

Data Science & Artificial Intelligence: Jobs Market

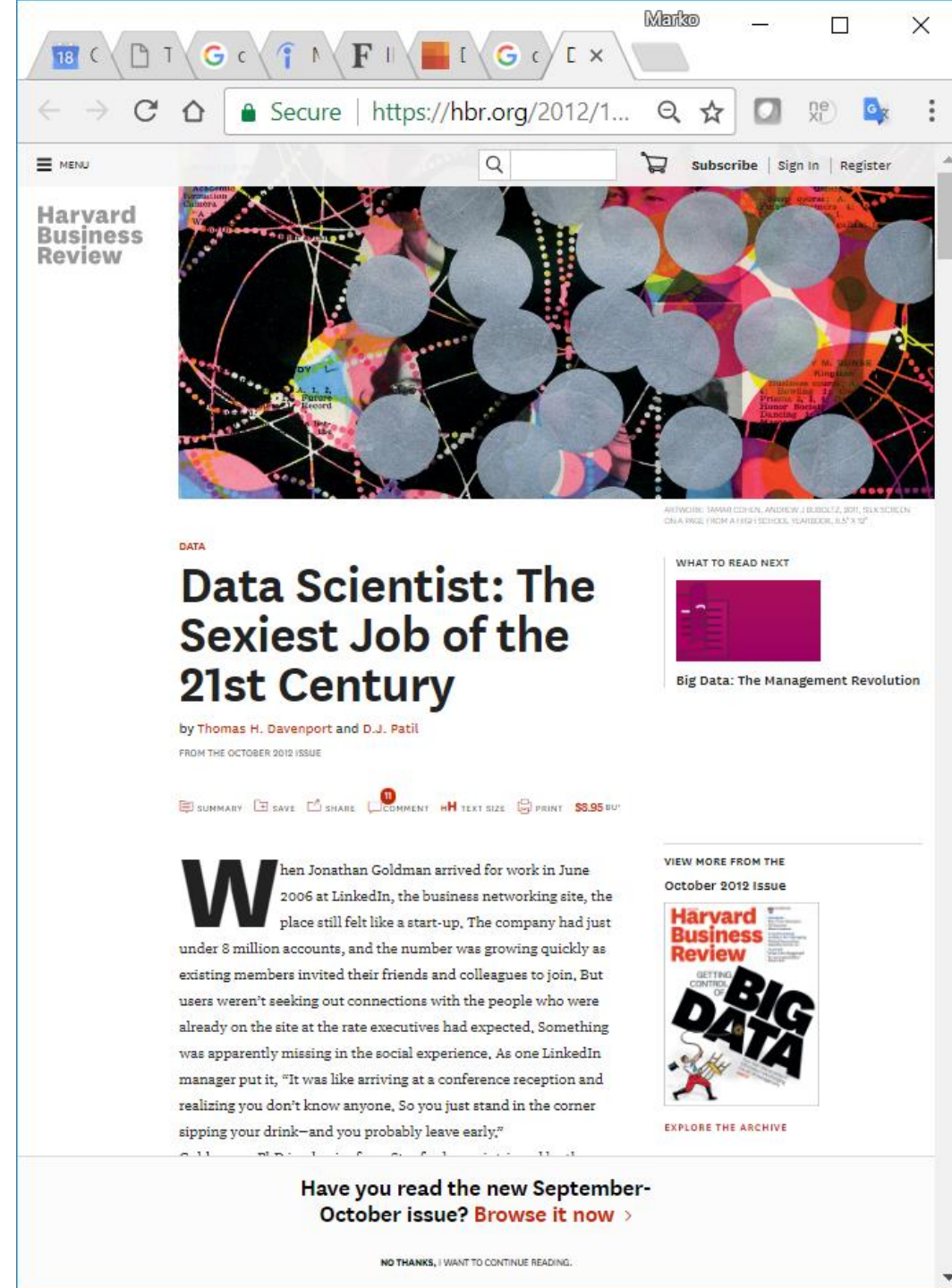
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
Artificial Intelligence Lab, Jozef Stefan Institute
Ljubljana, Slovenia



Data Scientist: The Sexiest Job of the 21st Century

- Is it true?
 - ...likely
- If yes, why?
 - The world became after year 2000 very “data driven” (bottom-up) vs the past, when it was “model driven” (top down)
 - To support “data driven” world, we need skills and people to operate with data
- Data Science is consequently horizontal area possibly affecting all aspects of life



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Harvard Business Review

DATA

Data Scientist: The Sexiest Job of the 21st Century

by Thomas H. Davenport and D.J. Patil

FROM THE OCTOBER 2012 ISSUE

 SUMMARY  SAVE  SHARE  COMMENT  TEXT SIZE  PRINT \$8.95 BUY

When Jonathan Goldman arrived for work in June 2006 at LinkedIn, the business networking site, the place still felt like a start-up. The company had just under 8 million accounts, and the number was growing quickly as existing members invited their friends and colleagues to join. But users weren't seeking out connections with the people who were already on the site at the rate executives had expected. Something was apparently missing in the social experience. As one LinkedIn manager put it, "It was like arriving at a conference reception and realizing you don't know anyone. So you just stand in the corner sipping your drink—and you probably leave early."

VIEW MORE FROM THE October 2012 Issue

Harvard Business Review

GETTING CONTROL OF **BIG DATA**

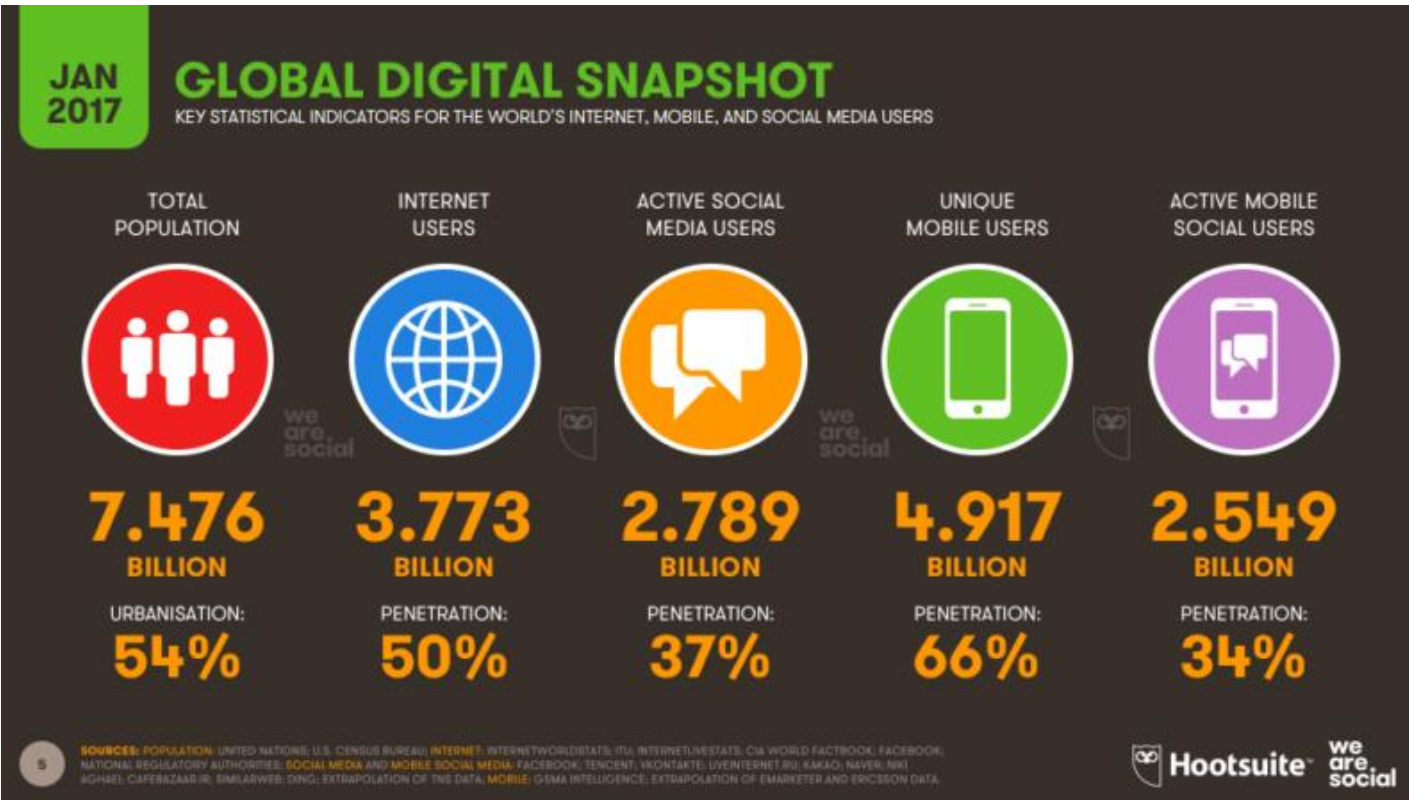
EXPLORE THE ARCHIVE

Have you read the new September-October issue? [Browse it now >](#)

NO THANKS, I WANT TO CONTINUE READING.

Where the data comes from?

2017 *This Is What Happens In An Internet Minute*



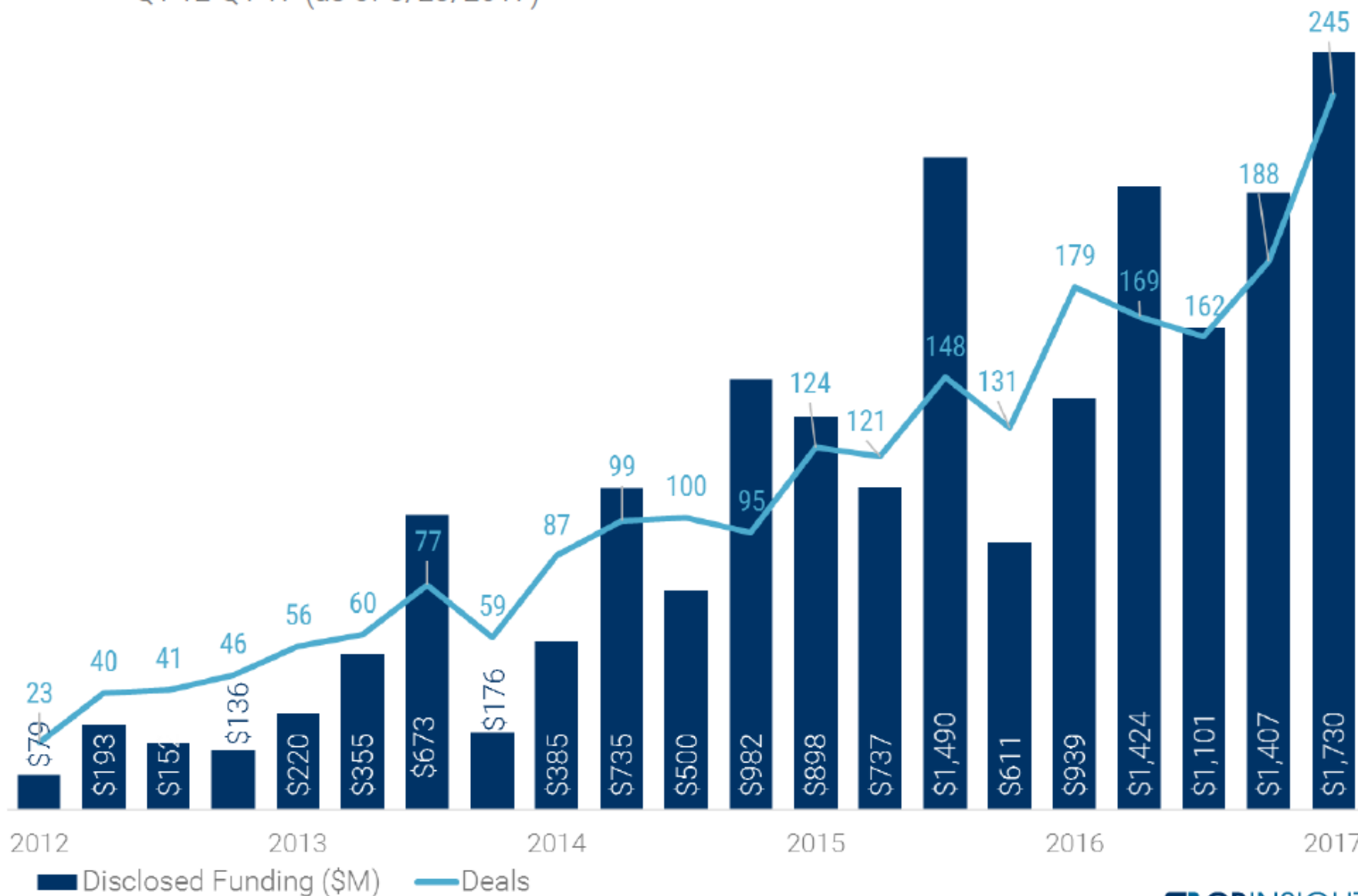


ARTIFICIAL INTELLIGENCE: QUARTERLY FUNDING

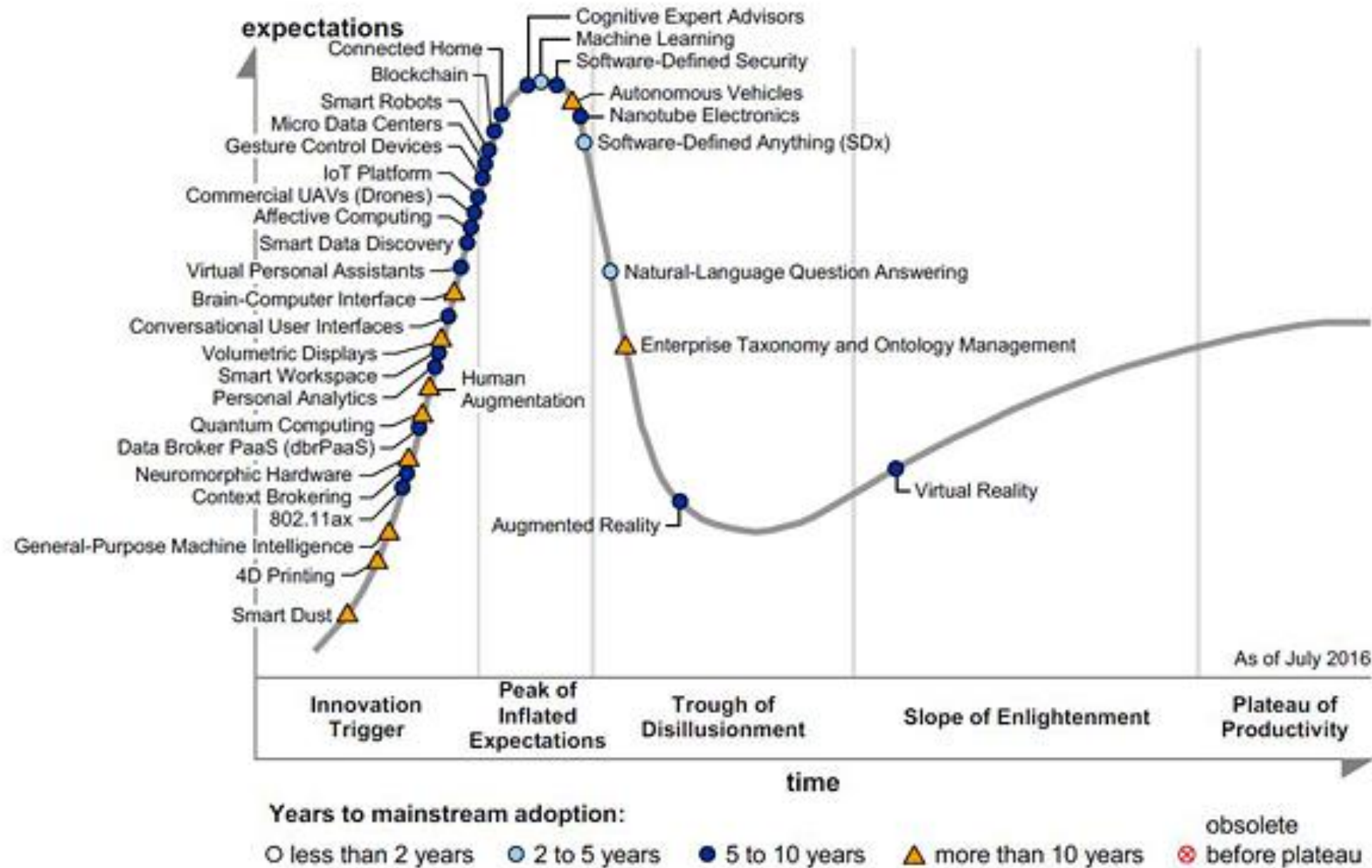
Q1'12-Q1'17 (as of 3/23/2017)

Q1'17 MOST ACTIVE QUARTER FOR AI STARTUPS

Before the close of Q1'17 (as of 3/23/17) AI startups received 245 deals and \$1.7B in funding. Nearly 48% of the deals in Q1'17 were in the seed/angel stage, indicating newer companies are continuing to enter the space.

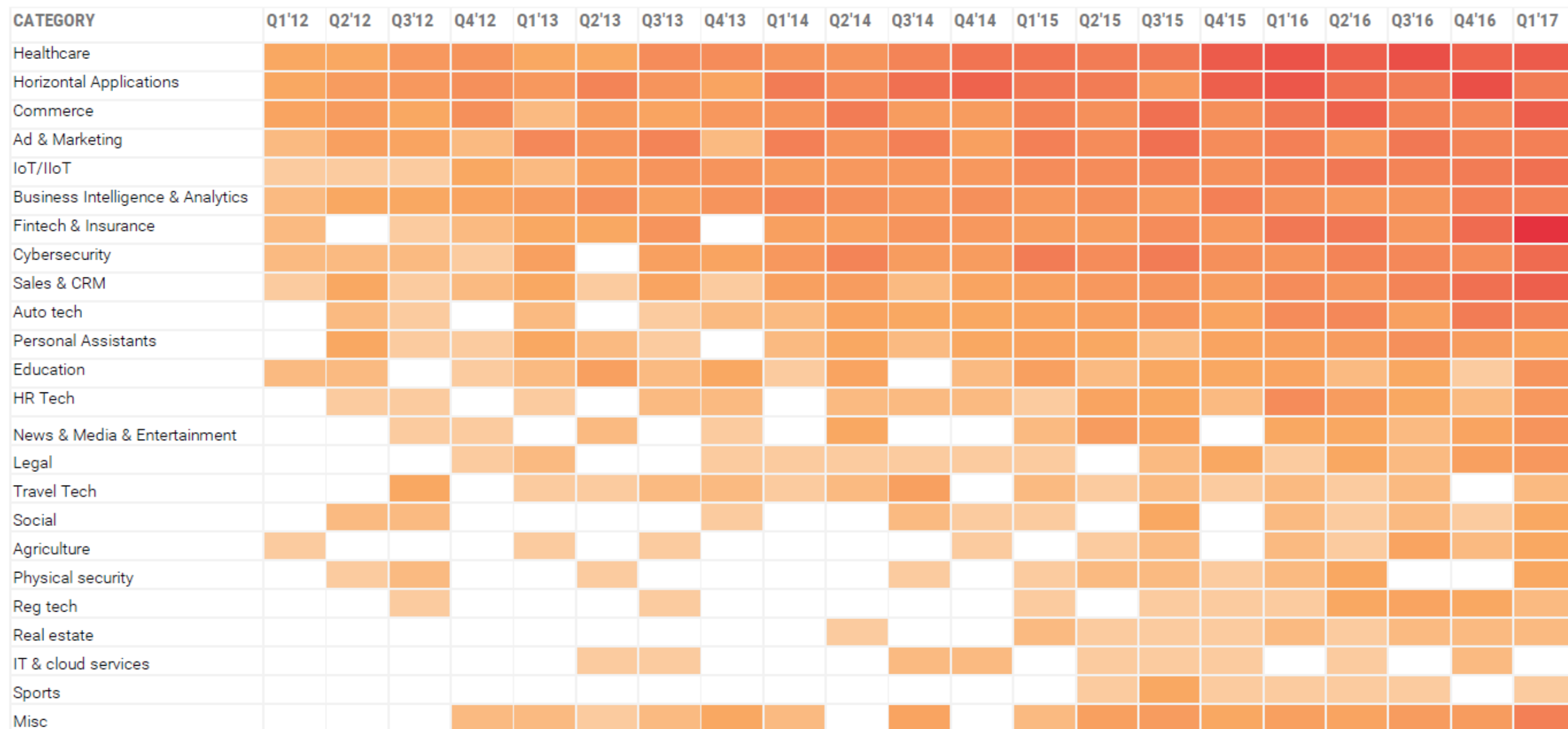


Hype Cycle for Emerging Technologies, 2016



AI HEATMAP: DEALS DISTRIBUTION BY CATEGORY

Q1'12-Q1'17 (as of 3/23/17)



Low deal saturation High deal saturation

<https://www.cbinsights.com/research-artificial-intelligence-trends-report>

H2020 workprogram for 2018-2020

Horizon 2020

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Data Science Jobs Overview

Summary from <https://www.ibm.com/analytics/us/en/technology/data-science/quant-crunch.html>

Data Science & Analytics Landscape

2,350,000

DSA job listings in 2015

By 2020, DSA job openings
are projected to grow

15%

364,000

Additional job listings
projected in 2020

Demand for both Data
Scientists and Data Engineers
is projected to grow

39%

DSA jobs remain open

5 days

longer than average

DSA jobs advertise average salaries of

\$80,265

With a premium over all BA+ jobs of

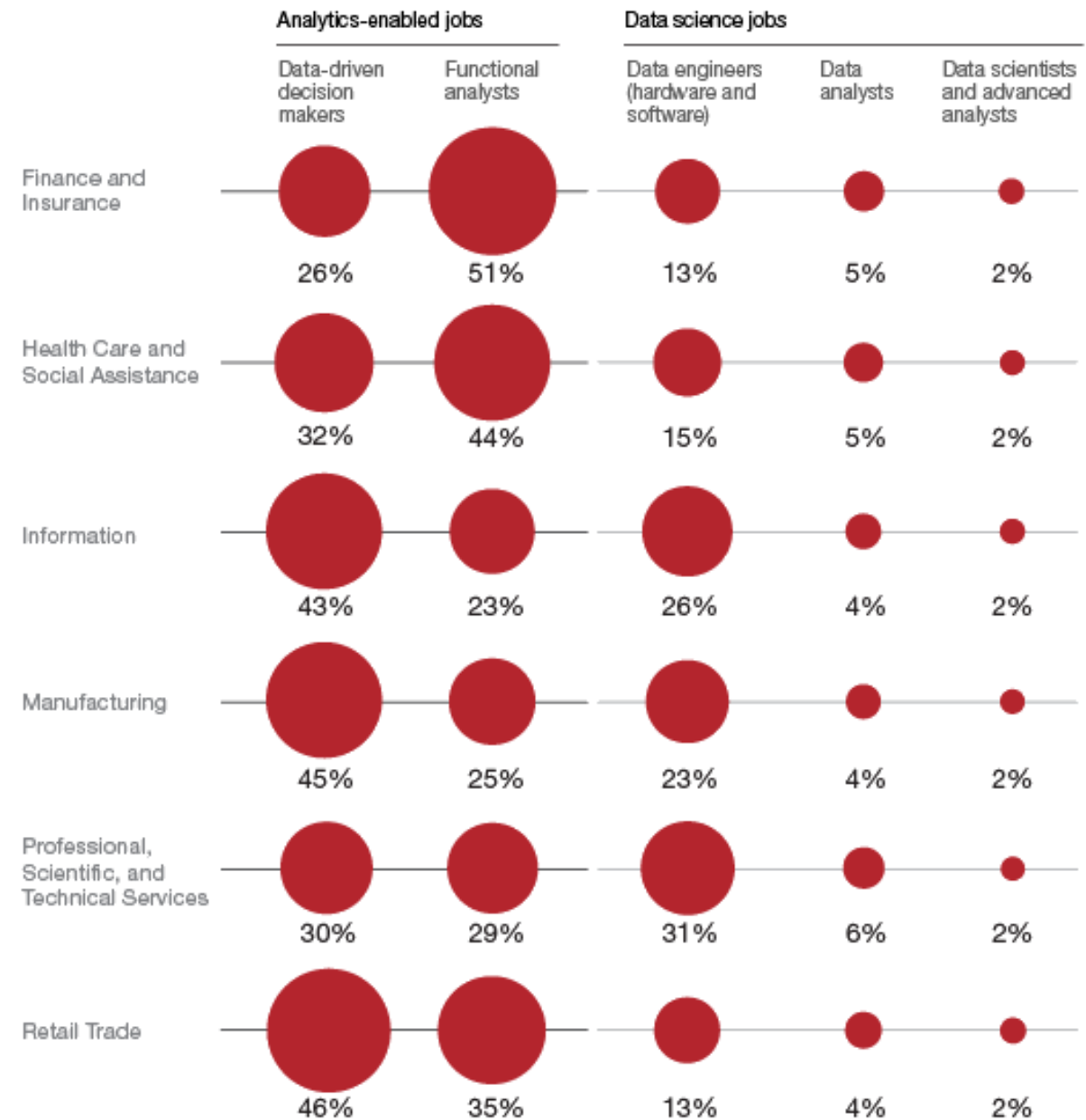
\$8,736

81%

Of DSA jobs require workers with
3-5 years of experience or more

Which data skill sets are needed most in an array of industries?

- There are two different markets for data science and analytics jobs:
 - analytics-enabled jobs, and
 - data science jobs
- Each of these markets requires its own strategy:
 - Sourcing from small pools of experienced data scientists and analysts for one, and
 - employee development for the other



Notes: Job category of analytics managers not shown. Totals may not equal 100%.
Source: PwC analysis based on Burning Glass Technologies data, January 2017.
Number of postings: Finance and Insurance (535,683); Healthcare and Social Assistance (100,900); Information (690,833); Manufacturing (237,484); Professional, Scientific, and Technical Services (511,947); Retail Trade (101,711).

DSA Skills matrix








■ Fundamental (conceptual literacy)
 ■ Intermediate (practical application)
 ■ Advanced (applied)

Skills	Analytics-enabled jobs		Data science jobs		
	Data-driven decision makers	Functional analysts	Data analysts	Data engineers (hardware and software)	Data scientists and advanced analysts
Domain knowledge Research or business	Advanced	Advanced	Fundamental	Fundamental	Advanced
Visualization The story in the data	Intermediate	Advanced	Advanced	Fundamental	Advanced
Data governance Including ethics and security	Intermediate	Intermediate	Fundamental	Advanced	Advanced
Engineering Hardware, software, storage		Intermediate	Fundamental	Advanced	Advanced
Management/Curation Sourcing, cleaning, manipulating		Fundamental	Fundamental	Advanced	Advanced
Analytical approaches Level of precision	Fundamental	Intermediate	Advanced	Fundamental	Advanced
Machine learning Teach computers to recognize patterns			Fundamental	Advanced	Advanced

Source: PwC analysis based on Burning Glass Technologies data, January 2017.

<https://www.pwc.com/us/en/publications/data-science-and-analytics.html>

Data Science Job Categories

DSA Framework Category		Functional Role	Sample Occupations
 Analytical Rigor	 Data Scientists & Advanced Analytics	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 Analysts 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 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

DSA Jobs Demand Statistics

DSA Framework Category	Number of Postings in 2015	Projected 5-Year Growth	Estimated Postings for 2020	Average Time to Fill (Days)	Average Annual Salary
All	2,352,681	15%	2,716,425	45	\$80,265
Data-Driven Decision Makers	812,099	14%	922,428	48	\$91,467
Functional Analysts	770,441	17%	901,743	40	\$69,162
Data Systems Developers	558,326	15%	641,635	50	\$78,553
Data Analysts	124,325	16%	143,926	38	\$69,949
Data Scientists & Advanced Analysts	48,347	28%	61,799	46	\$94,576
Analytics Managers	39,143	15%	44,894	43	\$105,909

Top Analytical Skills Within the DSA Landscape

Skill Name	Total Postings in 2015
SQL	338,555
Data Analysis	166,285
Financial Analysis	155,331
Data Management	113,807
Mathematics	107,297
Data Warehousing	97,797
SQL Server	93,630
Database Administration	92,256
Business Intelligence	88,603
Extraction, Transformation, and Loading (ETL)	82,920

Key Skills and High-Paying Skills by Occupation

Occupation	Key Skills	High-Paying Skills
Data Scientist	Data Science Machine Learning Python R Apache Hadoop	Pattern Recognition Database Schemas Quantitative Analysis Object-Oriented Analysis and Design Database Administration
Data Engineer	Data Engineering Big Data Apache Hadoop JAVA Python	Spark Programming Oozie Predictive Models Apache Flume PIG
Finance and Risk Analytics Manager	Risk Management Financial Analysis and Planning Forecasting and Financial Modeling Project Management SQL	MATLAB Mergers and Acquisitions Data Warehousing Project Management R

DSA Demand by Industry

Industry	Industry Job Openings that Fall within the DSA Framework
Finance and Insurance	19%
Professional, Scientific, and Technical Services	18%
Information	17%
Management of Companies and Enterprises	13%
Manufacturing	12%
Utilities	10%
Wholesale Trade	9%
Mining, Quarrying, and Oil and Gas Extraction	9%
Public Administration	7%
Other Services (except Public Administration)	6%