The Workforce in the Age of Al Strategic Horizon Network

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Managing the Future of Work

The American workforce is undergoing several major demographic changes



Prime-Age Labor force Participation Rate by Gender*

Percentage of Population Aged 65+ United States, 1980 - 2050



*Prime-age indicates workers between the ages of 25 and 54

Sources: OECD Historical population data and projections (1950 - 2050);

"(Seas) Labor Force Participation Rate - 25-54 yrs." Labor Force Statistics from the Current Population Survey

Since the recession, there has been increasing demand for educated workers

Change in total employment over time by education level

American civilians 25 years and over, 2007 - 2018



Source: Current Population Survey; Methodology adapted from Georgetown Center on Education and the Workforce Report, *America's Divided Recovery: College Haves and Have-Nots, 2016.*

The market for middle-skills workers has tightened, but wage growth remains lackluster



Note: Data are for persons age 25 and over. Earnings are for full-time wage and salary workers. "Some college or associate degree," "High school diploma," and "less than high school" have been seasonally adjusted. Bachelor's degree and Advanced degree are not seasonally adjusted. Source: U.S. Bureau of Labor Statistics, Current Population Survey, October 2018.

Underemployment at the start of a career can leave new graduates disadvantaged

For every 100 people in a first job:



5 Underemployment's Long-Term Effects on the Careers of College Grads" (May, 2018)

STEM majors have the lowest risk of underemployment



The majority of New York's high-demand, middleskills jobs take more than a month to fill

Days Needed to Fill Middle-Skills Jobs in New York

Average Duration in New York	v York Difference from National Average	
44	+2	
43	+2	
42	0	
42	+6	
41	-2	
40	+3	
39	+3	
38	-3	
37	-2	
36	-8	
34	0	
32	-3	
32	0	
	Average Duration in New York 44 43 42 42 41 40 39 38 37 36 34 32 32	

Registered nurses and truck drivers made up 18% of New York's middle-skills job postings in 2017

Job Postings by Middle-Skills Oce Analysis of job postings in 2017, New	cupation VYork	Mean Salary 2017, New York	Job postings growth CAGR, 2014 - 2017
Registered Nurses	49,326	\$73,347	27%
Heavy and Tractor-Trailer Truck Drivers	37,083	\$72,192	38%
Sales Reps, Wholesale & Manufacturing (Excl. Sci./Tech. products)	32,196	\$76,098	2%
Customer Service Representatives	23,233	\$37,522	6%
First-Line Supervisors of Retail Sales Workers	21,698	\$60,888	1%
General and Operations Managers	17,483	\$109,431	7%
Secretaries and Admin Assistants, (Excl. legal/medical/executive)	16,853	\$42,485	5%
Human Resources Specialists	14,756	\$67,991	9%
Bookkeeping, Accounting, and Auditing Clerks	10,681	\$42,693	12%
Food Service Managers	7,934	\$57,483	2%

New York Mean Salary: \$60,100

8 Source: Burning Glass New York Job Postings Data; Occupational Employment Statistics Dataset

Current and future occupations can be grouped into four categories based on work demands

Diagram of Occupational Categories by Levels of Cognition and Routineness



Source: Source: "The Trend is the Cycle: Job Polarization and Jobless Recoveries," by Nir Jaimovich and Henry E. Siu. The National Bureau of Economic Research Working Paper No. 18334. March 2014

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Recent job growth has been concentrated in nonroutine cognitive and non-routine manual jobs

Percent change in Routine vs. Cognitive positions



Source: "The Trend is the Cycle: Job Polarization and Jobless Recoveries," by Nir Jaimovich and Henry E. Siu. The National Bureau of Economic Research Working Paper No. 18334. March 2014.

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Many future jobs in the U.S. will require that workers learn various skills in cognitive occupations

Job growth by occupation type and number of technologies in occupations Thousands of new jobs from 2016 – 2026, United States



Most technologies referenced are software based (e.g., Microsoft Excel, Adobe Photoshop)

Source; O*NET Technology Database; Bureau of Labor Statistics

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Americans trail international averages at solving problems in technology-rich environments

Average scores on problem solving in technology-rich environments Adults aged 16-65, 2012/2014, Global



Source: "Skills of U.S. Unemployed, Young, and Older Adults in Sharper Focus: Results from the Program for the International Assessment of Adult Competencies (PIAAC) 2012/2014." U.S. Department of Education, March 2016.

Young Americans trail global averages in literacy, numeracy, and problem solving skills in technology-rich environments

Adult competencies by age cohort

U.S. (2012/2014) Vs. International Peers (2012)



Definition of Y axis (performance) = % of U.S. adults in top two proficiency categories - % of all int'l. adults in top two proficiency categories.

Note: PIAAC international average calculated from 2012 international data (survey conducted from Aug. 25, 2011 – Apr. 3, 2012) for all countries except for the United States, for which combined 2012 and 2014 data (survey conducted from Aug. 26, 2013 - May 5, 2014) were used.

Source: U.S. Department of Education, National Center for Education Statistics,

Organization for Economic Cooperation and Development (OECD),

13 Program for the International Assessment of Adult Competencies (PIAAC), 2012 and 2014.

Americans lag behind global averages at solving problems in tech-rich environments across various education levels

Average scores on problem solving in technology-rich environments

By highest level of education, adults 16-65, 2012/2014, global



Source: "Skills of U.S. Unemployed, Young, and Older Adults in Sharper Focus: Results from the Program for the International Assessment of Adult Competencies (PIAAC) 2012/2014." U.S. Department of Education, March 2016.

Middle-skills workers in New York can boost their employability and wages by learning high-demand skills

Selected Essential Skills in Top Middle-Skills Occupations

Number of New York job postings seeking skill in 2017

Communication Skills 148.623 Customer Service 85,700 Organizational Skills 74,810 Teamwork / Collaboration 63.435 Detail-Oriented 59,732 59,101 Scheduling Problem Solving 49.643 Planning 45,109 Multi-Tasking 39,760 Building Effective Relationships 39.278 Writina 36.763 Creativity 28.638

Selected Technical Skills in Top Middle-Skills Occupations

Number of New York job postings seeking skill in 2017



Note: These lists of skills were hand-picked to reflect interesting trends, not necessarily the most commonly requested skills.

16 Source: Burning Glass New York Job Postings Data

The number of occupations commonly filled with apprenticeships can be nearly tripled from 27 to 74

Already uses apprenticeships



17 Source: "Room to Grow: Identifying New Frontiers" by Joseph Fuller and Matthew Sigelman. November, 2017. HARVARD BUSINESS SCHOOL

20% of all jobs in New York that require 2 years or less of job experience could adopt an apprenticeship model

Potential Apprenticeships by Category

Job postings that could use an apprenticeship model

Occupations with most potential for apprenticeships

Job postings that could use an apprenticeship model



Source: Burning Glass New York Job Postings Data; Occupational Employment Statistics Dataset

There is rising demand for four-year college degrees in jobs that previously did not require one

Current and Requested Educational Levels of Executive Secretaries and Administrative Assistants Analysis of job postings and occupational data in New York from 2014 - 2017



Note: Data for the percentage of employees in an occupation who have Bachelor's Degree or Higher are based on 2015 American Community Survey data Sources: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Employment Statistics; HARVARD BUSINESS SCHOOL

Burning Glass Technologies' database of online job postings for 2017

Many occupations in New York are at risk of degree inflation

Middle-Skills Occupations by Current and Requested Levels of Education

Size of bubble corresponds to number of New York job postings in 2017



Percentage of employees in occupation that have a Bachelor's Degree or higher

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Note: Data for the percentage of employees in an occupation who have Bachelor's Degree or Higher are based on 2015 American Community Survey data Source: Burning Glass New York Job Postings Data, American Community Survey Data HARVARD | BUSINESS | Surveyed employers see little difference in productivity between graduates and non-degree workers

Evaluated worker attributes	Recent college graduates	Non-degree workers with experience		
Positive attributes Negative attributes	U	Both groups equally likely		Don't know
Higher levels of productivity	31%	49%	19%	0%
Higher rates of retention / longer tenure with company	29%	40%	31%	0%
Faster time to reach full productivity	37%	44%	19%	0%
Higher salary expectations	59%	30%	11%	1%
Likely to leave for a competitor	49%	38%	12%	1%
Likely to feel unengaged or underutilized	40%	35%	23%	2%

Source: 2016-2017 Accenture, Grads of Life and HBS Project on Managing the Future of Work, Hiring and Talent Management Survey.

Office, administration, and production workers will likely lose their jobs to automation in the near future

Projected structural changes in the US job market by 2026



Those occupations can transition to similar roles

Computer and Mathematical and Entertainment Construction and Extraction ^Dersonal Care and Service Building and Grounds Cleaning and Maintenance Installation, Maintenance, and Repair Social Office and Administrative Education, Training, and Library Practitioners Business and Financial Operations Community and Social Service Food Preparation and Serving Fishing, and and Sales and Related Arts, Design, Enter Sports, and Media Protective Service Architecture and Transportation Life, Physical, Design, I Starting job family engineering Healthcare F Technical [>]roduction Farming, F Forestry Science = potential job transfers Arts, Design, Entertainment, Sports, and Media **Business and Financial Operations** Key job transition pipelines н Community and Social Service Computer and Mathematical н Construction and Extraction Ŧ. Education, Training, and Library Т Farming, Fishing, and Forestry 4 • Food Preparation and Serving Т . Healthcare Practitioners and Technical I • Installation, Maintenance, and Repair ł Office and Administrative • . • • • • . . Personal Care and Service Production • . . . **Protective Service** • Sales and Related . . Transportation •

Target job family

Companies can tap into the labor pool more effectively by developing alternative talent development pipelines

Pool of Workers

Pipelines for Developing Talent

"Spot Market" Hiring Narrow and inefficient **Apprenticeships** Work based learning **Coop Programs** & competency based education **Paid Internships** Broad and efficient

Developed Talent

Case Study: Pathways to Prosperity in Delaware

"The American system for preparing young people to lead productive and prosperous lives as adults is clearly badly broken. Failure to aggressively overcome this challenge will surely erode the fabric of our society."

-Harvard Graduate School of Education, Pathways to Prosperity Project

The Goal: Develop a New College and Career Pathway for Young People

Finish high school with 12 college credits and work-based learning experience

Attain postsecondary credential with value in regional labor market

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Launch a career in a high-demand, highgrowth, high-wage occupation

Advance in career and pursue further education as interested

Delaware Pathways Student Participation

School Years 2014-15 to 2017-18







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While slightly higher than the national average, New York's unemployment rate is near record lows

Unemployment Rates

Seasonally adjusted, civilians 16 years and over, 1990 - 2018*

—New York ——United States



*Figures represent 4-month smoothed rolling average Source: Bureau of Labor Statistics, 2018

Americans trail the rest of the world in problem solving and numeracy skills

Average assessment score by type of skill

Adults ages 16 to 65, 2012 - 2014



Source: "Skills of U.S. Unemployed, Young, and Older Adults in Sharper Focus: Results from the Program for the International Assessment of Adult Competencies (PIAAC) 2012/2014." U.S. Department of Education, March 2016.

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Case Study: LifePoint Health reduced degree inflation by identifying its real skill needs

LifePoint Health's Phases For Identifying Degree Inflation



"Why are you insisting on a person with a high-school diploma when your facility is located in an area where 25% of the population does not have a high-school diploma?" Pam Belcher, Senior Vice President of Human Resources and Talent Management **Case Study**: State Street expanded its talent pool by partnering with non-profits to target high school students

Overview of State Street Talent Pipelines



30 Source: "Dismissed by Degrees," by Joseph Fuller and Manjari Raman, October 2017

As women make up a large share of the educated workforce, employers must support their caregiving needs

Share of Labor Force by Gender and Education

United States, 1970 - 2015



Women's share of advanced degrees

United States, 1970 - 2015







33 Source: "Dismissed by Degrees," by Joseph Fuller and Manjari Raman, October 2017



34 Source: "Dismissed by Degrees," by Joseph Fuller and Manjari Raman, October 2017



35 Source: "Dismissed by Degrees," by Joseph Fuller and Manjari Raman, October 2017



36 Source: "Dismissed by Degrees," by Joseph Fuller and Manjari Raman, October 2017