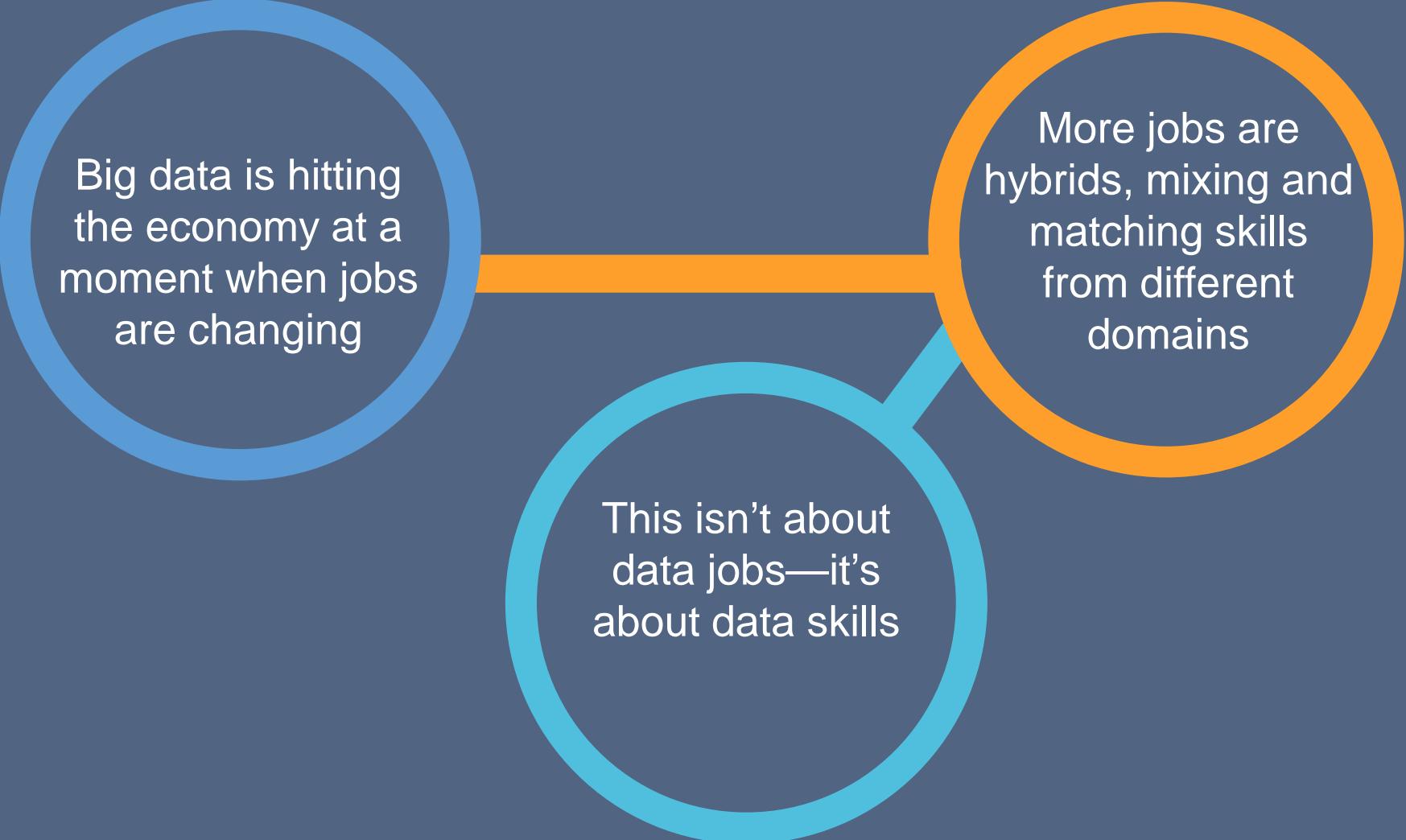
TOP NJ JOBS DEMANDING DATA SKILLS

THE 'M' IN STEM IS NOT JUST FOR ACTUARIES

Roles Requesting Data Skills, 2017



DEMAND FOR BIG DATA SKILLS GOES WELL BEYOND BIG DATA JOBS



Big data is hitting the economy at a moment when jobs are changing

More jobs are hybrids, mixing and matching skills from different domains

This isn't about data jobs—it's about data skills

JOBS HAVE A GENOME AND THAT GENOME IS SPECIFIC & DYNAMIC

Jobs are bundles of skills

Education is also built
around skills

Mapping between skills and
jobs creates a powerful,
ongoing bridge between
education and work



JOBs ARE HAVING SEX

THE EMERGENCE OF A HYBRID GENOME

Welder

WELDING

- Mig and Tig Welding
- Repair
- Inspection
- Gas-metal Arc Welding
- Flux Core Welding
- Calipers
- Shielded Metal Arc Welding
- Schematic Diagrams

SOFT SKILLS

- Detail oriented
- Work area maintenance
- Quality assurance



+15%
Since 2013

Data Scientist

PROGRAMMING

- Python
- SQL
- Hadoop
- R

DATA SKILLS

- Data Visualization
- Tableau
- Excel
- MapReduce

BUSINESS SKILLS

- Predictive Models
- Business Process
- Economics
- Strategic Planning

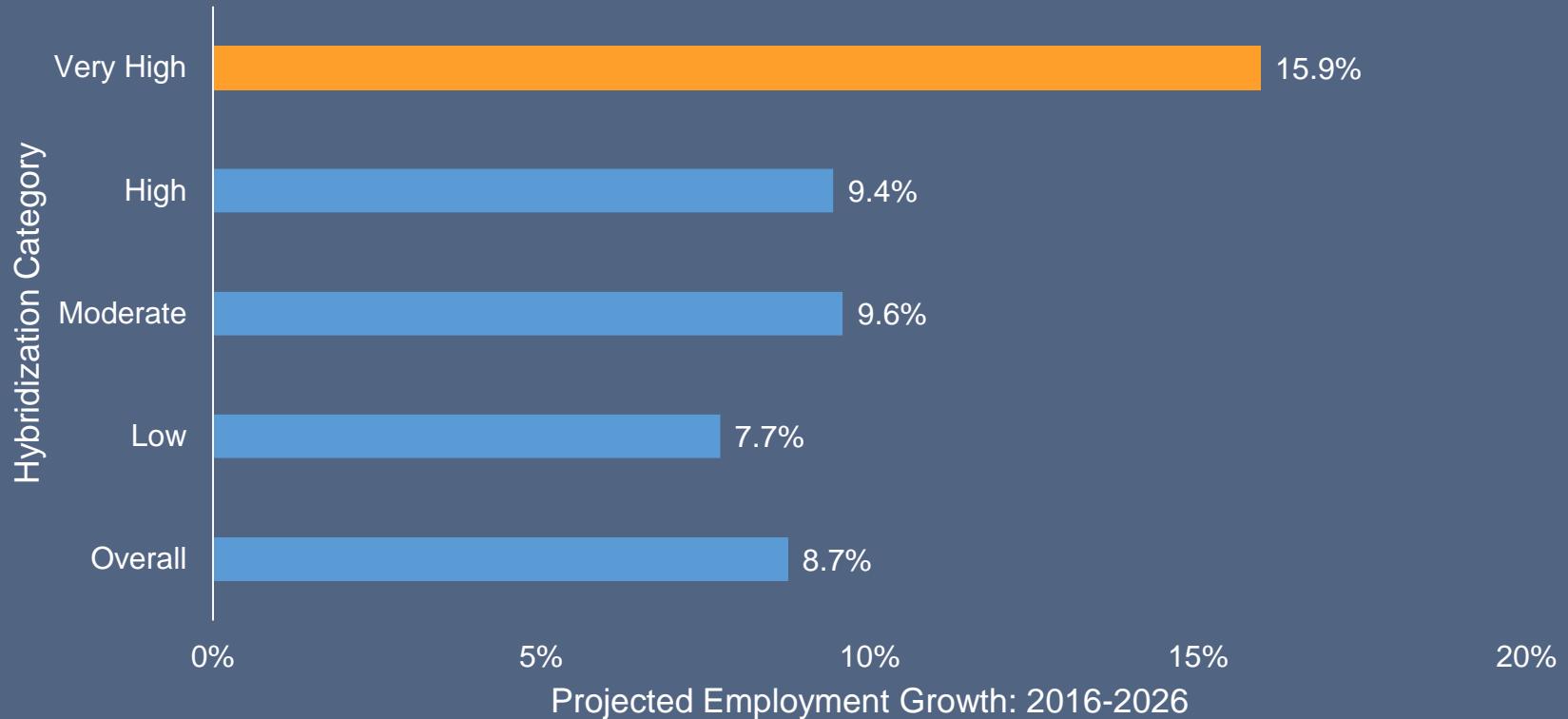
SOFT SKILLS

- Problem Solving
- Writing
- Teamwork

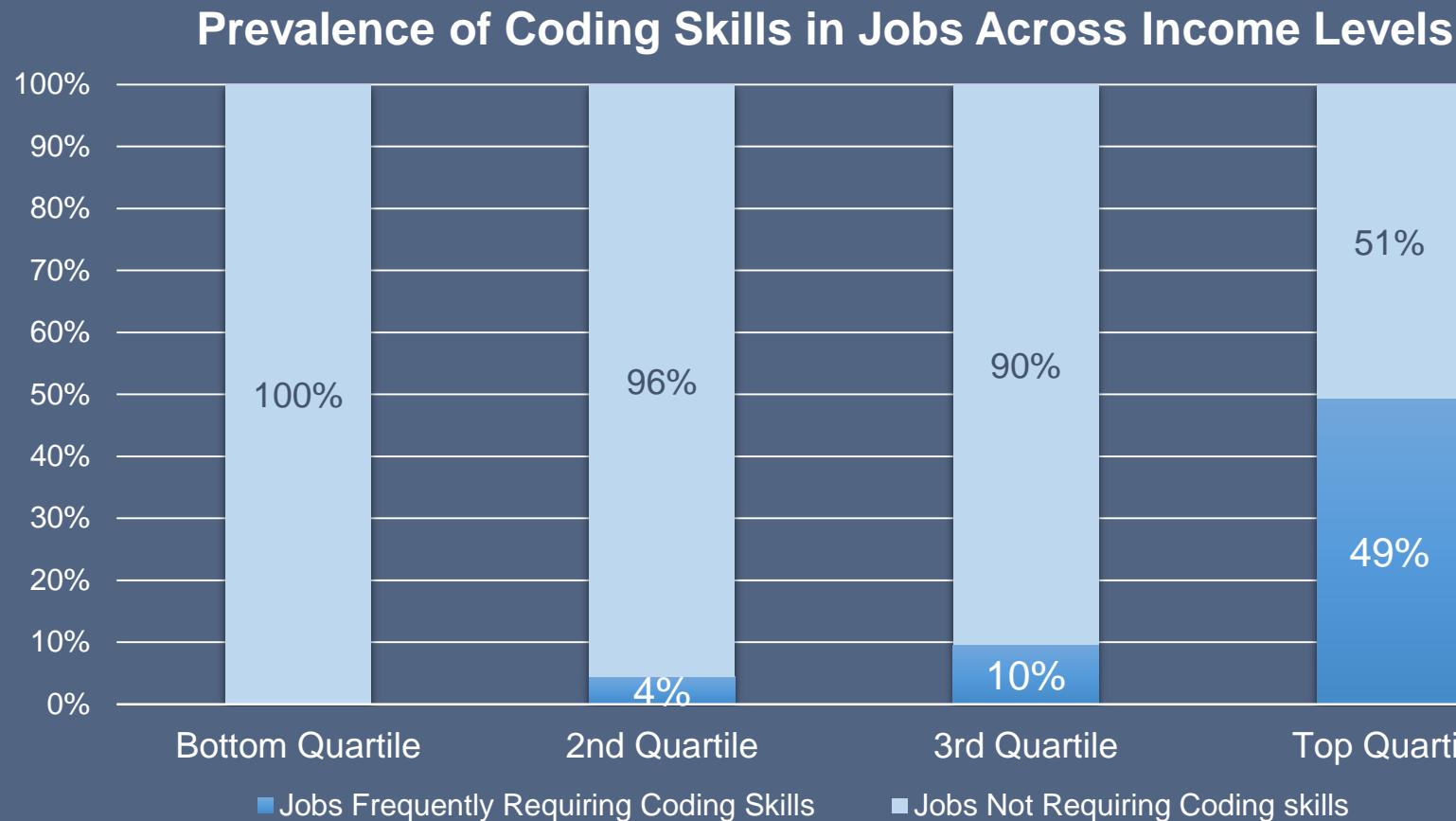


+424%
Since 2013

HYBRID JOBS ARE GROWING FAST NEARLY TWICE AS FAST AS JOBS OVERALL



SKILLS ARE CROPPING UP IN THE DARNEST PLACES

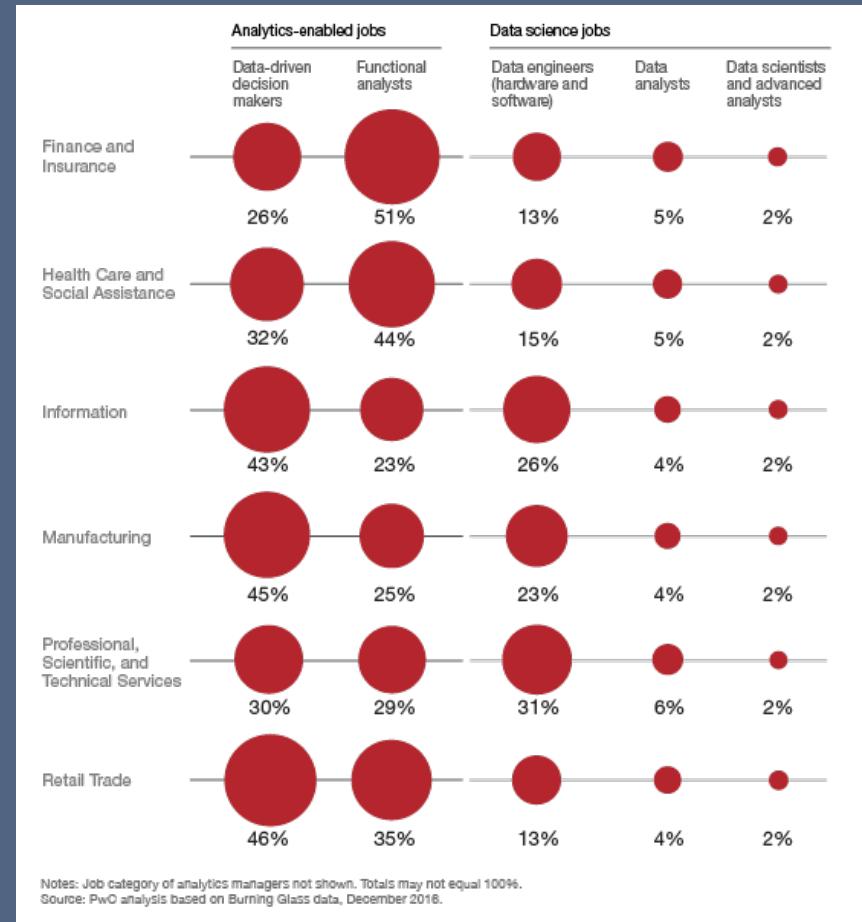


DEMAND FOR DATA SKILLS ISN'T ABOUT DATA SCIENCE JOBS

67% of jobs calling for data science & analytics (DSA) skills are “analytics-enabled”.

These jobs apply data to business cases. In other words, they make decisions based on data.

Only one-third of jobs calling for DSA skills are in data science.



DEFINING ROLES IN DATA SCIENCE

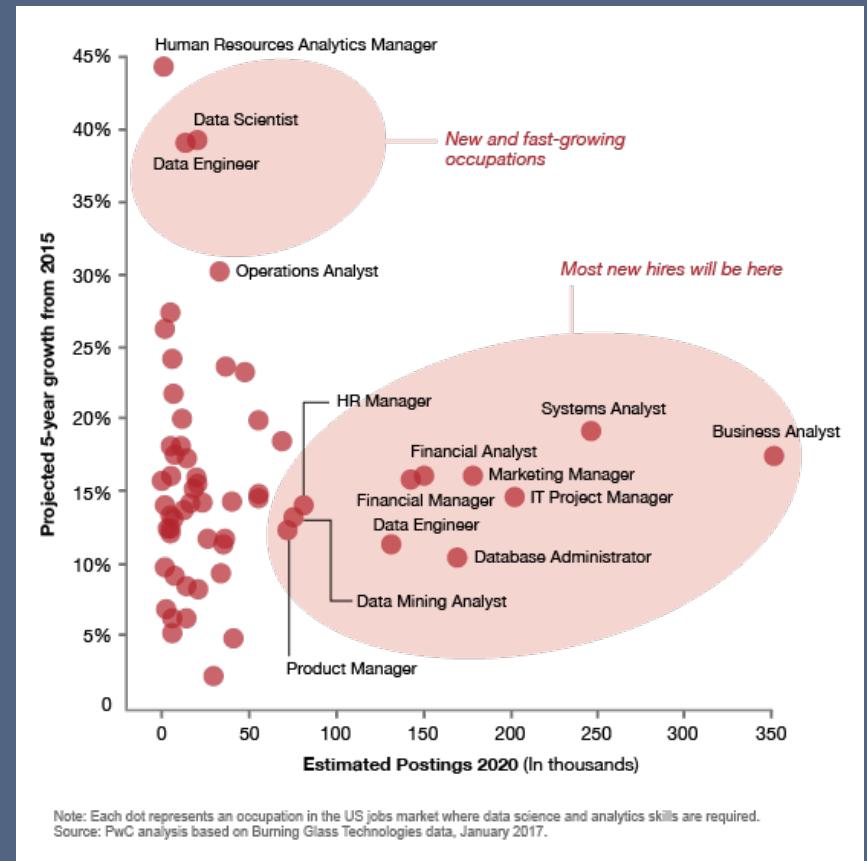
DSA Framework Category	Functional Role	Sample Occupations
Data Scientists & Advanced Analysts 	Create sophisticated analytical models used to build new datasets and derive new insights from data	Data Scientist Economist
Data Analysts 	Leverage data analysis and modeling techniques to solve problems and glean insight across functional domains	Data Analyst Business Intelligence Analyst
Data Systems Developers 	Design, build, and maintain an organization's data and analytical infrastructure	Systems Analyst Database Administrator
Analytics Managers 	Oversee analytical operations and communicate insights to executives	Chief Analytics Officer Marketing Analytics Manager
Functional Analysts 	Utilize data and analytical models to inform domain-specific functions and business decisions	Business Analyst Financial Analyst
Data-Driven Decision Makers 	Leverage data to inform strategic and operational decisions	IT Project Manager Marketing Manager

BIG DATA'S BIGGEST IMPACT WILL BE IN EXISTING ROLES

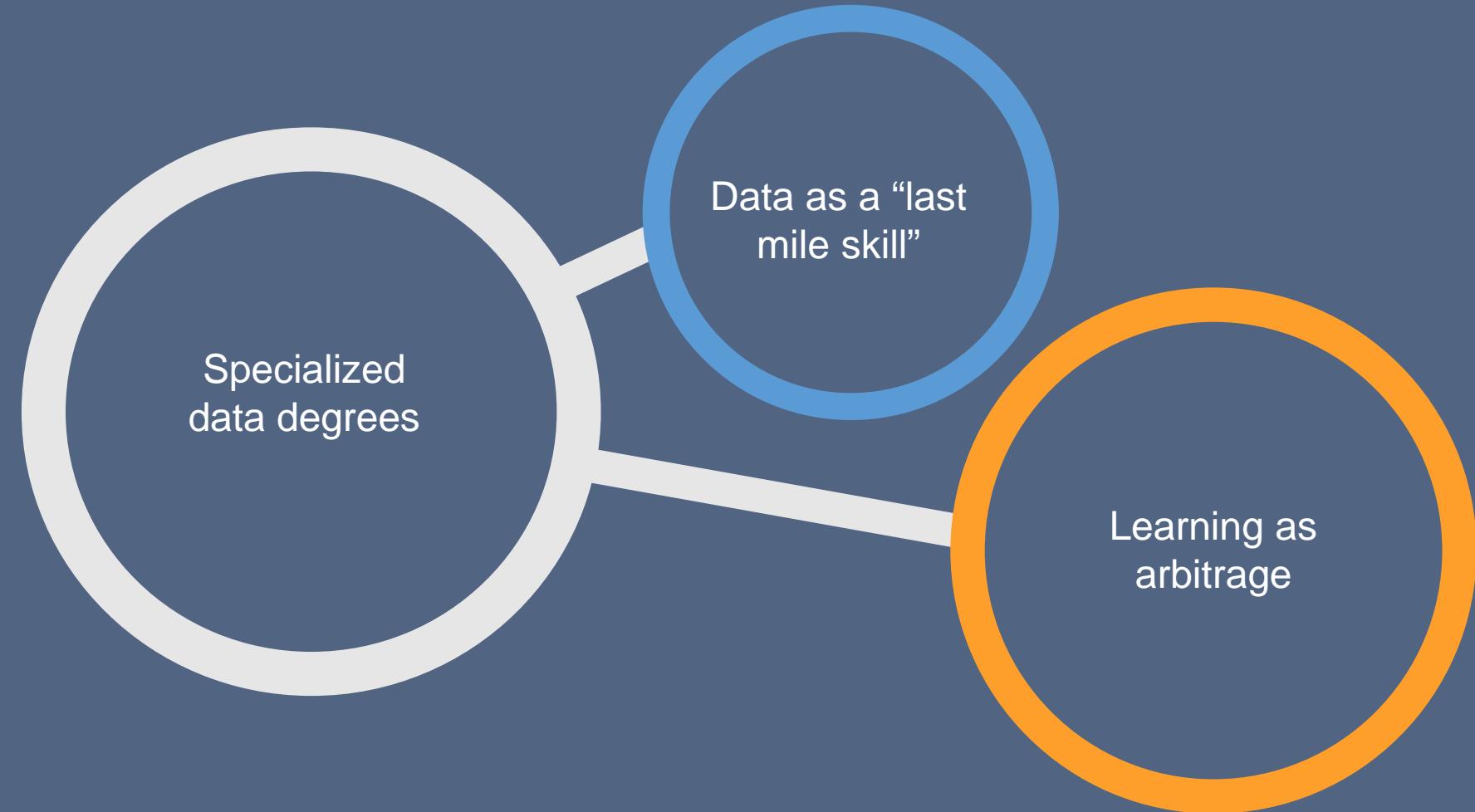
2.7 million DSA jobs projected in 2020

While quant roles are growing fast, much of this hiring will be in *existing* jobs

The biggest single area of hiring: Business Analyst, with an estimated 349,662 openings in 2020



OPPORTUNITIES FOR HIGHER ED



JOINT BUSINESS/DATA PROGRAMS? NY FINANCE LOOKING FOR BUSINESS AND DATA SKILLS

Skill	Postings Requesting	National Projected Growth (2017-2019)	Competitive Advantage ▾
SAS	703 (17%)	14.15%	●
Budgeting	550 (14%)	-0.34%	●
Oracle	447 (11%)	-4.58%	●
Data Management	431 (11%)	-0.39%	●
Customer Service	374 (9%)	15.55%	●
Information Systems	270 (7%)	-10.25%	●
Microsoft Access	234 (6%)	-15.49%	●
Business Administration	167 (4%)	-3.91%	●
Supervisory Skills	146 (4%)	-7.95%	●
Visual Basic for Applications (VBA)	143 (4%)	15.37%	●

BIG DATA JOBS ARE LIBERAL ARTS JOBS



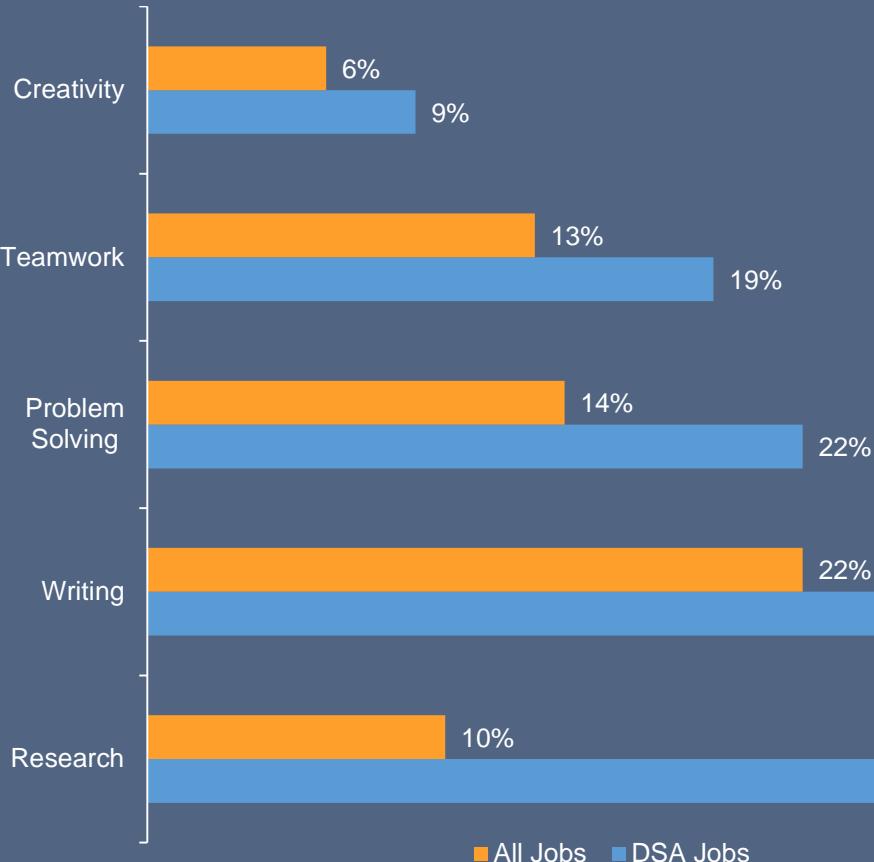
The combination of data, business knowledge and soft skills makes liberal arts majors viable candidates.

32% of data science jobs are already filled by liberal arts majors

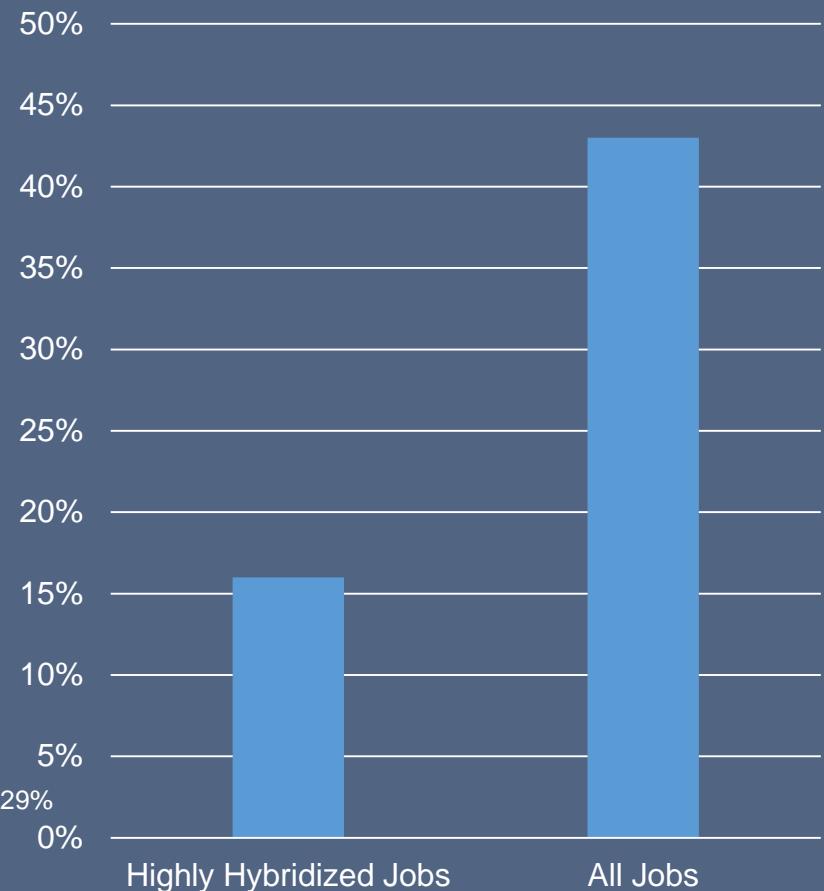
Adding DSA skills to a BA can bring a **\$17,000** early career salary premium over the average liberal arts major's salary

DATA JOBS ARE MORE HUMAN MORE SOFT SKILLS, MORE RESISTANT TO AUTOMATION

% of Data Science jobs requesting key soft skills vs. % of all jobs

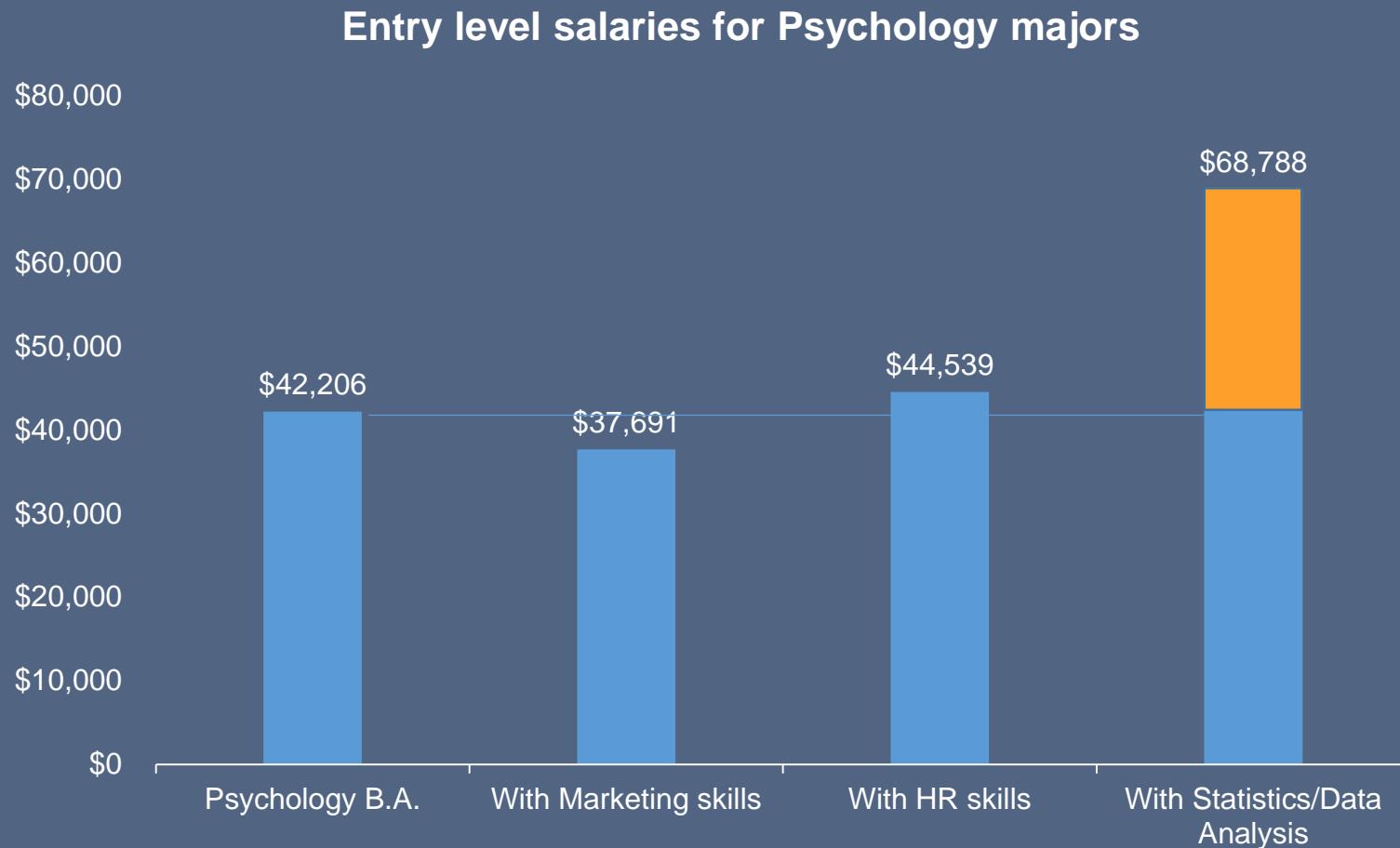


Vulnerability to Automation



THE LAST MILE

DATA SKILLS CAN CLINCH A JOB, RAISE PAY



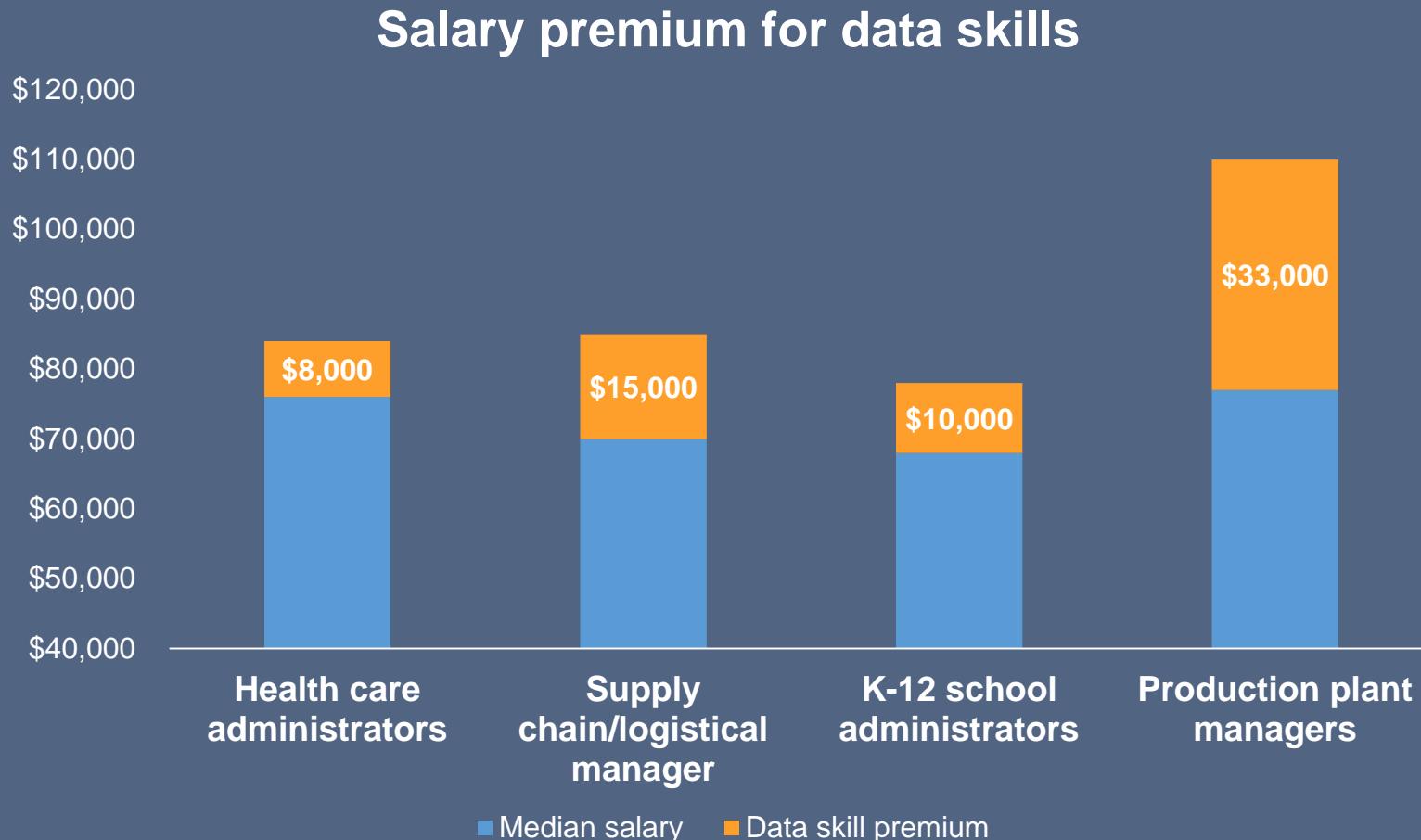
DATA SKILLS CLOSE THE GAP

PUTTING LIBERAL ARTS SALARIES ON PAR WITH STEM

Career Cluster	Entry-Level Openings	Expected Salary in Five Years
Business Administration	276,199	\$77,360
Data Analysis and Data Management	224,607	\$82,070
Human Resources	191,164	\$70,147
IT and Networking	173,691	\$75,837
Sales	157,127	\$92,320
Programming and Software Development	144,581	\$87,811
Finance	125,980	\$80,954
Marketing and PR	106,550	\$75,395
Design	49,047	\$66,957
Media and Communication	25,761	\$68,283
Average for all graduates		\$68,513
Average for STEM graduates		\$76,556
Average for Liberal Arts graduates		\$63,213

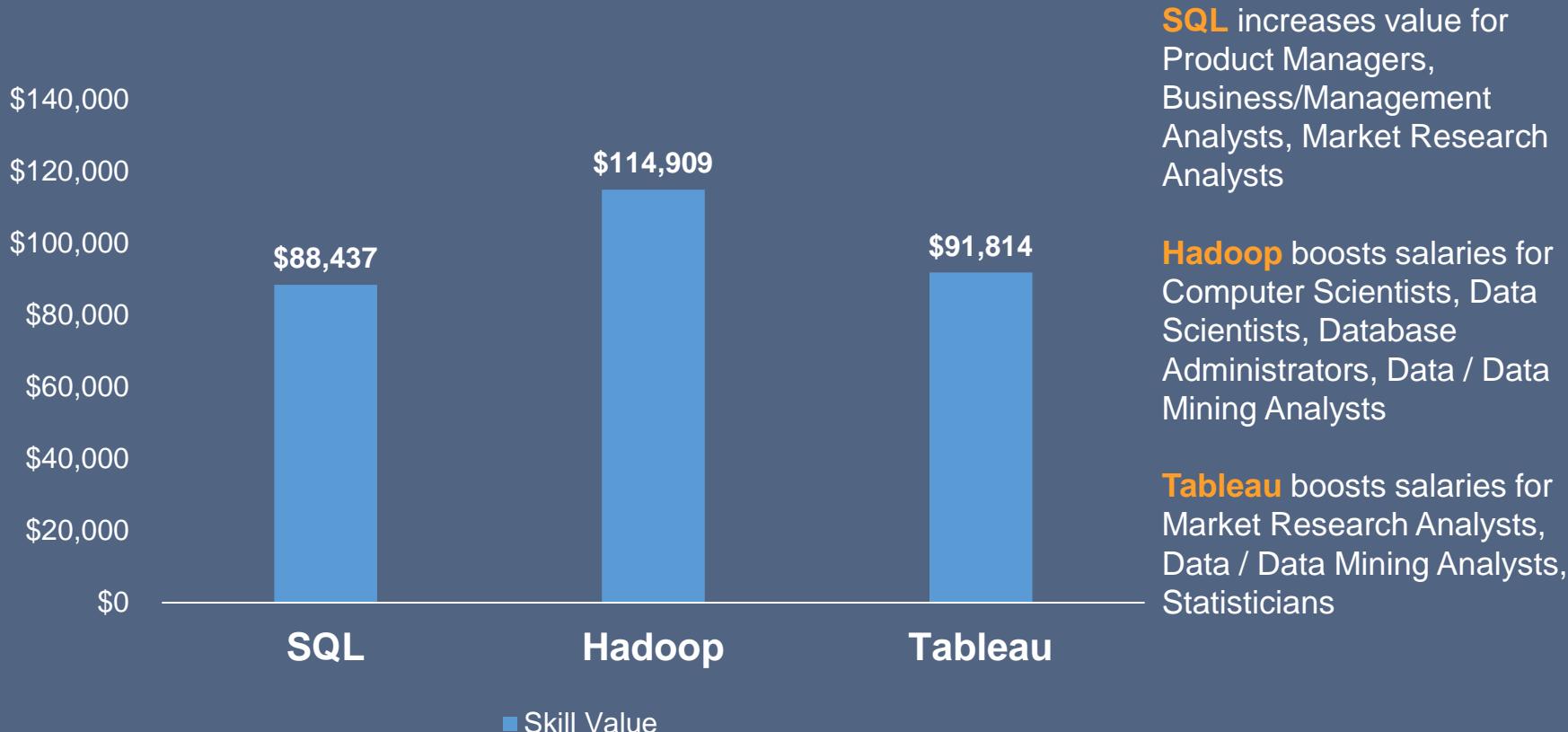
LEARNING IS ARBITRAGE

SKILLING UP HAS STRONG RETURNS



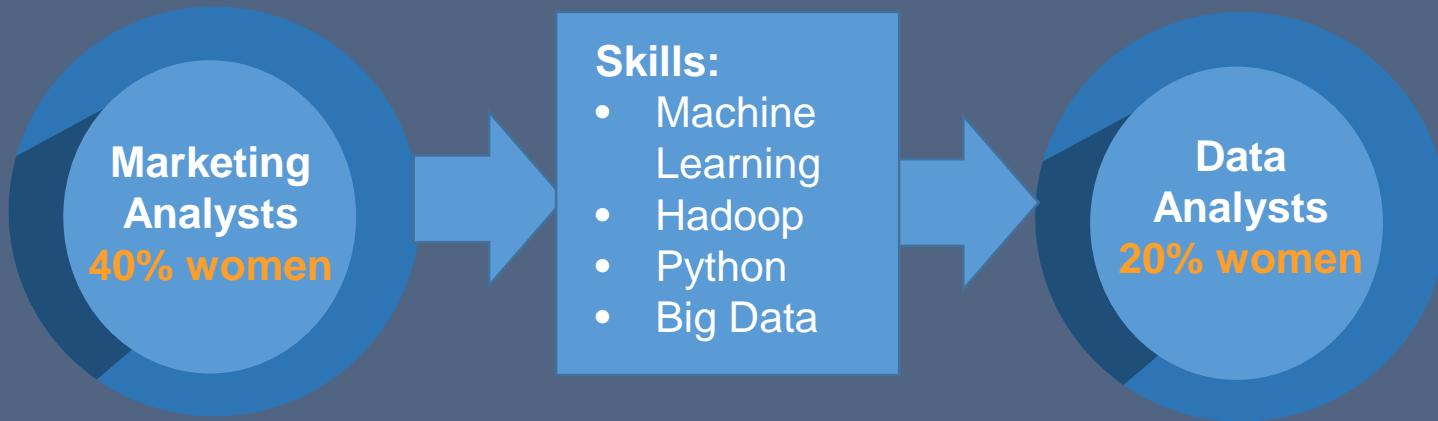
DATA SKILLS ADD VALUE ACROSS ROLES

SALARY BY SKILL



DATA SKILLS AND THE GLASS CEILING

DIVERSITY ISN'T A ZERO-SUM GAME



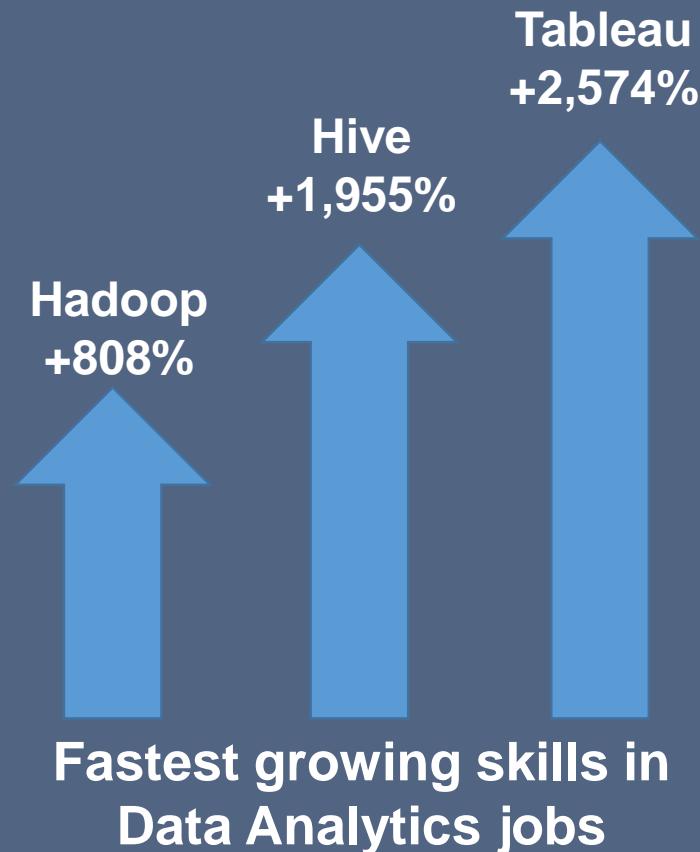
Data skills can be leveraged into higher-paying roles

THE DATA ECONOMY IS DYNAMIC

CAN HIGHER EDUCATION KEEP UP?

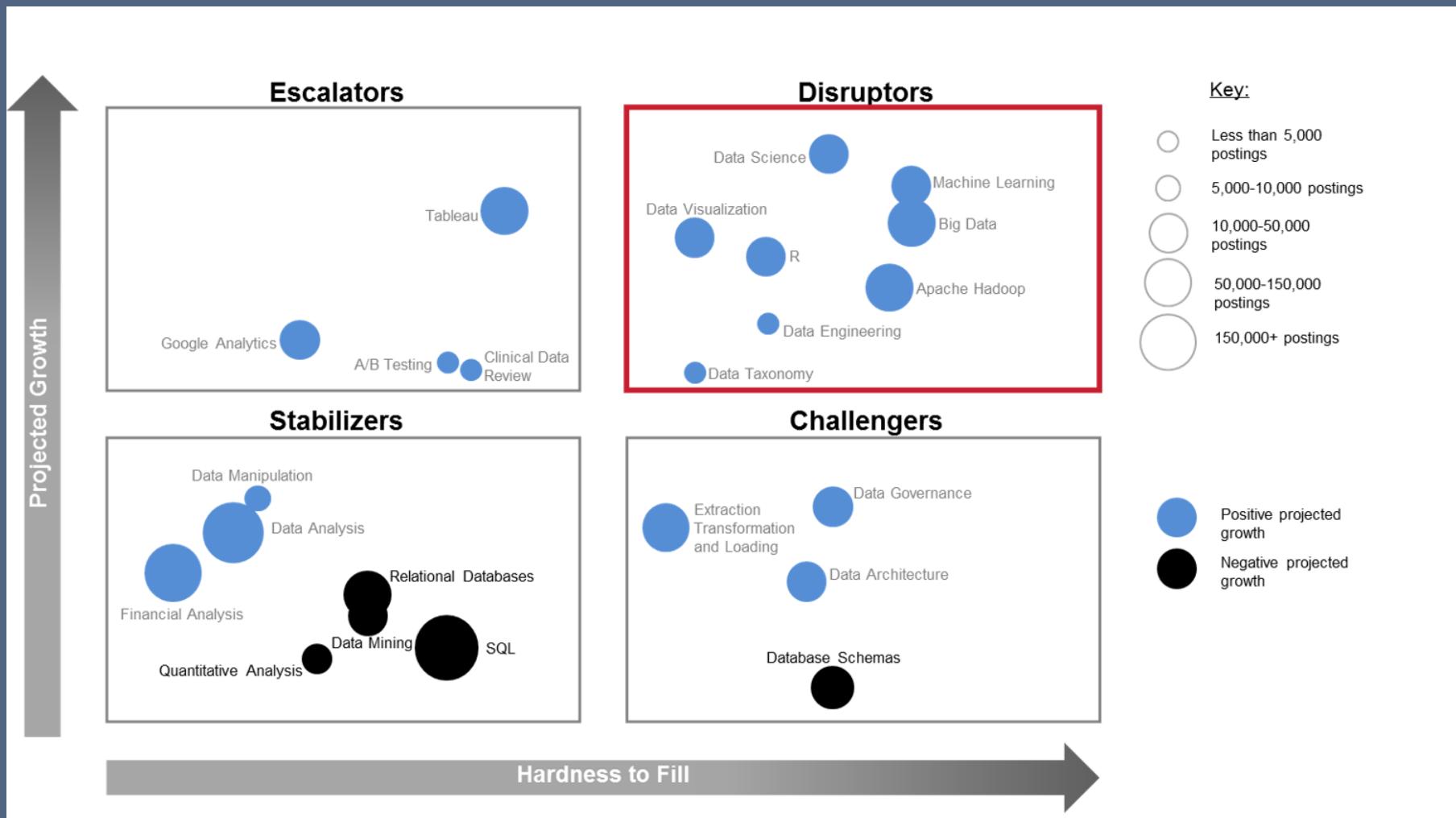


Example: Jobs in Data Analytics



BIG DATA IS DISRUPTING THE JOB MARKET

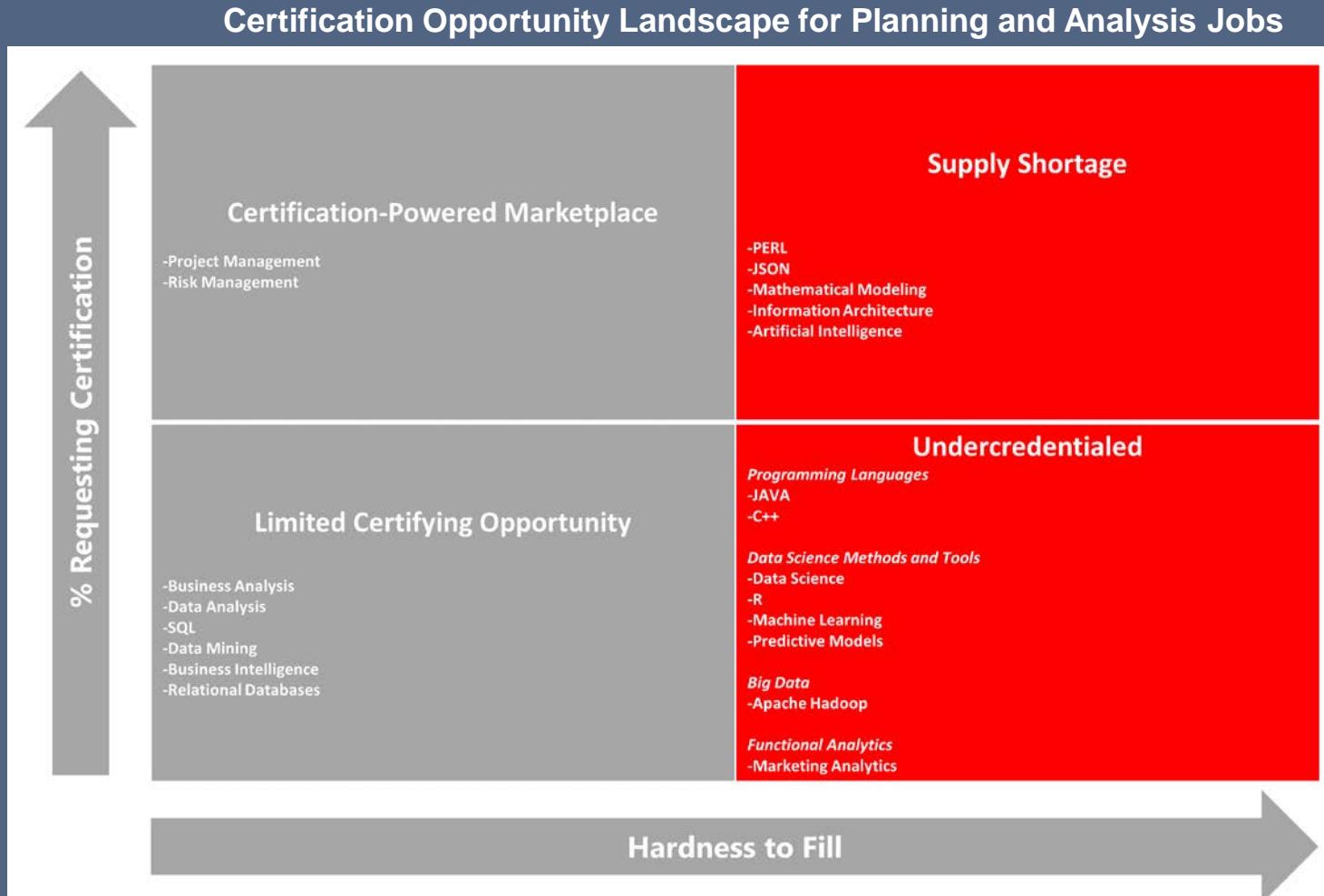
TARGET PROGRAMS TO THE MOST DISRUPTIVE SKILLS



EMPLOYERS NEED BETTER VALIDATION OF SKILLS IN A NEW AND RAPIDLY CHANGING FIELD

DSA Framework Category	% Requesting Experienced Workers (at least 3 years' prior work experience)	% Postings requiring MA or higher
All	81%	6%
Data-Driven Decision Makers	88%	5%
Functional Analysts	71%	6%
Data Systems Developers	84%	3%
Data Analysts	76%	6%
Data Scientists & Advanced Analysts	78%	39%
Analytics Managers	94%	11%

IDENTIFY ‘VALUE CERTIFICATIONS’ OPPORTUNITIES TO BOOST CREDENTIALING



THE CHALLENGE IS ALSO THE SOLUTION

Use Data Science to...

Pick Up on Emerging Trends

Data analysis can serve as job market radar, picking up on new roles and skill sets (such as the Internet of Things) as they first emerge on the market. That gives educators and employers more room to react.

Identify Crucial Data Skills

Data analysis can map the “genome” of jobs, identifying DSA skills that are rewriting the DNA of existing jobs. Organizations can identify DSA skills that are most costly, most difficult to fill, or that provide the greatest career advantage. In addition, analytics allow a highly localized response.

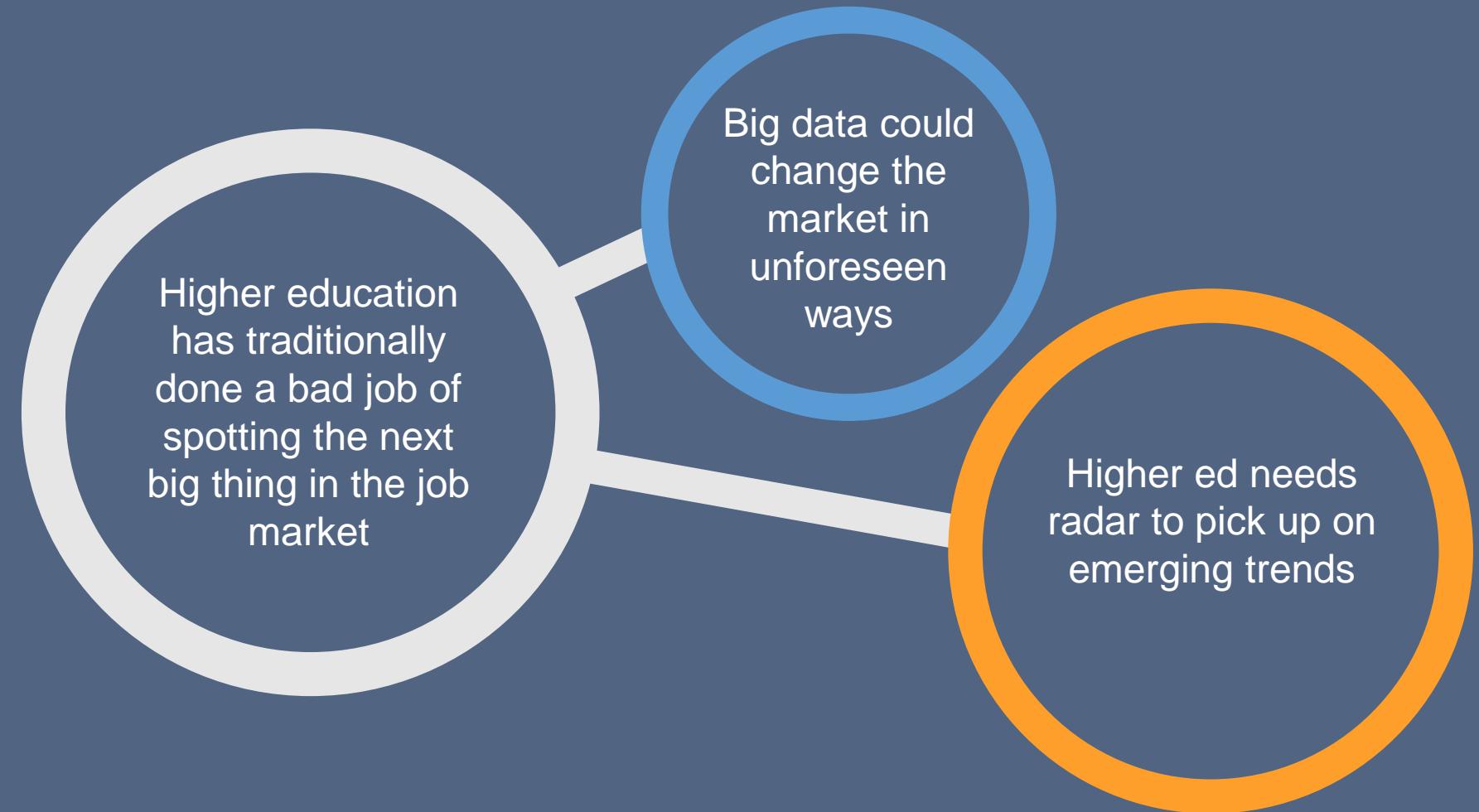
Develop Industry-Specific Data Science Pathways

Higher education and industry can create specific training programs to bolster talent pipelines for key positions. This allows colleges to shape programs to meet industry needs and provide training in-depth.

Understand Existing Capabilities

Analytics talent may already exist within organizations. Firms can use analytics to identify current employees who could transition into their hardest-to-fill DSA roles.

DISRUPTION BRINGS OPPORTUNITY BUT YOU HAVE TO BE LOOKING AHEAD



Higher education has traditionally done a bad job of spotting the next big thing in the job market

Big data could change the market in unforeseen ways

Higher ed needs radar to pick up on emerging trends

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