



Post-Secondary Education Subcommittee

October 11, 2017

9:00 AM

Mashburn Hall (306 HOB)

Meeting Packet

**Richard Corcoran
Speaker**

**Elizabeth Porter
Chair**



AGENDA

Post-Secondary Education Subcommittee
Wednesday, October 11, 2017
9:00 a.m. – 11:00 a.m.
306 HOB

- I. Call to Order and Roll Call
- II. Opening Remarks
- III. Presentation on Sub-baccalaureate Workforce Options
 - Dr. Jeff Strohl – Director of Research, Georgetown University Center on Education and the Workforce
- IV. Presentation on "Florida Jobs 2030"
 - Dr. Jerry Parrish – Chief Economist & Director of Research, Florida Chamber Foundation
- V. Closing Remarks and Adjournment

**Good Jobs That Pay
Without a BA**

GEORGETOWN UNIVERSITY



Center
on Education
and the Workforce

McCourt School of Public Policy



Just how missing is the
middle? Thinking about
good jobs that pay
without a BA

Jeff Strohl

October 11, 2017

Briefing for Florida House Postsecondary education
subcommittee


Georgetown University Center on Education and the Workforce



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Take aways


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- **Postsecondary education is necessary but this does not mean that the BA is the only key to opportunity.**
- **The Non-BA sector is critical, the idea that the middle has disappeared does not hold water.**
- **Upskilling has been occurring where the high school economy is less of a good investment: These opportunities are going to older workers who are more sensitive to global change or are for men.**
- **The sub-BA workforce has kept pace with national growth and the AA workforce has grown good jobs as well as BAs**

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- **The demand for value/ROI from education can be enhanced by better alignment between education and labor market requirements.**
- **This needs to occur close to the labor market when specific skill needs can be identified and taught. General education forms the foundation to use specific skills as well as respond to change.**
- **The community college sector plays a critical role, or should, because shorter term education and training combines with local employer engagement to (hopefully) better align workplace needs and curriculum.**
- **The community college sector is also important as upskilling demands articulation between K-12 and college CTE.**
- **There are good public investments to be made in data tool development that potentially can leapfrog off of development in other states.**


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Education demand and good jobs

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Lumina inspired education goal setting has spread throughout the states; and for good reason. The US has been historically under producing post secondary education since at least 1983 when the BA:HS wage premium started to widen greatly from its long term norm of around 42% (currently 75-80% depending on how this is measured)

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These goals setting exercises are now moving from aspirational slogans to implementation. In doing so people in the states have begun taking notice that while BA and above attainment is quite important that the economy has numerous workers without a BA.

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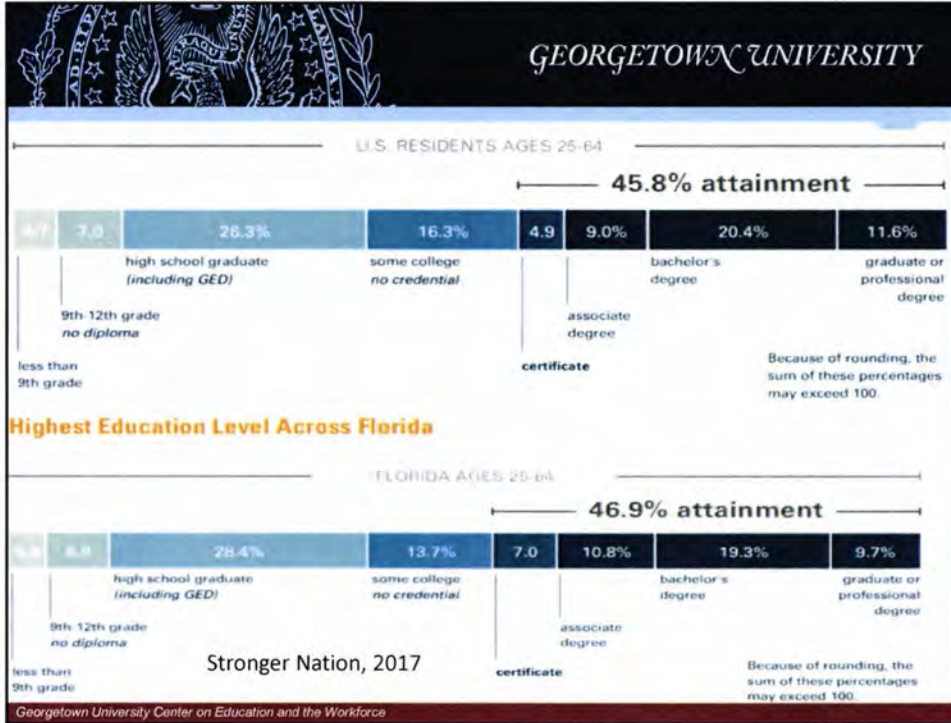
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105.4M AMERICANS NEED POSTSECONDARY CREDENTIALS BY 2025

Category	Value
Americans who have a degree	57.4M
Americans who have a certificate	7.4M
Projected credentials	24.2M
Gap	16.4M

Stronger Nation, 2017

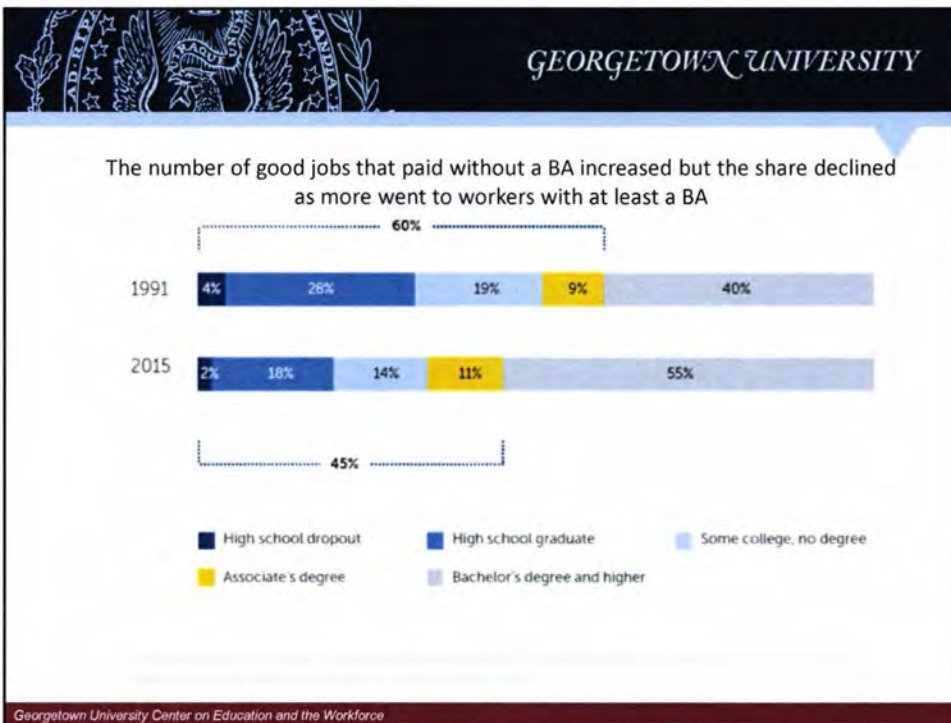
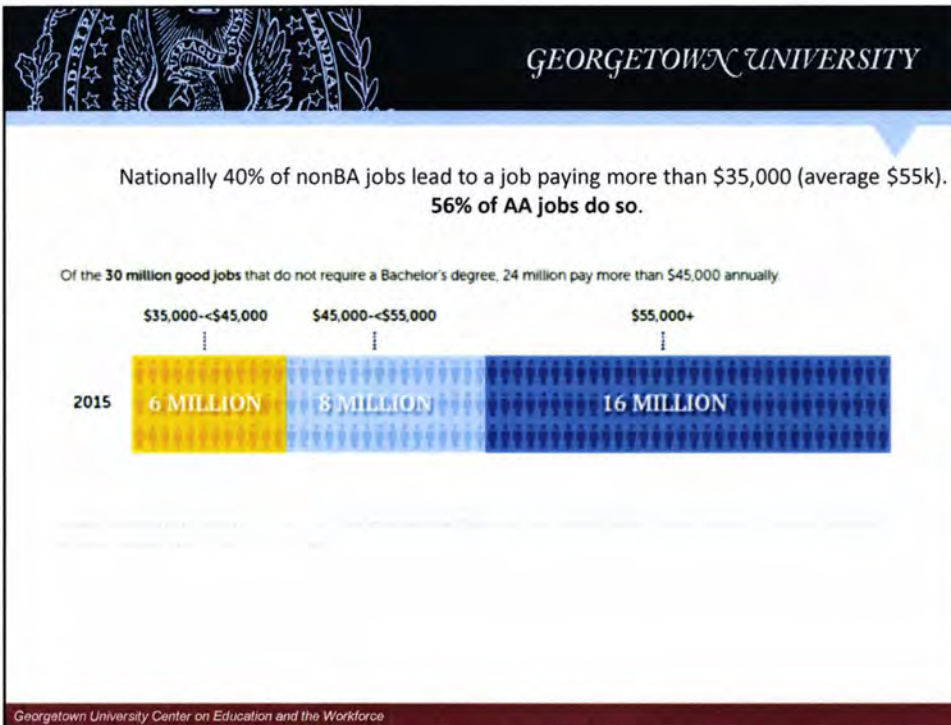
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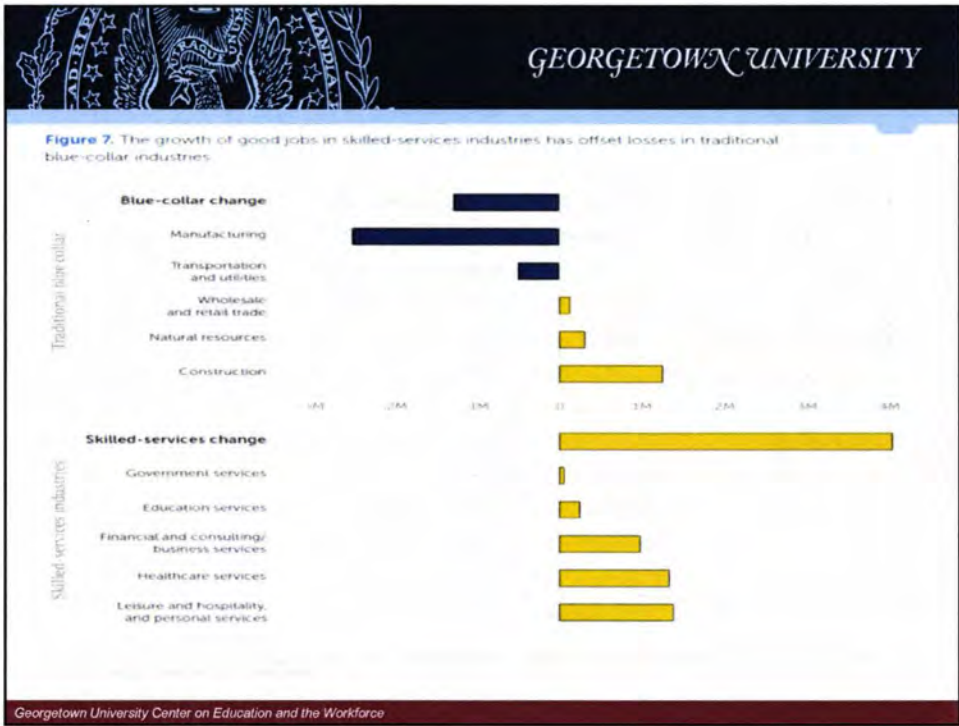
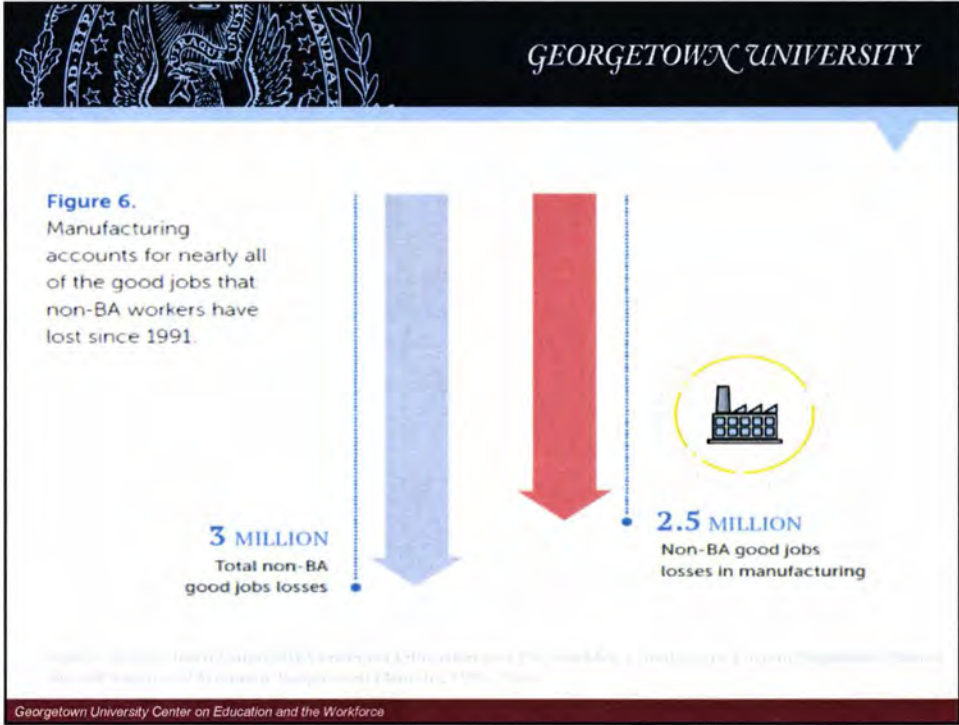


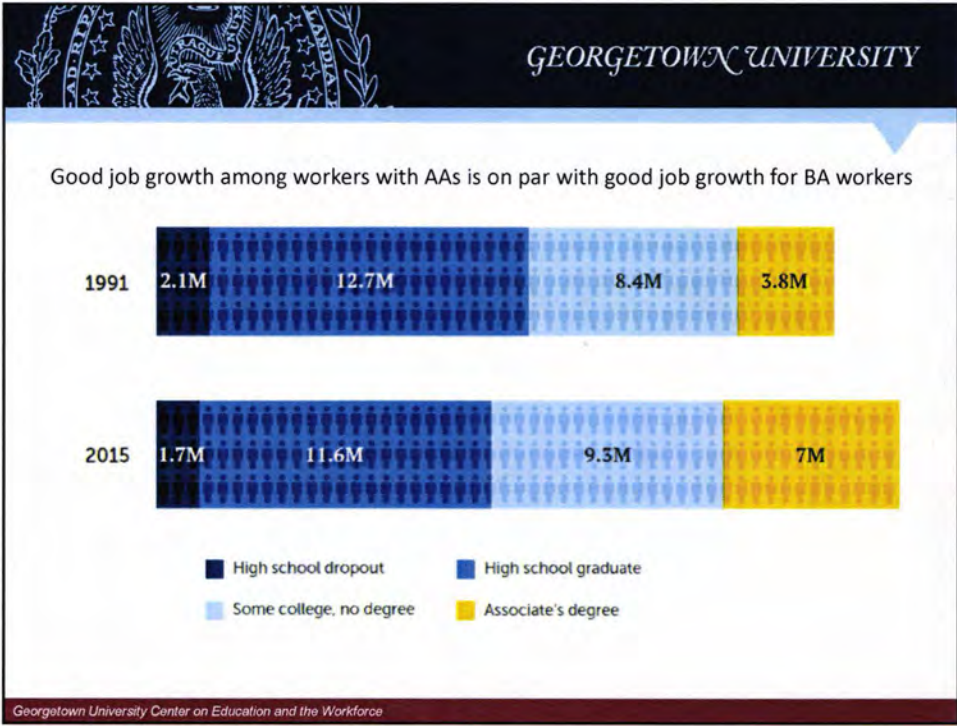
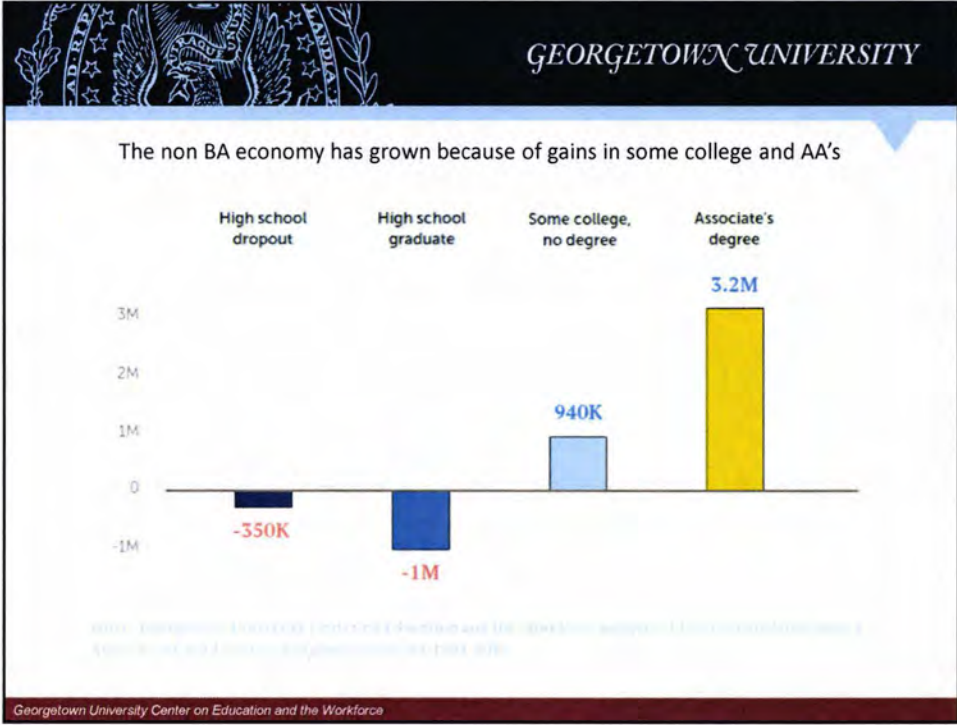
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Good Jobs that Pay without a BA

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Good Jobs that pay without a BA in Florida

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Florida has a robust nonBA economy where nearly half of all good jobs in the state go to workers Without a BA

The most populous states—California, Texas, Florida, New York, and Illinois—offer the largest number of good jobs for those without a BA .

California		3.4 MILLION
Texas		2.5 MILLION
Florida		1.7 MILLION
New York		1.5 MILLION
Illinois		1.2 MILLION

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While Florida stands out on the number of good jobs it is near the bottom on the states when it comes to the share of non-BA jobs that pay well (36%).



Manufacturing has declined in Florida but Florida has bucked the national trend with good job growth in both blue collar (22%) and skilled services industries (83%).




We need to be careful with policy aimed at promoting increases in sub-BA education. Nationally the sector has low graduation rates and is often well underfunded per student compared to 4-year institutions



Policy that focuses on developing the sector need simultaneously take on completions and modernization in the same breath.

Increased educational demand has brought with it increased demand for value.

Better alignment between education and workplace needs can help reconcile these pressures.




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CTE and community college curriculum modernization must face critical problems of tracking and the need to balance specific with general education.

Tracking is CTE's burden of history which has become that borne now by the community college system –it's the system where less college ready students get piped to land in lower paying jobs that are particularly sensitive to global change or into schools with low completion rates.

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The stereotype of dead end jobs reflects the idea that job opportunity dies with a particular industry.

Thinking about curriculum modernization as building skill and competencies shared across job families can be framed as building opportunities; not limiting them.

Movement between jobs can then be had by short period of training that meet the task specific differences between one job versus another within the job family

(see occupational competency model clearing house <https://www.careeronestop.org/competencymodel/competency-models/advanced-manufacturing.aspx>)

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- The CTE system and the community college system is a good place to begin this effort, or continue it, depending on state policies. CTE and community colleges historically embrace their role in workforce development and do not shy away from employer engagement and work based curriculum. (note also certifications, non credit, and customized training)
 - Our work in the states suggests that there is good money to be spent in developing data tools in the following areas:
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Figure 1. The five ways feature web-based tools to support policy- and decision-making.



Education Projections, Business Expansion, and Workforce Quality tools help state economic development leaders attract and retain new employers with data demonstrating that the state postsecondary education and training systems can provide workers with the needed skills.



Program Alignment with Labor Market Demand tools help college administrators, faculty, and deans make program-related decisions that address labor market needs, while college and system administrators can demonstrate return on investment to state leaders.



Curriculum Alignment with Workforce Requirements tools help faculty members create curricula aligned with the applied skills and abilities that learners will need to succeed in their careers.



Counseling and Career Pathways tools help advisors support students in their educational and career decisions, as well as identify and reach out to the learners who need additional support.



Job Placement and Skills Gap Analysis tools help workers determine if and how the knowledge, skills, abilities, interests, and work values they possess are transferable to new jobs. These tools also help workers assess skill gaps and provide connections to postsecondary education and training options that can prepare them for a career change.

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Good Jobs That Pay without a BA

By Anthony P. Carnevale, Jeff Strohl, Ban Cheah, and Neil Ridley

2017



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We are especially grateful to our talented designers, meticulous editorial advisors, and trusted printers whose tireless efforts were vital to our success. In addition, Georgetown CEW's economists, analysts, and communications and operations staff were instrumental in the production of this report from conception to publication:

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- Joe Leonard and Coral Castro for assistance with logistics and operations.

The views expressed in this publication are those of the authors and do not necessarily represent those of JPMorgan Chase & Co., or its officers or employees.

ABOUT THE GOOD JOBS PROJECT

In the fall of 2017, the Georgetown University Center on Education and the Workforce will launch the Good Jobs Project website, which will show the concentration of good jobs for non-BA workers both nationally and by state. A Good Jobs Index will be created to provide users an interactive way to determine the level of economic opportunity for workers without BAs across the country. The project also focuses on the prevalence of good jobs by industry and occupation, with greater detail about the types of job opportunities that are being generated in the economy. In addition to earnings, we will examine other characteristics that describe the quality of these jobs, such as how many are full-time and how many offer benefits.

TABLE OF CONTENTS

1	Introduction
5	The number of good jobs has grown for workers without a BA, but their share of all good jobs has declined.
7	Shifts in the economy have offset the losses of good jobs in blue-collar sectors with new good jobs in skilled-services industries.
9	New good jobs are going to workers with some college education and Associate's degrees rather than workers with high school diplomas.
13	High school-educated workers, men, and Whites still hold the most good jobs among those without a BA.
17	Big states yield plenty of good jobs, but size does not always tell the whole story.
19	Conclusion
20	Appendix A: Distribution of good jobs, 1991–2015
21	Appendix B: Data sources and methodology
22	Appendix C: Good jobs occupations
23	References

TABLE OF FIGURES

- 1 **Figure 1.** There are 30 million good jobs that pay for workers without a BA and 36 million for those with a BA or higher.
- 2 **Figure 2:** What is a good job?
- 3 **Figure 3:** Who gets good jobs and where are they?
- 4 **Figure 4:** Between 1991 and 2015, the share of good jobs going to workers without a BA fell from 60 percent to 45 percent.
- 5 **Figure 5:** Thirty million American workers aged 25 to 64 have good jobs that pay without a BA.
- 6 **Figure 6:** Manufacturing accounts for nearly all of the good jobs that non-BA workers have lost since 1991.
- 7 **Figure 7:** The growth of good jobs in skilled-services industries has offset losses in traditional blue-collar industries.
- 8 **Figure 8:** Many good jobs continue to exist in manufacturing and traditional blue-collar industries.
- 9 **Figure 9:** The increase in good jobs for Associate's degree holders (3.2 million) more than offset the job losses suffered by high school graduates (1 million).
- 10 **Figure 10:** High school graduates and dropouts had the rug pulled out from under them in the job market, losing about 1.4 million total good jobs since 1991.
- 11 **Figure 11:** Workers with some college but no degree lost good jobs in traditional blue-collar industries, but they have gained skilled-services jobs.
- 12 **Figure 12:** Associate's degree holders have secured good jobs in both blue-collar and skilled-services industries.
- 13 **Figure 13:** High school graduates have the largest number of good jobs without a BA, but their share has declined.
- 14 **Figure 14:** Men have long dominated good jobs without a BA.
- 15 **Figure 15:** Whites have the largest share of good jobs, while the share held by Latinos has increased and the share held by Blacks has been almost flat.
- 16 **Figure 16:** Good jobs are spread across many skilled-services industries in addition to the declining traditional blue-collar industries.
- 17 **Figure 17:** California and other states with large populations provide the largest number of good jobs for workers without a BA.
- 18 **Figure 18:** Wyoming has the largest share of good jobs for workers without a BA.

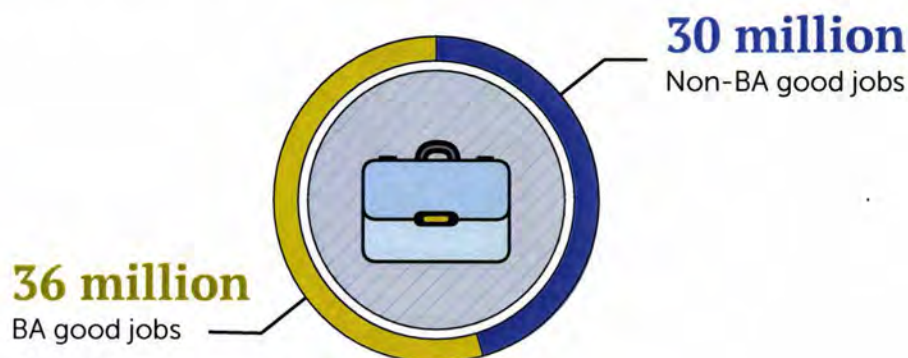
Introduction

The blue-collar economy conjures images of shuttered factories and the disappearance of good jobs. Those images reflect the suffering among blue-collar workers left behind by the shift away from an economy based in manufacturing, but they do not tell the whole story. In fact, we find that there are still 30 million good jobs that do not require a Bachelor's degree. These good jobs pay an average of \$55,000 per year, and a minimum of \$35,000 annually.¹

In the past, these good jobs were found almost entirely in manufacturing and other blue-collar industries like transportation and construction. Employment in blue-collar industries, however, has declined primarily because of robots and offshoring of jobs. These industries still hold the majority (55%) of jobs that pay without a BA,² but that is changing quickly.

Today we find good jobs in skilled-services industries, such as healthcare, finance, and information technology. These new good jobs have steadily been replacing good jobs lost in traditional blue-collar industries. Twenty-five years ago, a machinist was a typical good manufacturing job paying \$44,000 per year.³ Today, a computer support technician who

Figure 1. There are 30 million good jobs that pay for workers without a BA and 36 million for those with a BA or higher.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 2016.

¹ While there is no universally accepted or official earnings level that defines self-sustaining earnings, in defining a good job, we have chosen \$35,000 (\$17 per hour for a full-time job) as a minimum for those under age 45 and \$45,000 (\$22 per hour for a full-time job) for workers age 45 and older. Jobs that meet these standards pay a median \$55,000. The \$17-per-hour wage is consistent with living wage levels.

² In this report, the term BA is used to refer to all Bachelor's degrees.

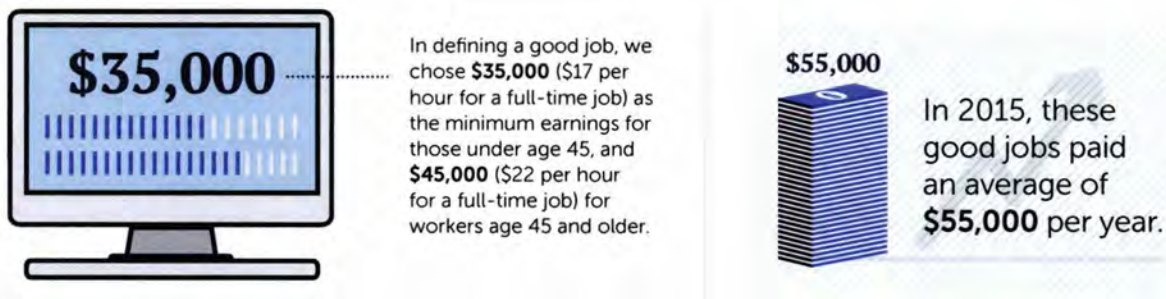
³ All earnings are reported in 2015 dollars. Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992, 2016.

makes \$60,000 per year typifies these good jobs in skilled services. Other examples include financial managers, sales representatives, and engineering technicians.⁴

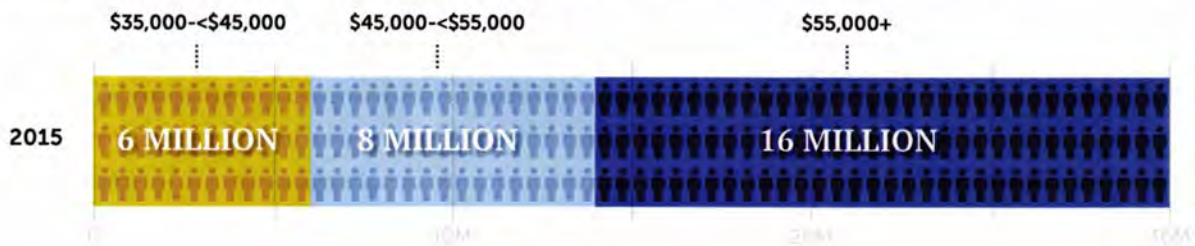
The educational requirements for good jobs that pay without a BA also are shifting. The number of good jobs held by workers with no more than a high school diploma has declined by more than 1 million since 1991. Good jobs have shifted primarily to workers with Associate's degrees, who have gained more than 3 million net new jobs during that same period.

Using our age-adjusted earnings standard for good jobs,⁵ we find that the number of workers with good jobs that pay without a BA has increased over the past quarter century—from 27 million in 1991 to 30 million today, even with large losses in manufacturing employment. The share of good jobs held by workers without a BA, though, has declined, from 60 percent to 45 percent of all good jobs, as BA holders are taking an increasing share of the good jobs. Workers with BAs now hold 36 million good jobs (Figure 1).

Figure 2. What is a good job?



Of the **30 million good jobs** that do not require a Bachelor's degree, 24 million pay more than \$45,000 annually.

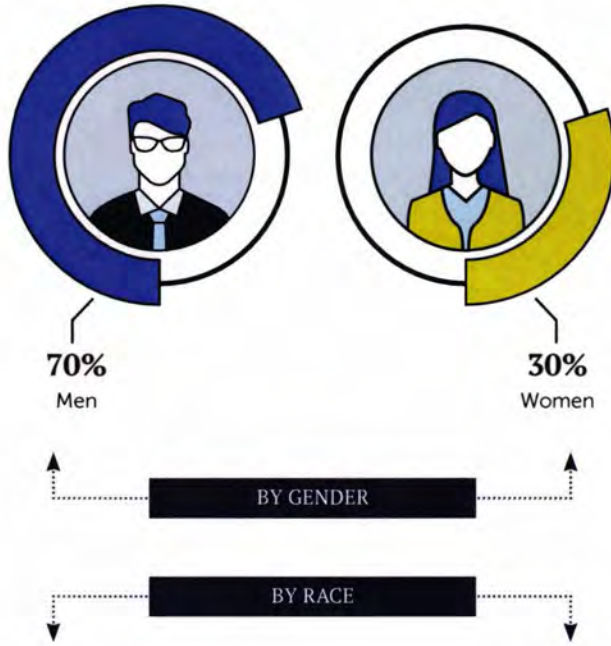


Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

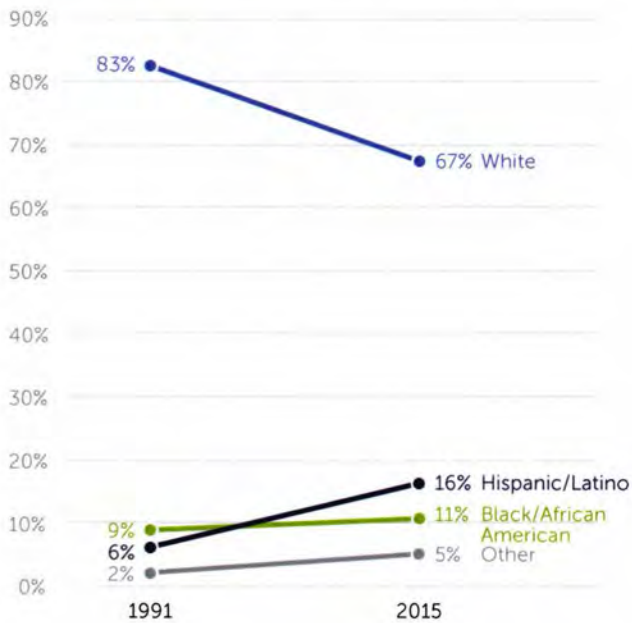
⁴ For examples of good jobs in blue-collar and skilled-services industries, see Appendix C.

⁵ We presume that higher earnings levels are required for self-sufficiency among older workers. To roughly adjust for this, we raise the threshold to \$45,000 for workers age 45 or older. We are studying the development of additional age adjustments.

Figure 3. Who gets good jobs and where are they?



Whites still have the largest share of good jobs, even though their share has declined, while Latinos have experienced the largest growth in good jobs. There has been little growth in good jobs for Blacks.



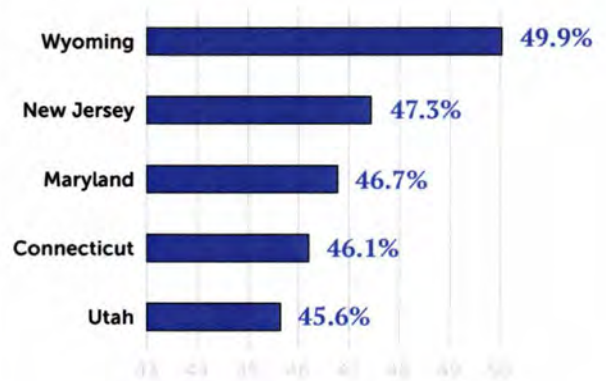
TOP FIVE STATES BY NUMBER OF GOOD JOBS

The most populous states—California, Texas, Florida, New York, and Illinois—offer the largest number of good jobs for those without a BA.



TOP FIVE STATES BY SHARE OF GOOD JOBS

Wyoming, the least populated state, has the largest share of good jobs, but it is followed in the rankings by three densely-populated East Coast states—New Jersey, Maryland, and Connecticut.



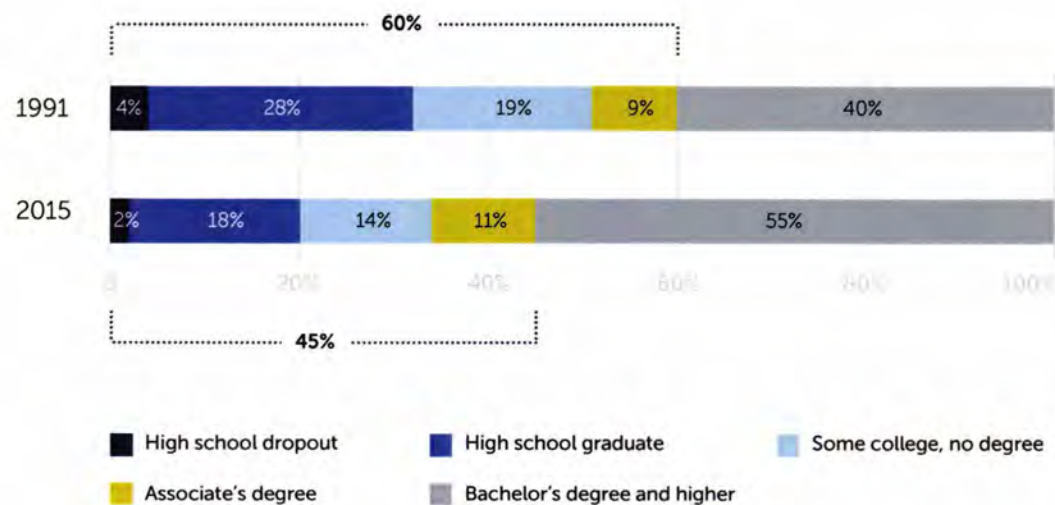
Source: Georgetown University Center on Education and the Workforce analysis of Current Population Survey Annual Social and Economic Supplement (March), 1992-2016.

The number of good jobs has grown for workers without a BA, but their share of all good jobs has declined.

While it is important to highlight this segment of the job market, there are still hard truths to face. Workers with BAs have gained far more jobs since the Great Recession of 2007-2009 (8.4 million) than workers with less education (3.2 million).⁶ The share of workers with Bachelor's degrees recently outnumbered workers with a high school diploma for the first time.⁷

It is not just the recession that is to blame. Good jobs for workers without a BA have increased from 27 million in 1991 to 30 million in 2015. But, because the size of the workforce expanded so much, the non-BA share of good jobs declined from about 60 percent of workers to 45 percent in 2015 (Figure 4).

Figure 4. Between 1991 and 2015, the share of good jobs going to workers without a BA fell from 60 percent to 45 percent.

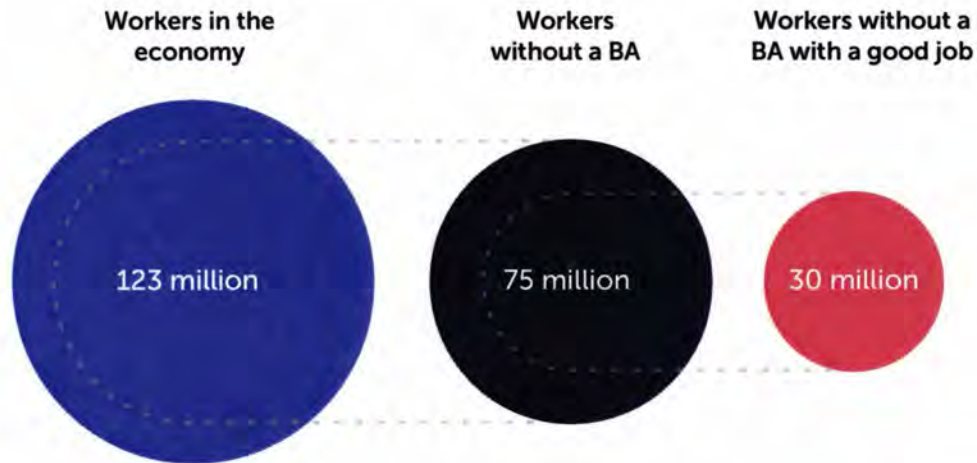


Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

⁶ Carnevale et al., *America's Divided Recovery*, 2016.

⁷ Ibid.

Figure 5. 30 million American workers aged 25 to 64 had good jobs that pay without a BA.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

To put the workforce in perspective, of the 123 million employed workers aged 25 to 64, 75 million workers do not have a BA. Of these, 30 million workers have good jobs that pay without a BA (Figure 5).

The slower growth in good jobs that pay without a BA can be attributed to the long-term decline of blue-collar jobs in the economy. Industrial production has increased by 60 percent in the United States since 1991, but blue-collar employment has declined by 30 percent over the same period.⁸ Of the 3 million good jobs for workers without a BA that have been lost, 2.5 million were in manufacturing (Figure 6). But the overall growth of good jobs for workers without a BA in skilled-services sectors has kept the non-BA economy above water.

Gains of 4 million good jobs, including 1 million in financial services and 1.4 million in health services, have helped offset the losses of good jobs in manufacturing.

Good jobs in factories at the height of the manufacturing economy in the United States only required a high school education or less, but the new good jobs almost all require at least some postsecondary education and training. In fact, the number of workers in good jobs with only a high school diploma has declined by 1 million since 1991. Among good jobs, employers favor those with Associate's degrees or some college, with 3.2 million net new good jobs going to Associate's degree holders.

⁸ Industrial production is from Federal Reserve Economic Data (FRED), Industrial Production Index 1991-2015 and consists of manufacturing, mining and logging, and utilities. Employment in these same industries is obtained from Bureau of Labor Statistics, *Current Employment Statistics*, 1991-2015.

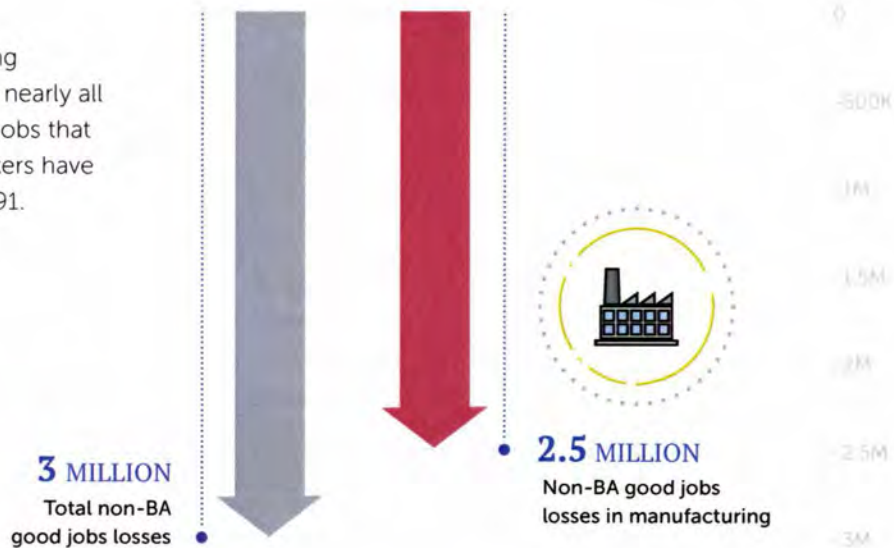
Shifts in the economy have offset the losses of good jobs in blue-collar sectors with new good jobs in skilled-services industries.

The decline of the manufacturing industry and the broader blue-collar economy was in motion long before the Great Recession. In 1947, more than 30 percent of U.S. employment was in manufacturing. More

than 40 percent was in goods-producing industries overall.⁹ But automation, globalization, and the rise of a more integrated, networked economy have taken a toll on employment.

Figure 6.

Manufacturing accounts for nearly all of the good jobs that non-BA workers have lost since 1991.



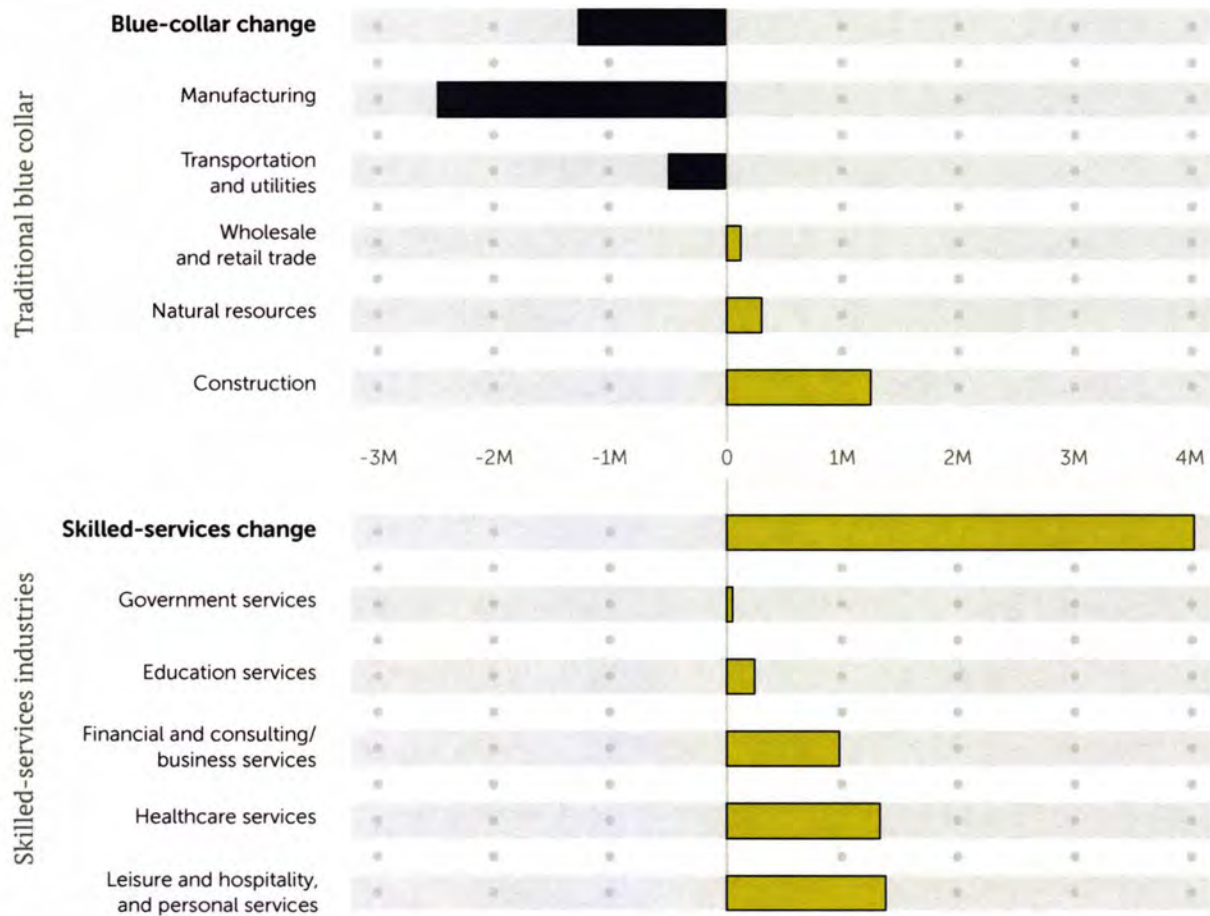
Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

⁹ Carnevale and Rose, *The Economy Goes to College*, 2015.

At the same time, the growth of jobs in skilled-services industries offsets the job losses that workers without BAs suffered in traditional blue-collar industries (Figure 7). The healthcare services, financial services,

and education services industries have added employment as the share of income spent by American consumers on food, clothing, and other basic items has shifted toward healthcare, education, and other services.¹⁰

Figure 7. The growth of good jobs in skilled-services industries has offset losses in traditional blue-collar industries.



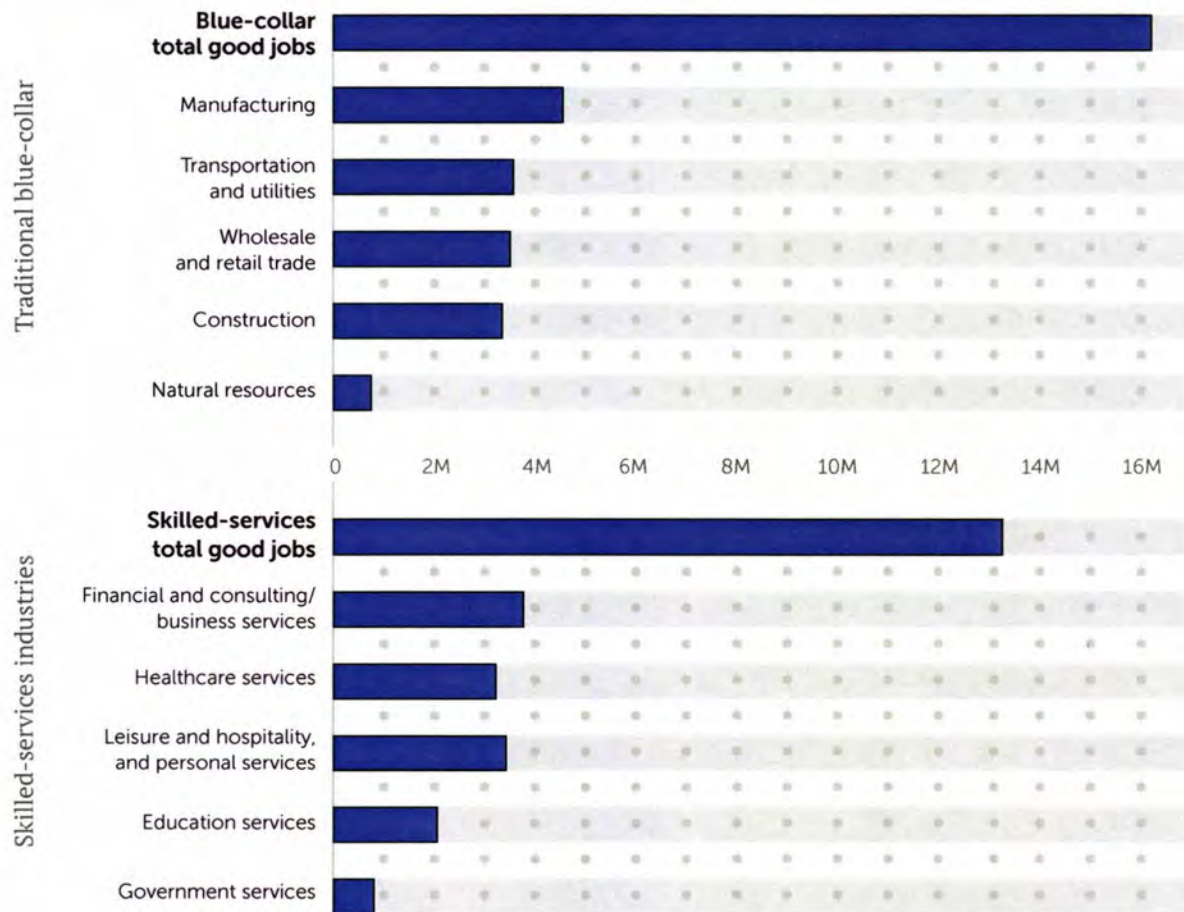
Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

10 Carnevale and Rose, *The Economy Goes to College*, 2015.

In addition to jobs in skilled services, there are still many good jobs for non-BA workers in traditional blue-collar industries. The

manufacturing, transportation, and utilities industries remain a major source of good jobs for workers without a BA (Figure 8).

Figure 8. Many good jobs continue to exist in manufacturing and traditional blue-collar industries.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

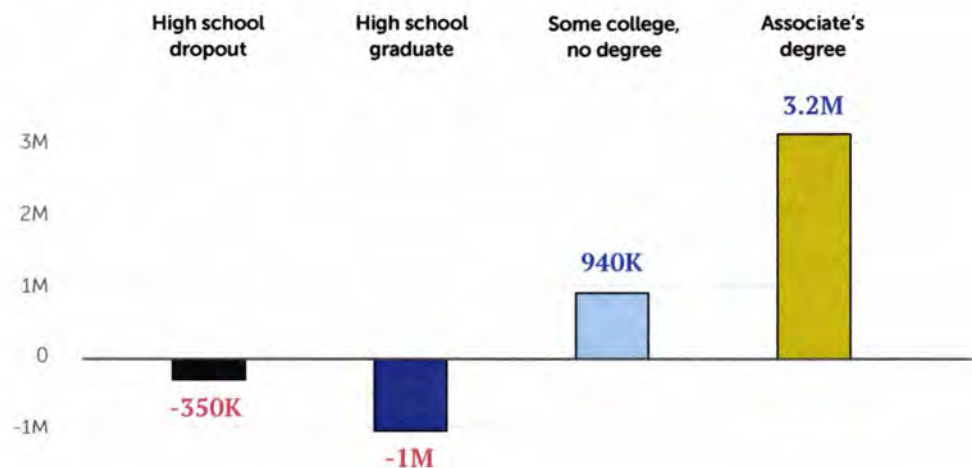
New good jobs are going to workers with some college education and Associate's degrees rather than workers with high school diplomas.

In the heyday of the industrial economy, young people could leave high school and easily find a good job in a nearby factory or mine. If an economic downturn cost them their job, experienced workers could just wait until the economy picked up and then return to a similar job.

Those days are gone. With the decline in traditional blue-collar industries, there has been a shift toward skilled-

services industries with higher concentrations of workers who have postsecondary education and training (Figure 9). This transfer of work toward more-educated workers has occurred because the skilled-services industries and even the old blue-collar industries increasingly rely on workers with higher-level skills to meet competitive requirements and to fully exploit ever more flexible technology.¹¹

Figure 9. The increase in good jobs for Associate's degree holders (3.2 million) more than offset the job losses suffered by high school graduates (1 million).



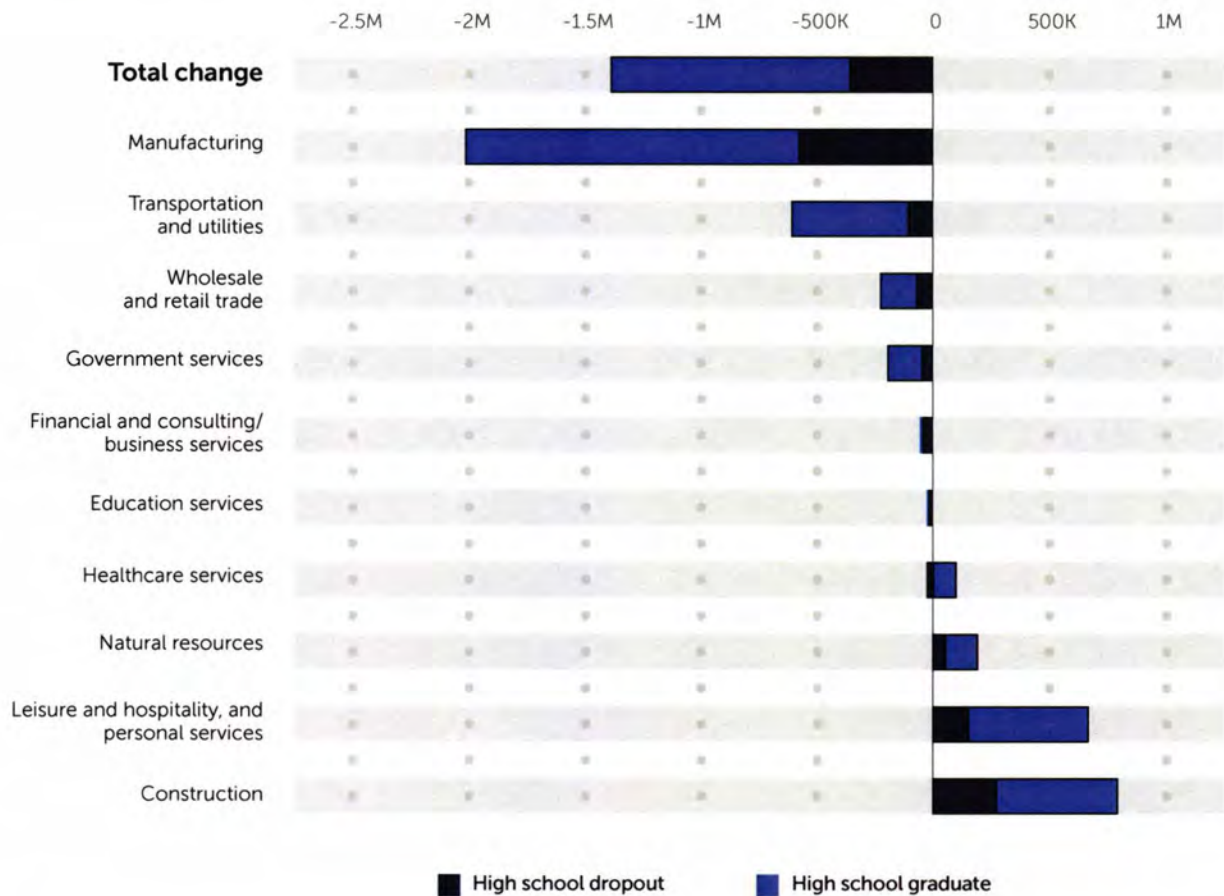
Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

¹¹ Carnevale and Rose, *The Economy Goes to College*, 2015.

High school-educated workers have suffered the most from job losses in traditional blue-collar industries. When factories closed, men and women with no more than

a high school education found themselves out of work and with fewer job options (Figure 10).

Figure 10. High school graduates and dropouts had the rug pulled out from under them in the job market, losing about 1.4 million total good jobs since 1991.

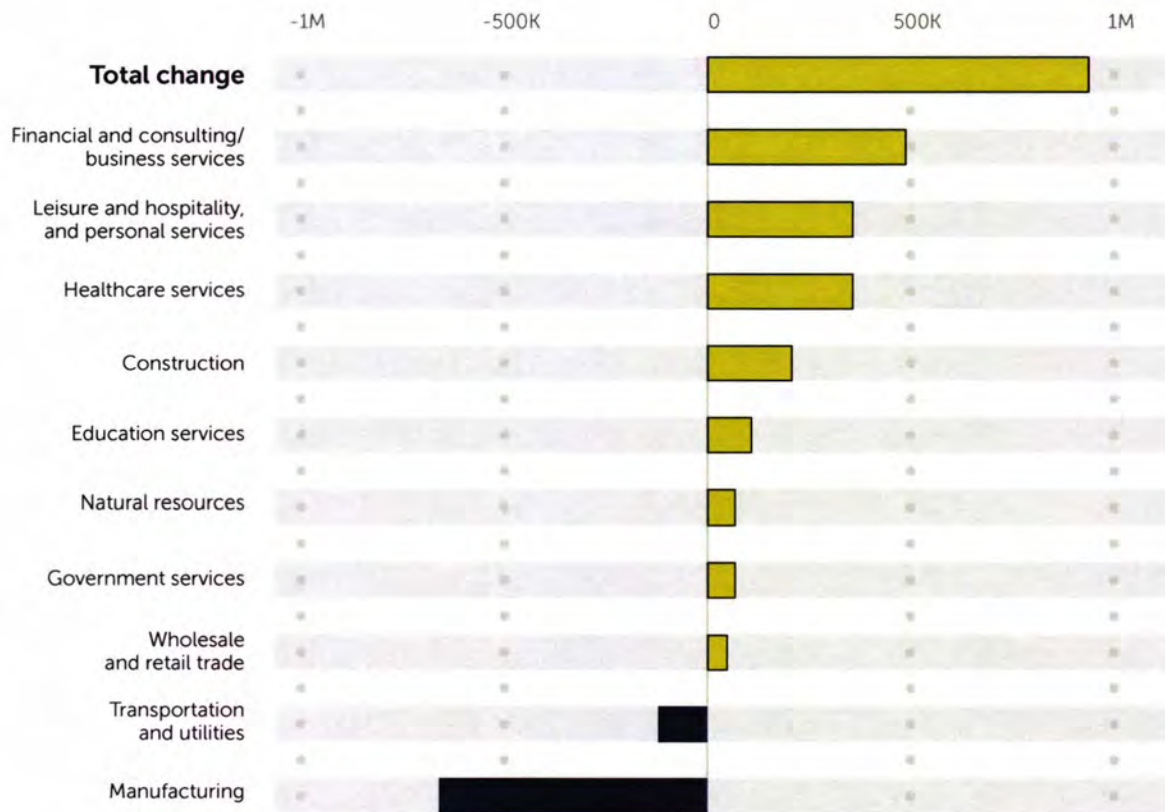


Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

Workers with some college but no degree have lost jobs in blue-collar industries, especially manufacturing, but they have

gained jobs in skilled-services industries, such as financial services and healthcare (Figure 11).

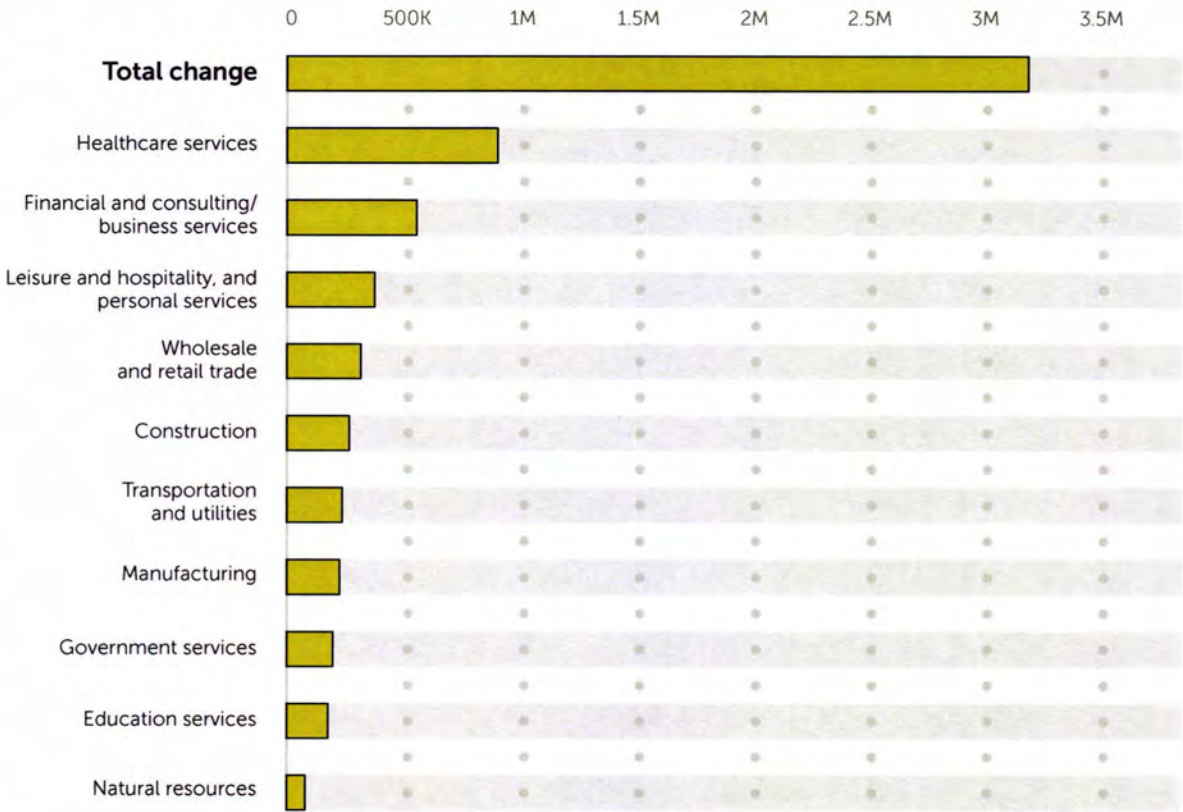
Figure 11. Workers with some college but no degree lost good jobs in traditional blue-collar industries, but they have gained skilled-services jobs.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

Associate’s degree holders have gained the most good jobs in both blue-collar and skilled-services industries (Figure 12).

Figure 12. Associate’s degree holders have secured good jobs in both blue-collar and skilled-services industries.



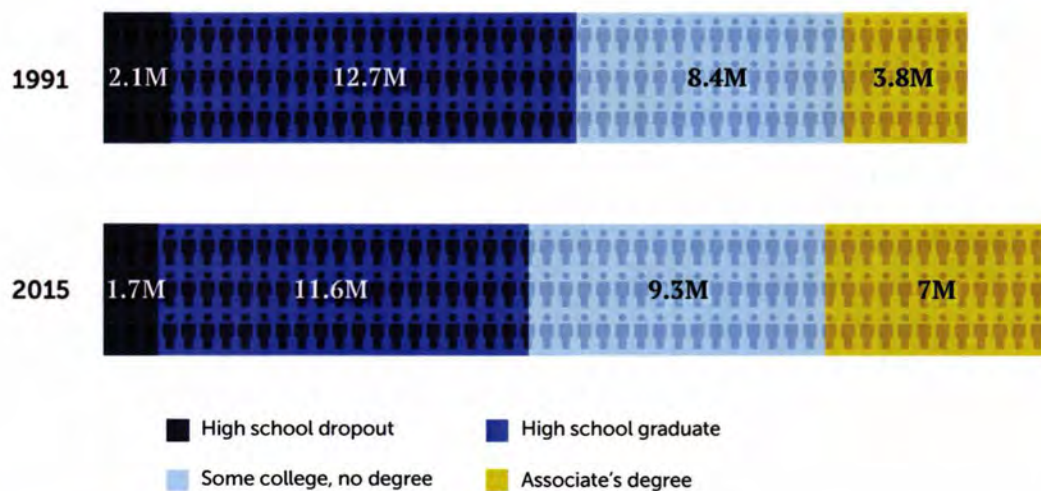
Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

High school-educated workers, men, and Whites still hold the most good jobs among those without a BA.

High school-educated workers continue to hold the largest share of good jobs among those without a BA. But good high school jobs have lost ground since 1991, declining

by 8 percent, while good jobs for workers with some college grew by 11 percent and good jobs for Associate’s degree holders grew by 83 percent (Figure 13).

Figure 13. High school graduates have the largest number of good jobs without a BA, but their share has declined.

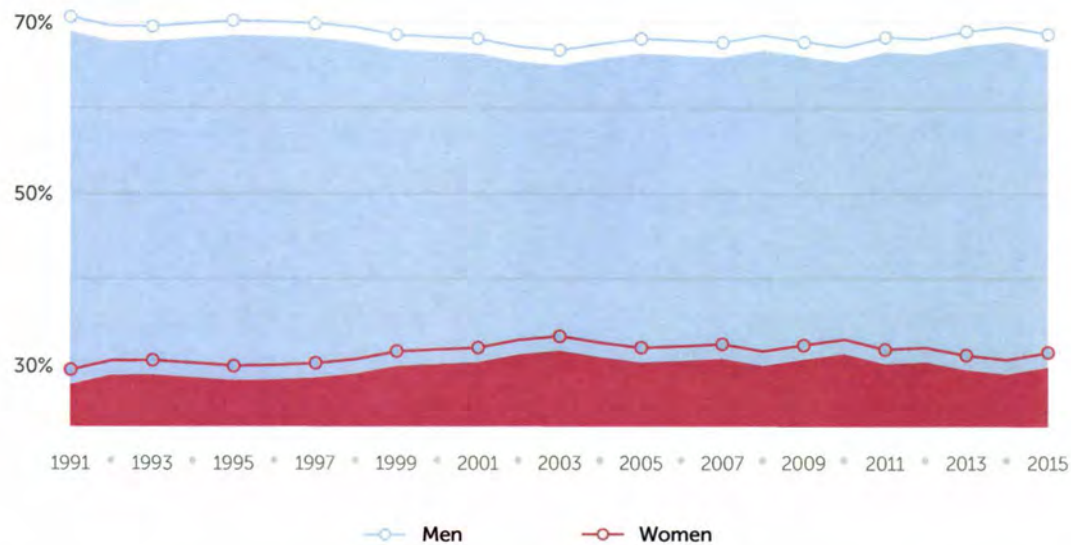


Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

Manufacturing and other blue-collar industries have historically generated jobs that went mostly to high school-educated men. Even with the shift in employment

toward healthcare and other skilled-services industries, women have not been able to attain a greater share of good jobs (Figure 14).

Figure 14. Men have long dominated good jobs without a BA.

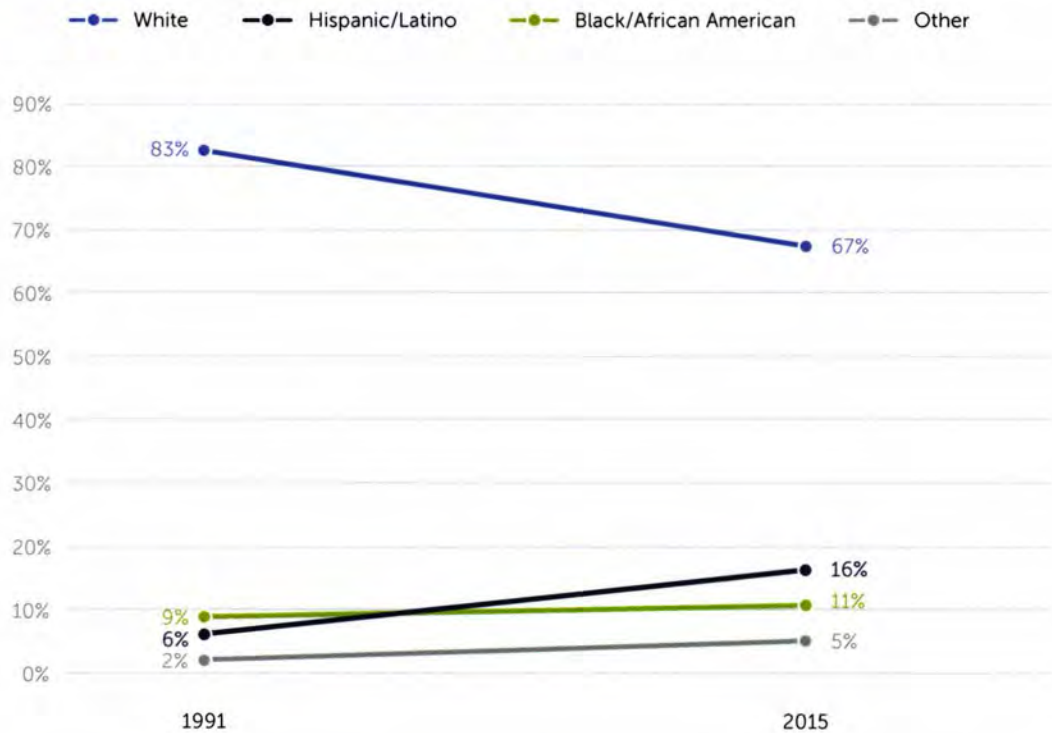


Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

In 1991, Whites held most of the good jobs going to workers without a BA. They continue to hold most of those jobs, but their share has declined somewhat. The rapidly

growing workforce of Latinos¹² has claimed a rising share of good jobs. The percentage of good jobs held by Blacks has been almost flat (Figure 15).

Figure 15. Whites have the largest share of good jobs, while the share held by Latinos has increased and the share held by Blacks has been almost flat.



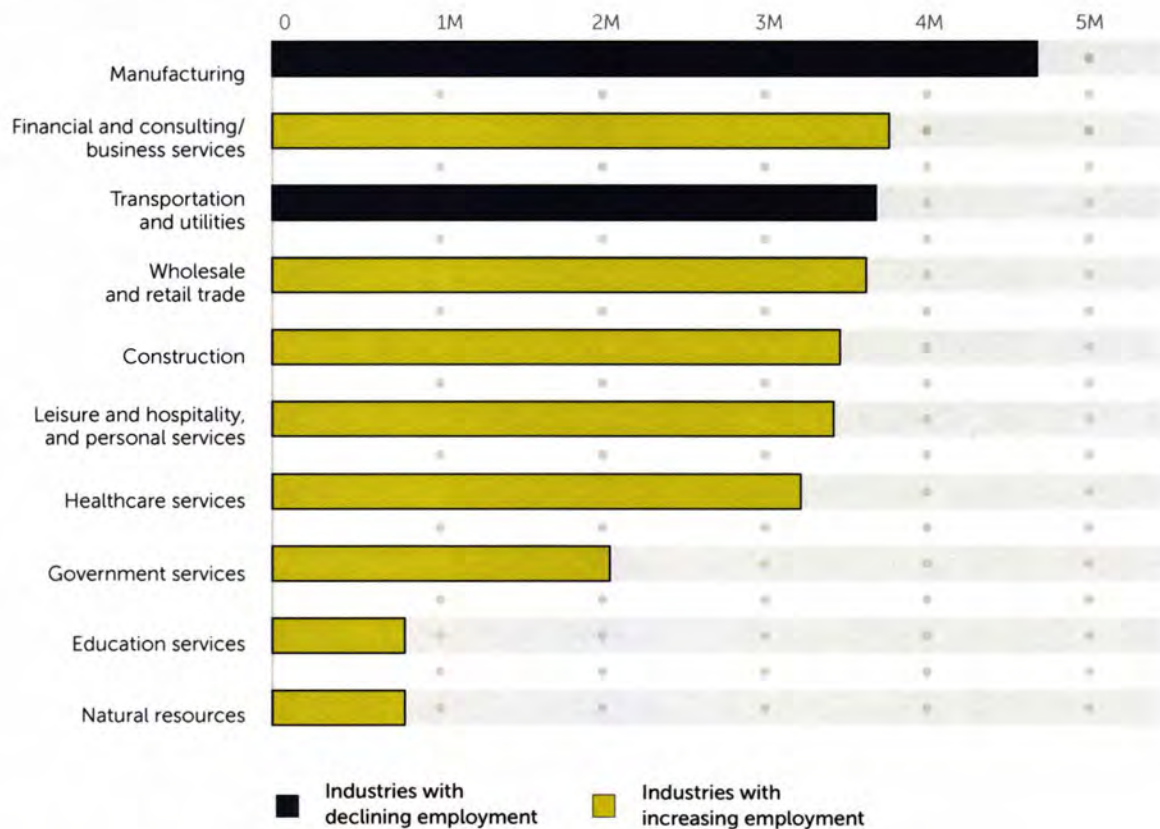
Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

¹² In this report, we use the term Latino to refer to people who identify as Hispanic or Latino, and we use Black to refer to people who identify as Black or African American. Most of the Center's research relies on surveys that do not differentiate between these groups. We use single terms—White, Black, and Latino—to alleviate ambiguity and enhance clarity. In charts and tables, we use White, Black/African American, Hispanic/Latino, and Other.

The 30 million good jobs that pay without a BA are spread unevenly across industries. The manufacturing industry still comprises the largest number of good jobs, but the share of good jobs in manufacturing has

dropped from 27 percent in 1991 to 16 percent in 2015. In the modern economy, good jobs that pay without a BA are also located in skilled-services industries such as financial services (Figure 16).

Figure 16. Good jobs are spread across many skilled-services industries in addition to the declining traditional blue-collar industries.



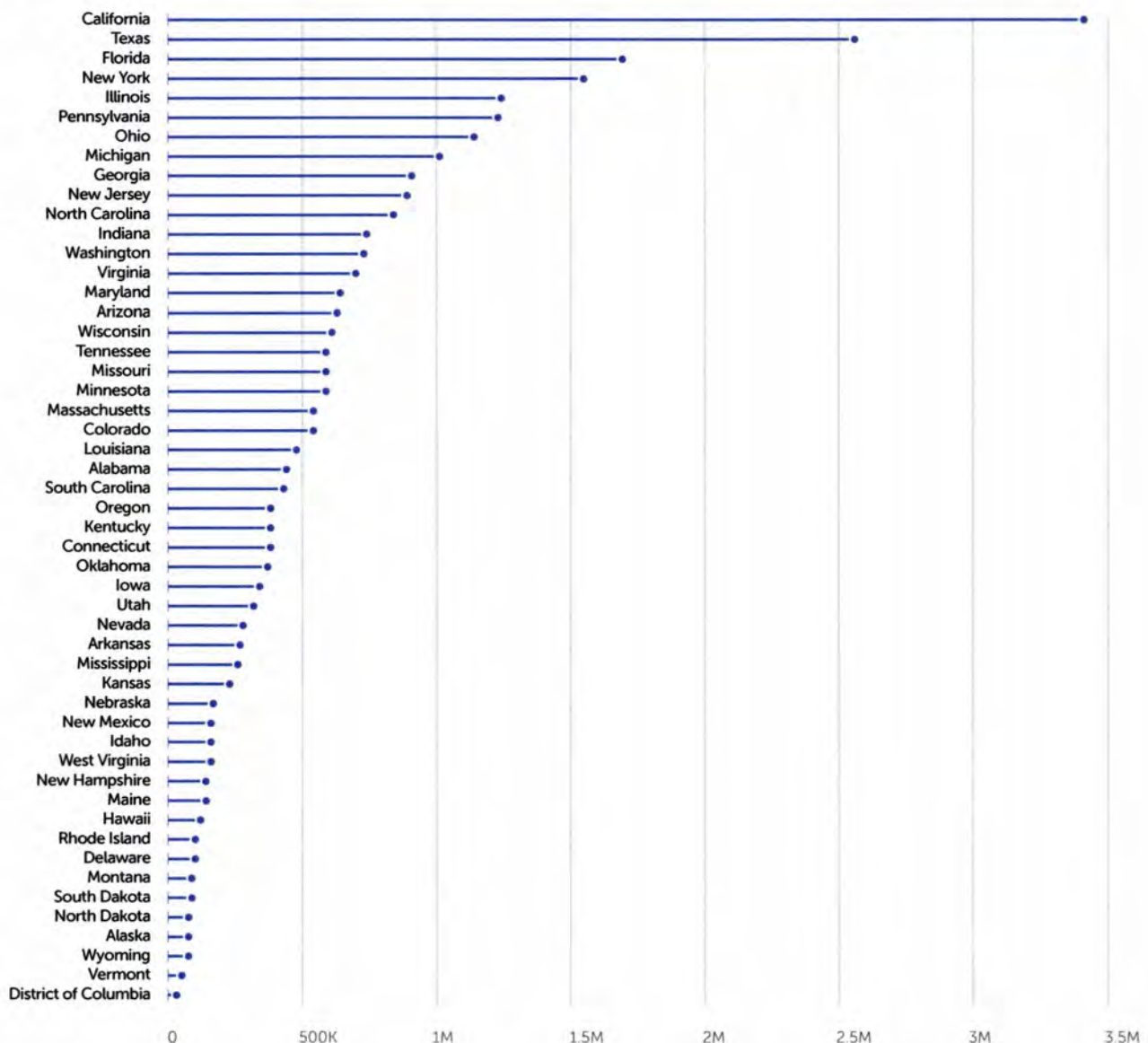
Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

Big states yield plenty of good jobs, but size does not always tell the whole story.

When looking at the geographic distribution of good jobs, it is not surprising that California, the most populous state, provides the largest number of good

jobs for those without a BA (Figure 17). The most populous states—California, Texas, Florida and New York—offer the largest number of these jobs.

Figure 17. California and other states with large populations provide the largest number of good jobs for workers without a BA.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

Figure 18. Wyoming has the largest share of good jobs for workers without a BA.



However, when we look at the share of good jobs within a state rather than the raw number, Wyoming comes out on top and California falls to the middle of the pack. Wyoming, though a small state, provides good jobs for less-educated workers in industries such as mining (Figure 18). Interestingly, Wyoming is followed in the rankings by three densely populated states on the East Coast—New Jersey, Maryland, and Connecticut.

Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

Conclusion

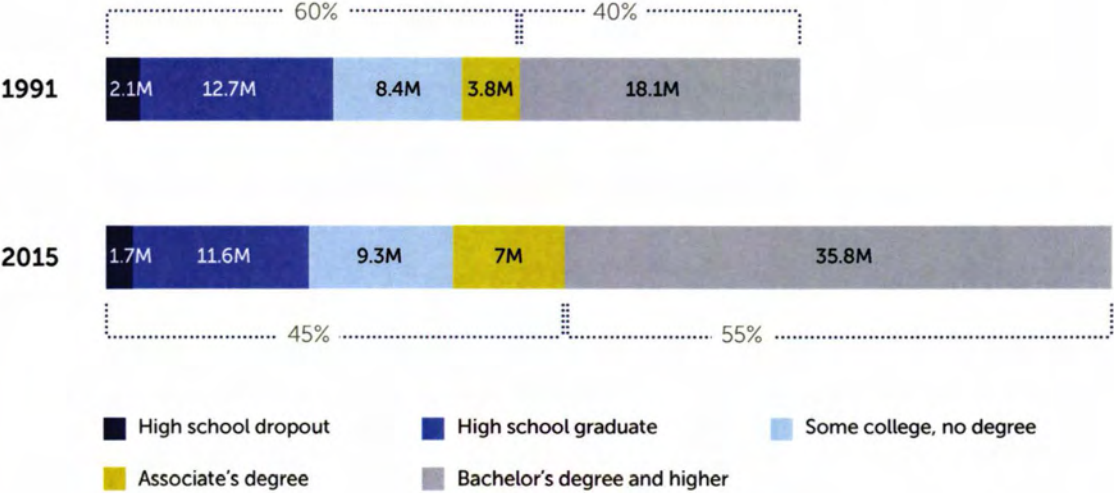
In the golden era of manufacturing, the pathways to good jobs were straightforward. A young person could leave high school and, with modest additional training, land a good job on the factory floor or in a mine. In today's labor market, the pathways to good jobs have become more complex. The brightest economic prospects for workers without BAs are found more and more in skilled-services industries, such as healthcare and financial services, in which some college education has become much more important. To compete effectively, workers need some level of postsecondary education and training. In addition, a variety of non-degree credentials are sometimes necessary to get those jobs, or to advance in them.

If policymakers want to get serious about restoring the health of the middle class, mapping this education and workforce landscape—both the educational pathways and the occupational pathways available to workers at different levels—is crucial.

Appendix A. Distribution of good jobs, 1991-2015

Number of good jobs by level of education

A good job pays at least \$35,000 and at least \$45,000 to those aged 45 or older.



Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

Appendix B. Data sources and methodology

This report uses data from the *Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC*, also known as the March Supplement), 1992-2016, an annual survey administered by the U.S. Census Bureau on behalf of the U.S. Bureau of Labor Statistics (BLS). The survey reports information from the previous year, so the report refers to the period of 1991 to 2015. In some places, we supplement that data with other data sources, as indicated in specific sections of the report. The CPS surveys from 1992-2016 for workers aged 25 to 64 are used to estimate the employment by state, level of educational attainment, industry, and occupation. This report uses the 1992 survey as the first year because it is the first time some college but no degree can be separately identified from Associate's degrees. Workers' educational attainment level is presented using four levels: high school dropout; high school graduate; some college, no degree; and Associate's degree.

Where relevant, additional statistics are based on data from the U.S. Bureau of Labor Statistics (BLS) Current Employment Statistics survey and from Federal Reserve Economic Data (FRED), hosted by the Federal Reserve Bank of St. Louis.

The industry analysis uses 10 major industry groups based on the North American Industry Classification System. For the purposes of this analysis, we further group industries into two categories: traditional blue-collar and skilled services. Traditional blue-collar industries include manufacturing; transportation and utilities; construction; and natural resources. Skilled-services industries include financial and consulting/business services; education services; and healthcare services. The following are also included with skilled services: leisure and hospitality, and personal services; and government services; and wholesale and retail trade.

Appendix C. Good jobs occupations

These are some examples of occupations—in both blue-collar and skilled-services industries—that pay without a BA.

BLUE COLLAR	SKILLED SERVICES
Automotive service technicians and mechanics	Applications and systems software developers
Carpenters	Bailiffs, correctional officers, and jailers
Computer, automated teller, and office machine repairers	Bookkeeping, accounting, and auditing clerks
Construction workers	Computer and information systems managers
Driver/sales workers and truck drivers	Computer support specialists
Electricians	Customer service representatives
Heating and air conditioning mechanics	Diagnostic-related technologists and technicians
Heavy vehicle and mobile equipment service technicians and mechanics	Engineering technicians
Industry machinery operators	Financial managers
Machine operators, assemblers, and fabricators	Firefighters
Maintenance and repair workers, general	Food service managers
Metalworkers and plastic workers	Human resources workers
Operating engineers and other construction equipment operators	Industrial production managers
Pipelayers, plumbers, pipefitters, and steamfitters	Licensed practical and licensed vocational nurses
Production workers	Managers
Radio and telecommunications equipment installers and repairers	Marketing and sales managers
Welding, soldering, and brazing workers	Nursing, psychiatric, and home health aides
	Police officers
	Property, real estate, and community association managers
	Registered nurses
	Sales representatives
	Secretaries and administrative assistants
	Security guards

Note: Not all workers in these occupations make a minimum of \$35,000 per year.

Source: Georgetown University Center on Education and the Workforce analysis of *Current Population Survey Annual Social and Economic Supplement (March)*, 1992-2016.

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Good Jobs That Pay without a BA can be accessed online at goodjobsdata.org

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CAREER PATHWAYS: FIVE WAYS TO CONNECT COLLEGE AND CAREERS



2017

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CAREER PATHWAYS: FIVE WAYS TO CONNECT COLLEGE AND CAREERS

Anthony P. Carnevale, Tanya I. Garcia, and Artem Gulish | 2017

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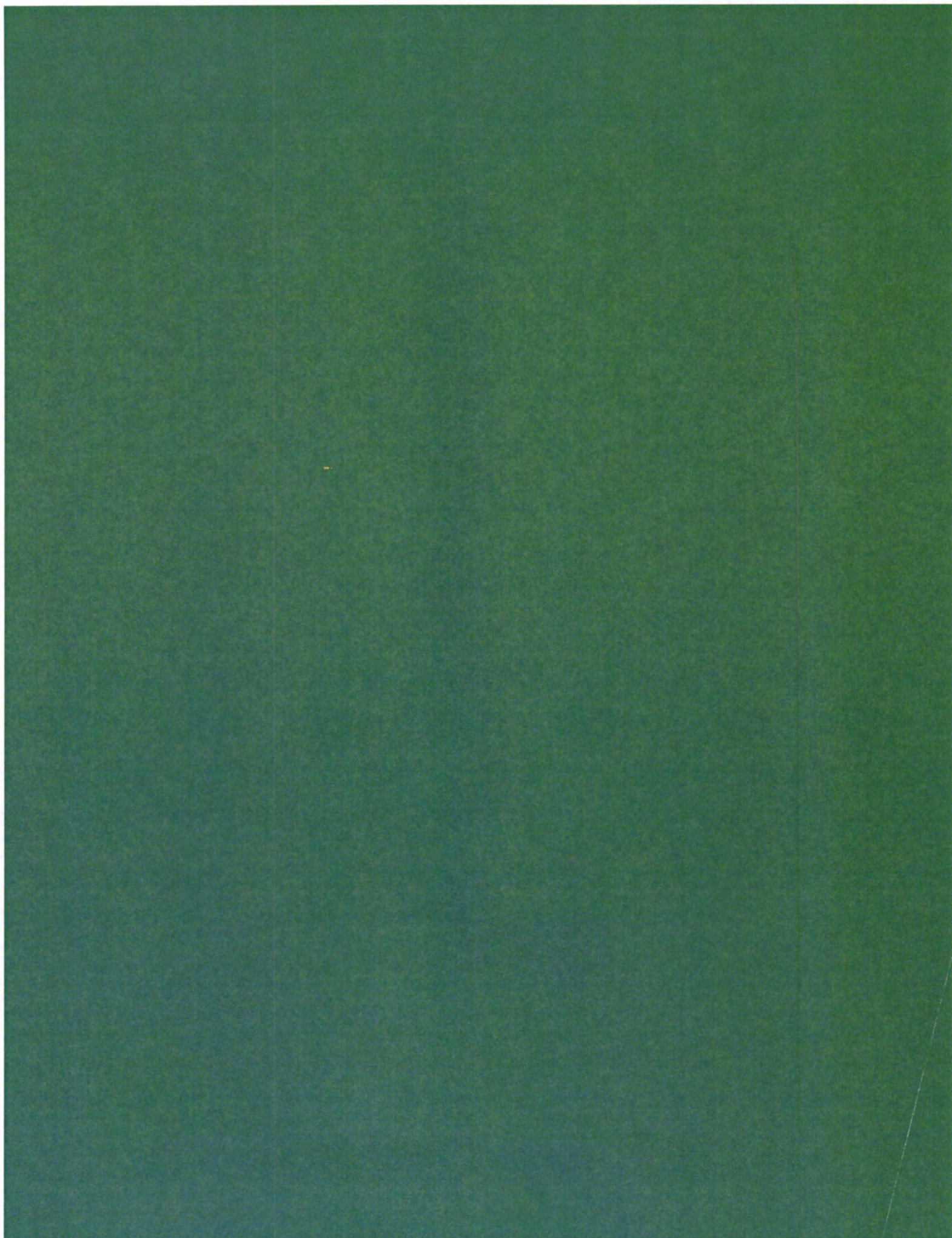
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TABLE OF CONTENTS

Foreword: How We Came to Need a Learning and Earning Exchange	1
Introduction	4
Postsecondary education is the gateway to the middle class in the 21st century.	4
The Five Ways	7
Education Projections, Business Expansion, and Workforce Quality	8
Program Alignment with Labor Market Demand	9
Curriculum Alignment with Workforce Requirements	10
Counseling and Career Pathways	11
Job Placement and Skills Gap Analysis	13
Conclusion	14
References	15
Appendix: Labor Market Information Data Sources, Characteristics, and Potential Uses	19
Survey Data	19
<i>American Community Survey (ACS)</i>	19
<i>Current Population Survey (CPS)</i>	20
<i>CPS Annual Socioeconomic Supplement</i>	20
<i>Current Employment Statistics (CES)</i>	20
<i>Occupational Employment Statistics (OES)</i>	21
Administrative Data	21
<i>State unemployment insurance (UI) wage records</i>	21
<i>State tax records</i>	22
<i>Federal Employment Data Exchange System (FEDES)</i>	22
<i>Internal Revenue Service (IRS) records</i>	23
<i>Social Security Administration (SSA) records</i>	23
Aggregated Databases	24
<i>Occupational Information Network (O*NET)</i>	24
<i>Longitudinal Employer-Household Dynamics (LEHD)</i>	24
Emerging Data Sources	25
<i>Job postings data</i>	25
<i>Resume/profile data</i>	25
Table 1: Labor Market Information Data Sources at a Glance	26
Appendix References	28



Foreword: How We Came to Need a Learning and Earning Exchange

The old rules of thumb no longer apply.

Go to college. Study hard. Get good grades. Get a degree. Get a job. This is great advice that has served many generations well. But these simple principles are no longer enough in today's more complex world. The relationship between education after high school and jobs has become trickier and harder to navigate.¹ Learners and workers need a clear guidance system that will help them make good college and career decisions and enable them to lead fulfilling, purposeful lives while supporting their families.

People want to know the value they are getting from one of the biggest investments they will make in their lives.

Colleges have become very expensive, with tuition and fees at public four-year colleges and universities growing 19 times faster than the median family income since 1980.² The trend toward state disinvestment in postsecondary education for the past three decades has shifted the financial burden to students and their families.³ If students are investing more to go to college, they need to have answers to basic questions about the value of postsecondary education.⁴ They need better information to make decisions that have lifelong economic consequences, and this information should be delivered in new ways.⁵

In addition, the governance, accreditation, and financing of postsecondary education must go beyond student completion as a goal and be connected to measurable post-college outcomes. While completion is an important metric for improving efficiency, it ignores the relationship between learning and earning in particular fields of study, as well as the social and economic value of general education. If we don't change the way we think about providing postsecondary education and training, we will continue to have a system with runaway costs driven by institutional prestige rather than learning and earning outcomes.⁶

How did we get here?

Higher education is struggling to adjust in the transition from an industrial to a post-industrial economy. As a result, the sector is finding it increasingly difficult to serve

1 About 40 percent of students are attending community colleges, where the complexity of choosing a program might pose a greater challenge both because of the higher number of options and greater granularity of labor market outcomes. Community college students also are more likely to be first generation, and come from low-income families and historically underrepresented groups, and therefore are more likely to lack information and guidance they need in making education and career decisions. Baker et al., "The Effect of Labor Market Information on Community College Students' Major Choice," 2017.

2 Georgetown University Center on Education and the Workforce analysis of the College Board, *Trends in College Pricing 2015*, 2015, Table 2A; U.S. Census Bureau and Bureau of Labor Statistics, *Current Population Survey, March Supplement*, 1980, 2016.

3 State Higher Education Executive Officers, "SHEF FY 2016," 2017.

4 Engle, *Answering the Call*, 2016.

5 Harris, "Little College Guidance," 2014.

6 Higher education remains vital, but it must be more efficient, transparent, and equitable. We cannot afford all the postsecondary education we need without more efficiency, and we cannot achieve more equity without more efficiency (Carnevale, *We Need a New Deal between Higher Education and Democratic Capitalism*, 2017).

simultaneously the needs of learners, workers, and employers. The two organizational models typical of the industrial era – the top-down vertically integrated institutions (e.g., automakers and government) and the fragmented model of service delivery (e.g., healthcare and education) – are being displaced in the post-industrial service economy by networks of institutions and individuals that foster direct consumer participation and compel measured outcomes. Just like other industries before it, higher education is going through the growing pains of modernization. It is being asked to deliver more quality, innovation, customization, convenience, and speed.⁷

The growing complexity of today's economy is making it difficult for higher education to deliver efficiency and consistent quality.

Today's economy is more intricate than those of decades past. We have more occupations, programs of study, colleges and universities, and students than ever before:

- Occupations grew from 270 in 1950 to 840 in 2010;⁸
- Postsecondary programs of study more than quintupled between 1985 and 2010 – from 410 to 2,260;⁹
- The number of colleges and universities more than doubled from 1,850 to 4,720 between 1950 and 2014;¹⁰ and
- The number of college students swelled almost tenfold in the period between 1949 and 2014 – from 2.4 million to 20.2 million.¹¹

The variety of postsecondary credentials available has multiplied rapidly in recent years, including degrees, certificates, certifications, licenses, and badges and other micro-credentials. New providers as well as delivery modes and models, such as online and competency-based education, have added further to the growing complexity and confusion. This has translated into an explosion of choices and decisions that make it hard for people to navigate in and out of college and careers.¹² We need better information connecting higher education to the economy.

No one really knows what a postsecondary credential represents.

Today's ecosystem of postsecondary credentials is complex, fragmented, and multilayered, and presents significant challenges to learners, employers, and policymakers.¹³ We don't know enough about the learning and competencies required to receive specific credentials. We also don't know how various credentials across diverse fields are valued, or how they interact with one another. Employers traditionally have used specific credentials as signals of workers' competencies. But today they are unable to assess the value of different credentials and want to know how their underlying competencies match job requirements. Without clear, comprehensive, and actionable information, mediocrity prevails, and reputation rather than quality (captured by earnings returns) is rewarded.¹⁴

7 Widely distributed information technology allows the shift to complex learning networks driven by widely shared information, measured outcome standards, and direct consumer participation – making these new networks the dominant form of organization for both consumption and production in all industries (Carnevale and Rose, *The Economy Goes to College*, 2015).

8 Wyatt and Hecker, "Occupational changes during the 20th Century," 2006; Bureau of Labor Statistics, *Occupational Employment Statistics*, 2015.

9 National Center for Education Statistics, Integrated Postsecondary Education Data System, Classification of Instructional Programs (CIP) Resources, 1985-2010.

10 National Center for Education Statistics, *Digest of Education Statistics* tables, table 317.10, 2015.

11 National Center for Education Statistics, *Digest of Education Statistics* tables, table 303.10, 2015.

12 Cappelli, *Will College Pay Off?*, 2015.

13 ConnectingCredentials.org, "Connecting Credentials: A Beta Credentials Framework," 2015.

14 Akerlof, "The market for lemons," 1970; Shapiro, "Consumer information, product quality, and seller reputation," 1982.

We need new rules to help us understand the connection between college and careers.

Measuring learning and earning at the program level is the key to unbundling the value of postsecondary education options. Currently we have ways to measure earning, but we are far away from being able to measure learning. Why is measuring learning important? General education competencies make workers more flexible and more adaptable to changing technology, which is advantageous over the course of a career.¹⁵ In the long term, we will need to figure out which combination of general and specific competencies prepare workers better for occupations. For now, the new relationship between postsecondary programs and the economy comes with new rules that require much more detailed information on the connection between individual postsecondary programs and career pathways:



RULE 1.

On average, more education yields more pay.

Over a career, a high school graduate earns \$1.4 million; an Associate's degree holder earns \$1.8 million; a Bachelor's degree holder earns \$2.5 million; a Master's degree holder earns \$2.9 million; a PhD holder earns \$3.5 million; and a professional degree holder earns \$4 million.¹⁶



RULE 2.

What a person makes depends on what that person takes.

A major in early childhood education pays \$3.4 million less over a career than a major in petroleum engineering.¹⁷



RULE 3.

Sometimes less education is worth more.

IT certificate holders who work in field earn \$70,000 per year compared with \$61,000 per year for the average Bachelor's degree holder. Thirty percent of Associate's degree holders make more than the average Bachelor's degree holder.¹⁸



RULE 4.

Programs are often the same in name only.

The value of programs and college majors varies according to the alignment between particular curricula and regional labor market demand.¹⁹

15 Hanushek et al., "General education, vocational education, and labor-market outcomes of the life-cycle," 2011.

16 Georgetown University Center on Education and the Workforce analysis of U.S. Census Bureau, *American Community Survey: 2009-2015*, pooled one-year person level micro data files.

17 Carnevale et al., *The Economic Value of College Majors*, 2015.

18 Carnevale et al., *Certificates*, 2012; Carnevale et al., *The Economic Value of College Majors*, 2015.

19 Carnevale et al., *Learning While Earning*, 2015.

INTRODUCTION

The information age²⁰ has given us digital maps on phones with directions to restaurants, reviews from previous diners, and other nearby dining options. We can get electronic reminders of meetings accompanied by information about weather and traffic conditions. Yet when it comes to navigating education and career pathways, learners and workers mostly have been left on their own, operating with outmoded methods and incomplete information from different sources that are difficult to reconcile and apply toward a particular purpose. This is not the way to equip more Americans with the skills they need in the 21st-century economy, nor offer employers the skilled workforce they demand. We need a better way: one that will remove the guesswork and allow the postsecondary education and training system to catch up to the modern world.

State leaders are rising to this challenge to improve postsecondary and workforce outcomes. Advances in data systems are enabling state leaders and other stakeholders to respond to pressures from learners, workers, and employers. Stakeholders are using these advances to inform how they prioritize postsecondary and workforce investments and make decisions that are efficient, effective, and equitable.

The data exist, and they are getting more comprehensive. A number of states have done pioneering work in assembling data to connect college and careers. A framework that integrates postsecondary education and workforce data, primarily in public-facing websites, will serve the interests of all parties: governors, legislators, state higher education and workforce executives, postsecondary leaders, and, ultimately, learners, workers, and employers. State leaders can draw from the best ideas of other states, adopt the ones that work for them, or use the ideas as a basis to devise new and improved solutions. This report is meant to describe the ideal system — what we call the Learning and Earning Exchange — and how data can be used to create such a system.

Postsecondary education is the gateway to the middle class in the 21st century.

Postsecondary education is increasingly a prerequisite for entering the middle class.²¹ However, escalating costs coupled with rising uncertainty about college value are creating mounting pressure to increase transparency and improve outcomes within and across the postsecondary and workforce sectors. This pressure is stimulating innovation in public policy development because all the parties involved seek answers to basic questions about the value of postsecondary education, how to access and provide it, and what it means for individual and collective success.

Innovative efforts in eight states could be models for others about where investments can make a strong impact. These solutions integrate postsecondary and workforce data²² in a way that provides actionable information which can be used to improve postsecondary

20 The amount of information we collect and store has grown exponentially since the early 2000s. This explosion in information has given rise to big data and machine learning algorithms, which together have supported the creation of new information and guidance tools, allowing consumers, businesses, institutions, and policymakers to benefit from experiences and outcomes of people in different spheres of society (King, "Too Much Content," 2011; Lohr, "The Age of Big Data," 2012).

21 Carnevale and Rose, *The Economy Goes to College*, 2015.

22 Since 2009, the State Higher Education Executive Officers Association (SHEEO) has documented changes in state postsecondary data systems in its *Strong Foundations* reports, including data sharing with the workforce sector. For more information, see Armstrong and Whitfield (2016), Garcia and L'Orange (2012), and Garcia and L'Orange (2010).

education and training programs, connect learners and workers to career pathways, and satisfy employers' workplace needs.

If done well:

- *Learners and workers* will better understand how their choices of postsecondary programs can prepare them for fulfilling lives and careers;
- *Colleges* will refresh and strengthen programs to improve student outcomes;
- *Employers* will be able to identify and hire talented workers more precisely; and
- *Policymakers* will allocate resources effectively and efficiently in order to build strong economies.

This report shows how state leaders are using technological advances to improve the use of data in five critical areas:

- Helping economic and workforce developers, businesses, and colleges to reduce the high costs resulting from uninformed education and workforce decisions;
- Assisting college leaders in making program-related decisions that take into account labor market needs;
- Ensuring that postsecondary education and training programs strike a balance between learners' foundational knowledge and what they'll need to know and be able to do in the workplace;
- Enhancing high school counseling and college advising to make the process of exploring, entering, and finishing college easier for learners; and
- Helping workers understand how to take advantage of postsecondary education and training options as they change jobs and navigate their careers.

These five ways would increase transparency and accountability across the postsecondary and workforce sectors.²³

No state has built out all of the five areas we describe in this report (Figure 1). In addition, each featured state example is in the early stages. While their development is likely to mature over time, these are early innovations in each of the five practices. We believe that all states are experiencing common challenges to improve the efficiency, equity, and effectiveness of public investments, which makes these examples worthy of attention. Although each state faces slightly different issues, investments in these areas can address the needs of key stakeholders in ways that can transcend state borders.

Several characteristics emerged when we analyzed the featured examples. Each seeks to turn integrated data into information. The examples also demonstrate the various states' commitment to making this information accessible via public-facing websites, rather than merely embedding it in reports. The existence of multisector partnerships emphasizes the importance of creating mutually reinforcing relationships. We also suspect that the extent and effectiveness of each state's marketing and outreach efforts, along with how

23 Legislation to increase transparency and accountability is gaining momentum in Congress. The College Transparency Act of 2017, introduced by two Republican and two Democratic senators, would lift the so-called "student record ban," which would allow for more accurate data on graduation rates, workplace outcomes, and how students are performing at individual colleges, among other things. Meanwhile, the Student Right to Know Before You Go Act, known for its sponsors Sen. Ron Wyden (D-Oregon) and Sen. Marco Rubio (R-Florida), would require colleges to release new data, such as institutional graduation rates, average wages of students who earn a degree, graduation rates and wage outcomes by major.

they leveraged state and federal funding,²⁴ played an important role in the development, pilot, and implementation phases. These tools will be more effective as state leaders foster a culture of data use,²⁵ including helping users understand the data, turning the data into information, and changing organizational practices as a result.²⁶

Figure 1. The Five Ways feature web-based tools to support policy- and decision-making.



Education Projections, Business Expansion, and Workforce Quality tools help state economic development leaders attract and retain new employers with data demonstrating that the state postsecondary education and training systems can provide workers with the needed skills.



Program Alignment with Labor Market Demand tools help college administrators, faculty, and deans make program-related decisions that address labor market needs, while college and system administrators can demonstrate return on investment to state leaders.



Curriculum Alignment with Workforce Requirements tools help faculty members create curricula aligned with the applied skills and abilities that learners will need to succeed in their careers.



Counseling and Career Pathways tools help advisors support students in their educational and career decisions, as well as identify and reach out to the learners who need additional support.



Job Placement and Skills Gap Analysis tools help workers determine if and how the knowledge, skills, abilities, interests, and work values they possess are transferable to new jobs. These tools also help workers assess skill gaps and provide connections to postsecondary education and training options that can prepare them for a career change.

Our aim is to give state leaders a view of what is possible. For states that have initiatives in some areas, these practices can provide guidance for the next investment. For states just beginning to plan, this report provides insight into how states have used data and technology to provide valuable information for improved decision-making.

24 Between 2005 and 2015, the U.S. Department of Education invested more than \$700 million in statewide longitudinal data systems (Armstrong and Zaback, "Assessing and Improving State Postsecondary Data Systems," 2016).

25 Engle and Greenstein, "Leading with Data," 2015.

26 Phillips and Horowitz, "Big Data Alone Won't Help Students," 2017.

THE FIVE WAYS

These five practices call for the integration of postsecondary education and workforce data to support individual, organizational, and policy decisions.

Together, they represent closer alignment between the postsecondary education and workforce sectors.

Alignment does not mean that the postsecondary sector becomes the pawn of the workforce sector, or vice versa; rather, the two sectors work in concert to contribute to a state's overall success.

The tools featured in this report represent how leaders within and across eight geographically diverse states are using labor market information²⁷ to build a more complete picture of what happens to learners and workers before, during, and after they complete their postsecondary studies. In each of the following sections, we include an overview and describe the data being integrated, as well as the intended audience for each of the Five Ways. Each section concludes with one or more state examples.



²⁷ See the appendix for a listing of Labor Market Information (LMI) data sources, characteristics, and potential uses.

EDUCATION PROJECTIONS, BUSINESS EXPANSION, AND WORKFORCE QUALITY

Overview

Workforce development can be thought of from three perspectives: being prepared for the future, attracting new business, and ensuring continued workforce quality that meets the needs of both existing employers and prospective ones. Business expansion policies have relied heavily in recent years on tax incentives, but state policymakers are turning more to projections of education demand to frame how the state plans to meet the need for a highly skilled workforce. This contextual framing is transforming the role of workforce development, which is tasked with meeting workforce needs, avoiding skill gaps, and being flexible in the face of change brought on by globalization. Employer demand for talent has elevated the importance of workers with specific skills gained through postsecondary education and training. While partnerships between economic developers and businesses – as well as those between postsecondary institutions and businesses – are common, strong alliances among all three groups can together better address the mismatch between jobs and workers.²⁸

State example: Indiana

The Indiana Chamber of Commerce and Indiana Chamber Foundation created IndianaSkills in 2012 as an online job database for learners, job seekers, and career counselors.²⁹ Originally, this was a supply-demand resource of occupations requiring short-term credentials (Associate's degrees, certificates, and certifications), but it was expanded in 2014 to occupations calling for Bachelor's degrees and higher. Employers can use the information to compare educational requirements by job, view wages that Indiana employees earn in distinct occupations, and create job descriptions. Economic developers can access information on the wages and the percentage of those who complete education and training programs who are employed, jobs with the highest demand, and the training and certifications most in demand.



Data to be integrated

Projections of educational demand in the workforce,³⁰ proprietary analytical information, and college administrative data can be linked with state wage records into the process of retaining and attracting employers and industries to the state.³¹

Audience

Economic development agencies, workforce boards, and employers

28 The International Economic Development Council advocates a tripartite alliance among postsecondary institutions, employers, and economic developers to address the nationwide mismatch between jobs and workers (Brown, *Shifting Workforce Development into High Gear*, 2015).

29 IndianaSkills, <http://www.indianaskills.com/>; Network Indiana, "Indiana Chamber Unveils Database for Job Seekers," 2012; Indiana Chamber, "Chamber's IndianaSkills.Com Site Now Also Features Supply and Demand Job Info," 2014.

30 *Recovery 2020* is the second installment of the Georgetown Center's jobs and education projections. Its predecessor, *Help Wanted*, came out in 2010. The third iteration, which is forthcoming, will project educational demand through 2025 (Carnevale et al., 2010; 2013).

31 For more information on Labor Market Information (LMI) data sources, see the appendix.

PROGRAM ALIGNMENT WITH LABOR MARKET DEMAND

Overview

Administrators at the college and systems levels are using workforce data to measure demand for different career fields in their local labor markets in order to make decisions about which programs to add, expand, contract, or discontinue. When college leaders are aware of the demand for their programs' graduates, it signals to both learners and state leaders the college's commitment to preparing students for careers.

State example: California

In California, the LaunchBoard was conceived in 2012 by a group of career and technical education (CTE) stakeholders. The California Community College Chancellor's Office released a beta version of the LaunchBoard in 2013 and launched its second iteration in 2016.³² Designed as an internal tool for California community college and K-12 school district leaders, its purpose is to help modify and improve CTE programs. It includes supply and demand information on earnings outcomes of graduates, student enrollment patterns, and impact of programs on groups such as veterans and first-generation students.³³ The 2016 improvements realigned existing metrics to state and federal initiatives and feature dynamic reports with answers to practitioners' common questions.³⁴

State example: Connecticut

The Training and Education Planning System was created in 2008 by the Connecticut Department of Labor to allow state college administrators to consider labor market skill shortages or surpluses for the programs they offer.³⁵ The system incorporates state occupational projections and information about people who completed programs, using data from federal sources, the Connecticut Office of Higher Education, and the Connecticut Department of Education. The results are organized by occupation and program of study, and include a short description for each profession, average earnings for selected jobs, and tables projecting the annual number of graduates in each field compared to the number of available jobs.³⁶



Data to be integrated

Occupation- and industry-specific employment and earnings data can be linked with student enrollment data to aid program design, planning, and review.³⁷

Audience

College and system administrators, deans, and faculty

³² LaunchBoard, <https://www.calpassplus.org/Launchboard/Home.aspx>.

³³ Booth and Perry, "The CCC 'CTE LaunchBoard,'" 2015.

³⁴ Ibid.

³⁵ Training and Education Planning System (TEPS), <http://www1.ctdol.state.ct.us/TEPS/Default.aspx>; Connecticut Academy of Science and Engineering, "Strategies for Evaluating the Effectiveness of Programs and Resources," 2012.

³⁶ A full list of caveats is available at the TEPS website, <http://www1.ctdol.state.ct.us/TEPS/FAQs.aspx#caveats>.

³⁷ For more information on LMI data sources, see the appendix.

CURRICULUM ALIGNMENT WITH WORKFORCE REQUIREMENTS

Overview

Learners, workers, educators, and employers differ in their descriptions of the competencies gained, taught, and valued in the job market.³⁸ Whether as part of a competency-based or traditional education program, curriculum alignment that starts with data analysis is necessary for colleges to keep student learning relevant to the competencies demanded by industry, as well as to establish stronger ties to employers. Employers also can tailor their job ads to include academic competencies that employees need. These activities can build bidirectional, mutually reinforcing partnerships in which the contribution of each party is valued.

State example: Texas

The Center for Employability Outcomes, an applied research center of Texas State Technical College, created the Skills Outcome Analysis in 2014 to help colleges match what is taught in the classroom with work performed in business and industry.³⁹ The online analytical tool incorporates more than 3,000 skills for more than 900 occupations from 1,400 Texas employers.⁴⁰ The skills were validated by 4,000 subject matter experts. In all, 26 Texas colleges have used the tool to align 1,300 courses and 83 postsecondary credentials.⁴¹



Data to be integrated

Occupational data and employer/industry expert feedback can be combined with the process of developing competencies and learning outcomes for postsecondary education and training programs.⁴²

Audience

Faculty, curriculum developers, and administrators

38 Lumina Foundation's *Connecting Credentials* initiative identifies the development of a common language to serve as the basis for a connected credentialing system as one of seven priority areas in its action plan. <http://connectingcredentials.org/wp-content/uploads/2016/09/Action-Plan.pdf>.
39 Skills Outcomes Analysis, <https://sws.tstc.edu/soahome/soa/9/zpublic.php>. The Skills Outcome Analysis tool was developed as a pilot project that will undergo changes and improvements in the implementation phase.
40 Bettersworth, "Announcing C4EO," 2014.
41 Curriculum Alignment Initiative, <http://www.c4eo.org/curriculum-alignment>. Other agency partners are the Texas Higher Education Coordinating Board and the Texas Education Agency.
42 For more information on LMI data sources, see the appendix.

COUNSELING AND CAREER PATHWAYS

Overview

Many learners, especially those with little or no work experience, often make life-altering decisions under a cloud of uncertainty about how their postsecondary choices will affect their employment outcomes, the path needed to reach those outcomes, the likelihood of success, and whether their career will line up with their abilities, preferences, and interests. High school counselors and college advisors are designated to guide students through these tough decisions, but these professionals often have scarce time and resources and are unable to address the needs of all students. States and postsecondary systems have been looking to provide additional guidance to those who need it most, including low-income and first-generation college students. Many colleges are using predictive analytics to identify course-taking patterns, course completion rates, and other factors that might help determine the keys that lead to student progress and success. If provided with proper information and guidance, students leave high school better prepared for college, choose majors aligned to their personality and interests, and develop reasonable career expectations.

State example: Virginia

In 2009, the Virginia Community College System (VCCS) created the Virginia Education Wizard, an online portal that takes into account the skills, interests, and values of learners and helps them make decisions about careers and postsecondary education and training options.⁴³ The newest version, released in January 2016, updates existing information on career pathways, curricula, and financial assistance, adds a new portal designed by and for veterans attending VCCS institutions, and features a game for teenagers, *Imagine*, that suggests occupations, with wages, that would allow them to afford the particular lifestyle they wish to enjoy.⁴⁴

State example: New York

The NYC Labor Market Information Service at the City University of New York (CUNY) Graduate Center began creating Career Maps in 2014.⁴⁵ The five career maps produced to date allow CUNY students to plan career trajectories for themselves as they acquire more skills or attain higher levels of education. The maps include flowcharts of



Data to be integrated

Occupational and labor market data, employment projections, wages, and student skill, value, and interest assessment data can all be added to the student career counseling process to inform college major and career selection.⁴⁶

Audience

College advisors and middle school and high school counselors

43 Virginia Education Wizard, <https://www.vawizard.org/wizard/home>; Langhorne, "Virginia Launches 'Education Wizard,'" 2009.

44 rccinfo, community contributor, "Updated 'Virginia Education Wizard' to be Launched," 2016.

45 Center for Urban Research, Career Maps, http://www.gc.cuny.edu/lmis/information/career_maps.

46 For more information on LMI data sources, see the appendix.

different tiers of the most common career progressions based on actual work histories. They also include the median annual salary of workers in each position, the typical educational requirements needed to hold that position, and details on which CUNY institutions offer the necessary credentials to advance in those careers. The careers that are mapped include medical assisting, home health, bookkeeping and accounting, tech support, and cooks and chefs.⁴⁷

State example: Colorado

Launch My Career Colorado is an online dashboard that allows high school students to visualize the return on investment from a credential at a particular Colorado postsecondary institution.⁴⁸ College Measures at the American Institutes for Research developed the dashboard in 2016 with data from the Colorado Department of Labor and Employment, the Colorado Department of Higher Education, and Gallup. Learners and workers can select jobs and view an occupational description, the expected earnings over a 20-year period compared to those of high school graduates, a list of associated skills common to the industry, and the highest degrees common to workers in the field. They can also view how many years it will take for them to break even after paying off their college loans given their current and expected spending habits.⁴⁹

47 Additional maps are being developed for human services and social work, network support and administration, web development and web design, and software development.

48 Launch My Career Colorado, <http://launchmycareercolorado.org/>.

49 Hendee, "New Colorado Website Shows Career Value of College Majors." 2016.

JOB PLACEMENT AND SKILLS GAP ANALYSIS

Overview

Employers spend billions of dollars advertising job openings, evaluating candidates, and hiring new employees each year.⁵⁰ New online analytical tools will result in a more effective matching process among jobs, workers, and training programs. These tools also assist mid- and late-career adults who need additional education, training, and career services to remain in the workforce.⁵¹

State example: Minnesota

The Minnesota Department of Employment and Economic Development created the Job Skills Transfer Assessment Tool (JOBSTAT) in 2010 to facilitate job seekers' transitions from their current jobs to similar or different occupations.⁵² Organized around 22 job families in the Occupational Information Network (O*NET) database, JOBSTAT shows job seekers how well their current skills match the skills needed for their desired occupations, annual wages for each occupation, postsecondary education and training options available to gain the new skills necessary, and current job openings. State leaders made the tool's algorithm available to other states; among others, the U.S. Department of Labor is using Minnesota's tool as a model for its My Next Move website.⁵³



Data to be integrated

Data on competencies, resumes, online job ads, and occupational demand can be used to connect job seekers to jobs and postsecondary education and training programs.⁵⁴

Audience

Job seekers (including displaced and unemployed workers), training providers, and employment agencies

50 Employers spend about \$4,000 to fill an open position (Bersin by Deloitte, 2015, cited in Glassdoor, *50 HR and Recruiting Statistics*, 2016).

51 There are 19 million workers, ages 45-65, with a high school diploma or less, who are unemployed, not in the labor force, or working part-time. Georgetown University Center on Education and the Workforce analysis of *Current Population Survey, March Supplement*, 2016.

52 Minnesota Department of Employment and Economic Development, Job Skills Transfer Assessment Tool (JOBSTAT), <https://apps.deed.state.mn.us/lmi/ota/OccupationSelectA.aspx>; Forster, "Minnesota's new online career-change tool draws national interest," 2010.

53 My Next Move, <https://www.mynextmove.org/>.

54 For more information on LMI data sources, see the appendix.

CONCLUSION

The state examples featured in the Five Ways are a good start toward building what America needs. State data systems that connect college with careers are becoming more common, and we now have more data than ever. State leaders realize, however, that existing data has not been translated into useful information to support decision-making. The tools developed to date hold much promise and are a step in the right direction, but if their implementation is piecemeal rather than part of a coordinated statewide process, the gulf between the postsecondary and workforce sectors is likely to remain.

Learners and workers may want to choose their college and select their major based on the workforce outcomes of graduates,⁵⁵ but without a true navigational system, the process is mostly guesswork. As our economy becomes more knowledge-based, information is becoming our greatest resource. But all the data and consumer information now being collected must be converted to smart data.⁵⁶ Until then, it will be difficult for learners and workers to make sound college and career choices. And it will be harder for employers to pick the best talent.

The **Learning and Earning Exchange** is a framework for the next generation of data use that capitalizes on integrated data available to states. The five practices featured in this report are the beginning of a smart education and career guidance system. As the state examples show, these tools are not static; in many states, they have evolved from the pilot stage to implementation, and they are constantly being improved. They also require an active outreach component to attract the intended audience. The good news is that states can borrow ideas from other states and implement tools in any one of these five practices within a year or two. What is needed now is to promote their use more broadly within and across states.

Harnessing the power of integrated data to provide learners, workers, families, colleges, employers, and policymakers with information can help state leaders improve their economies and also the quality of life for their residents. Connecting the education system to careers has the potential to help state governments use public education and training funds more efficiently and promote economic development and growth. This would revitalize the American education system as the gateway to economic opportunity.

⁵⁵ Fishman, "2015 College Decisions Survey," 2015.

⁵⁶ The federal College Scorecard does not go far enough in helping learners, since it presents aggregate average salary information for an entire institution and not individual programs of study (Sandeen, "Here's the Score for Obama's College Scorecard," 2015).

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APPENDIX: LABOR MARKET INFORMATION DATA SOURCES, CHARACTERISTICS, AND POTENTIAL USES

The Five Ways call for integration of postsecondary and workforce data to support individual, organizational, and policy decisions. The federally funded Statewide Longitudinal Data Systems (SLDS) program that began in 2005 has evolved to become the primary repository for integrated data from preschool through the workforce. This appendix provides an overview of the sources of labor market information (LMI) and the type of information the sources can provide. Some sources are publicly available and accessible, others are accessible to authorized state or federal policymakers for limited purposes, and other sources are available through third-party vendors.



Survey Data

The U.S. Census Bureau and the Bureau of Labor Statistics conduct surveys of households and employer establishments. Results are publicly available and provide a good snapshot of the employment, earnings, occupation, and industry makeup of the labor market and of worker demographics. While surveys are a good source of data about general labor market demand, states must connect administrative workforce and education data to reach the level of insights detailed in this report. Survey data can be used to augment information from these databases, especially in areas for which legal, privacy, or availability issues make the use of administrative data impractical.

AMERICAN COMMUNITY SURVEY (ACS)

An annual household survey that includes the following data:

- Demographics
- Employment
- Earnings
- Occupation
- Industry
- Number of hours worked per week
- Number of weeks worked per year
- Place of residence/employment (for state and local level analysis)

Examples of what this data source has to offer:

- » Occupations in demand in the local labor market
- » Earnings by educational attainment in the local labor market
- » Highest paid jobs by occupation and industry

CURRENT POPULATION SURVEY (CPS)

Monthly survey of a rotating group of households that includes the following data:

- Demographics
- Employment
- Earnings
- Occupation
- Industry
- Number of hours worked per week
- Number of weeks worked per year
- Place of residence/employment (for state level analysis)

Examples of what this data source has to offer:

- » Employment levels in different occupations
- » Distribution of education level for workers in different occupations

CPS ANNUAL SOCIOECONOMIC SUPPLEMENT

Annual household survey that includes the following data:

- Demographics
- Employment
- Earnings
- Occupation
- Industry
- Number of hours worked per week
- Number of weeks worked per year
- Place of residence/employment (for state-level analysis)

Examples of what this data source has to offer:

- » Employment levels in different occupations
- » Earnings by educational attainment
- » Distribution of education level for workers in different occupations

CURRENT EMPLOYMENT STATISTICS (CES)

Monthly survey of employers that includes the following data:

- Employment
- Earnings
- Industry
- Number of hours employees worked per week
- Location of the firm (for state-level analysis)

Examples of what this data source has to offer:

- » Top-paying industries in the state
- » Industry sectors in the state that employ the largest numbers of workers

OCCUPATIONAL EMPLOYMENT STATISTICS (OES)

Semi-annual survey of employers that includes the following data:

- Occupational employment
- Earnings by occupation
- Breakdown of occupations by industry
- Geography: for analysis of occupations at the state and local level

Examples of what this data source has to offer:

- » List of growing occupations
- » Distribution of earnings within occupations



Administrative Data

Administrative data is collected in the process of administering specific government programs at the federal and state levels, such as unemployment insurance (UI) and Social Security. The advantage of these data sources is that they contain individual records on the vast majority of workers, which theoretically could be connected to other data sources to determine each individual's specific education and training history, as well as career paths. While these data generally are not publicly accessible and involve strict limitation on who can use them and for what purposes, states are finding ways to incorporate administrative data, in particular from state UI wage records, into their SLDS.

State Administrative Data Sources

STATE UNEMPLOYMENT INSURANCE (UI) WAGE RECORDS

State UI wage records are often the main sources of administrative labor market information (LMI) that states use to create informational tools for consumers and stakeholders. UI wage records cover the majority of employees in any state (the exceptions are federal government workers, the self-employed, and individuals working for employers outside of the state). The de-identified, aggregated information from these records is also reported in the Quarterly Census of Employment and Wages (QCEW). At a minimum, all states collect employment and wages on a quarterly basis. Outside of collecting and reporting federally mandated data, some states also collect information on hours and weeks worked, tips and bonuses, gender of workers, work site location, etc. Occupational data is one enhancement that is gaining traction because of its potential in connecting fields of study to careers. In general, UI data is accessible to authorized users and is the primary source of LMI in SLDS. States can also get LMI on residents who work out of state and students who move out of state through the Wage Record Interchange System (WRIS) 2 sharing agreements.

UI wage records include the following data:

- Employment
- Earnings
- Industry
- Employer
- Place of employment
- Other (state-dependent, which may include demographics)

Examples of what this data source has to offer:

- » Employment and earnings of graduates from different institutions and programs of study
- » Types of education and training options that lead to jobs in a particular career field

STATE TAX RECORDS

The states annually collect information on employed workers through state tax returns. The data in tax returns potentially could be linked to other individual data at the state level and made available in de-identified, aggregated form. State tax returns include the following data:

- Employment
- Earnings
- Occupation (self-reported)
- Employer
- Place of residence/employment

Examples of what this data source has to offer:

- » Employment and earnings of workers residing in the state
- » Occupation of workers residing in the state
- » Workforce outcomes of high school graduates who do not pursue postsecondary education
- » Share of graduates who find jobs in their field within a certain period following graduation

Federal Administrative Data Sources

FEDERAL EMPLOYMENT DATA EXCHANGE SYSTEM (FEDES)

The U.S. Office of Personnel Management collects quarterly information on federal military and civilian employees (except the U.S. Postal Service). Under the FEDES pilot program, extracts of individual federal employee records are provided to the 41 participating states and the District of Columbia and include the following types of data:

- Employment
- Earnings

Examples of what this data source has to offer:

- » Supplementing state UI wage records with information on employment and earnings of federal government employees working in the state
- » Tracking earnings of college graduates who enter the military



Federal administrative data sources currently not accessible for creation of state tools

While LMI from the Internal Revenue Service (IRS) and Social Security Administration (SSA) is not accessible to states, it represents a potentially rich source of data with which to supplement other administrative data sources. These data sources are more comprehensive and would offer a greater level of accuracy if their use was authorized.

INTERNAL REVENUE SERVICE (IRS) RECORDS

Information is reported annually to the IRS through tax forms that include the following data:

- Employment
- Earnings
- Industry (for some records)
- Occupation (self-reported)
- Employer
- Place of residence/employment

Examples of what this data source has to offer:

- » Employment and wage outcomes for all students who attended different programs of study at different institutions in the state
- » Career pathways based on changes in jobs and wages of graduates over a certain period of time
- » Supplementing financial aid records from SLDS with information on student loan interest rate deduction and other education tax credits

SOCIAL SECURITY ADMINISTRATION (SSA) RECORDS

Information collected annually from tax forms includes the following data:

- Employment
- Earnings
- Industry (for some records)

Examples of what this data source has to offer:

- » Employment and wage outcomes for all students who attended different programs of study at different institutions in the state
- » Geographic distribution of college graduates relative to colleges attended
- » Number of workers who hold multiple jobs



Aggregated Databases

These databases are large aggregated sources of survey, administrative, and other data developed for particular purposes. These databases offer a more comprehensive view of the world of work and the state of the labor market. Some of these are publicly accessible; others are limited by law and require authorized access.

OCCUPATIONAL INFORMATION NETWORK (O*NET)

This U.S. Department of Labor, Employment and Training Administration database contains descriptive occupational information that is continually updated through surveys of workers in each occupation as well as expert input.

The information includes the education, knowledge, skills, and abilities necessary to perform jobs in each occupation; occupational interests, work values, and work styles associated with each occupation; and tasks, work activities, and organizational and work contexts that are part of performing job duties within each occupation.

Examples of what this data source has to offer:

- » Knowledge, skills, and abilities required for jobs in different occupations
- » Assessment of how well a program's curriculum matches competencies demanded in particular occupations
- » Different occupations that require similar skills, so workers considering a career change can identify new possibilities
- » Identification of what workers in a particular career (occupation) do

LONGITUDINAL EMPLOYER-HOUSEHOLD DYNAMICS (LEHD)

The U.S. Census Bureau coordinates the state-federal Local Employment Dynamics (LED) Partnership project that collects and disseminates LEHD data. It combines state administrative data with federal administrative and survey data from employers and workers to provide a more complete picture of the labor market.

LEHD information includes employment, earnings, hires, separations, job changes, worker demographics (gender, age, race, and ethnicity), and worker education, along with industry, sector, age, and size of the employer. Information is available at the state and local level. OnTheMap is an interactive mapping and reporting tool using LEHD data that shows the overlap between where workers live and work.

Examples of what this data source has to offer:

- » Geographic distribution of jobs in the local area for workers with a particular level of education
- » Hiring practices of large and small businesses with regard to worker demographics in the local geographic area
- » Worker mobility from declining sectors



Emerging Data Sources

The Internet has become a central place for job search and recruitment. These activities leave a digital footprint that can be analyzed to get a “real-time” picture of demand and supply in local labor markets.

JOB POSTINGS DATA

Employers are increasingly posting job openings online, in particular when they are looking for workers with a college education. Employers post job openings both on their own websites and on electronic job boards, such as Monster.com and Careerbuilder.com. There is no standard format for online job postings. The number of job postings, which employers post job openings, and the industries and sectors of the economy they represent all provide important information on the current employer demand within state and local labor markets. The job titles for the postings add another layer of important information, especially if titles can be tied to occupations. The contents of the postings offer information about qualifications employers are looking for from workers. When aggregated across a variety of different sources and large swaths of the labor market, they can reveal important trends that can inform the decisions of learners, workers, education and training providers, economic and workforce developers, and state policymakers. A number of private vendors, such as Burning Glass and EMSI, are involved in efforts to aggregate information from job postings data.

Examples of what this data source has to offer:

- » Employers posting the most job ads
- » Occupations with the highest online demand based on numbers of jobs ads
- » Skills employers are requesting of employees in different career fields

RESUME/PROFILE DATA

The flipside of the online job marketplace are resumes and profiles that workers post on job boards and professional networking sites, such as LinkedIn. When aggregated and made anonymous, these data can offer significant insights into workers’ current and desired occupations, education and training, previous job experience, technical and soft skills, credentials, career interests, and career pathways. States often have their own resume banks. Another option is third-party vendors, who either collect resumes themselves or aggregate resume data across different sources.

Examples of what this data source has to offer:

- » Examination of education and career pathways for individuals moving within and between different career fields and education and training experiences
- » Identification of related job titles, responsibilities, and skill sets in typical workers’ career progressions

Table 1: Labor Market Information Data Sources at a Glance

Basic Information			Types of Data				
Source Type	Source	Unit of Analysis	Employment	Earnings	Demographics	Occupation	Industry
Survey	American Community Survey (ACS)	Household Sample	✓	✓	✓	✓	✓
	Current Population Survey (CPS)	Household Sample	✓	✓	✓	✓	✓
	CPS Annual Socioeconomic Supplement	Household Sample	✓	✓	✓	✓	✓
	Current Employment Statistics (CES)	Employer Sample	✓	✓			✓
	Occupational Employment Statistics (OES)*	Occupation	*	*		*	*
Administrative	State Unemployment Insurance (UI) wage records**	Individual	✓	✓	**		✓
	State tax records	Individual	✓	✓	✓	✓	✓
	Federal Employment Data Exchange System (FEDES)***	Individual	✓	✓			
	Internal Revenue Service (IRS)	Individual	✓	✓	✓		✓
	Social Security Administration (SSA)	Individual	✓	✓	✓		✓
Aggregated	Occupational Information Network (O*NET)	Occupation					
	Longitudinal Employer-Household Dynamics (LEHD)	State/local area	✓	✓	✓		✓
Emerging	Job postings	Job ads					
	Resumes	Individual					

Note: Though all administrative data is not publicly accessible, state UI wage records, state tax records and FEDES data are potentially accessible to authorized users within state governments, while SSA and IRS data are not currently accessible to the states for use in information tools.

* OES provides occupational employment, average and median wages, and distribution of occupations by industry.

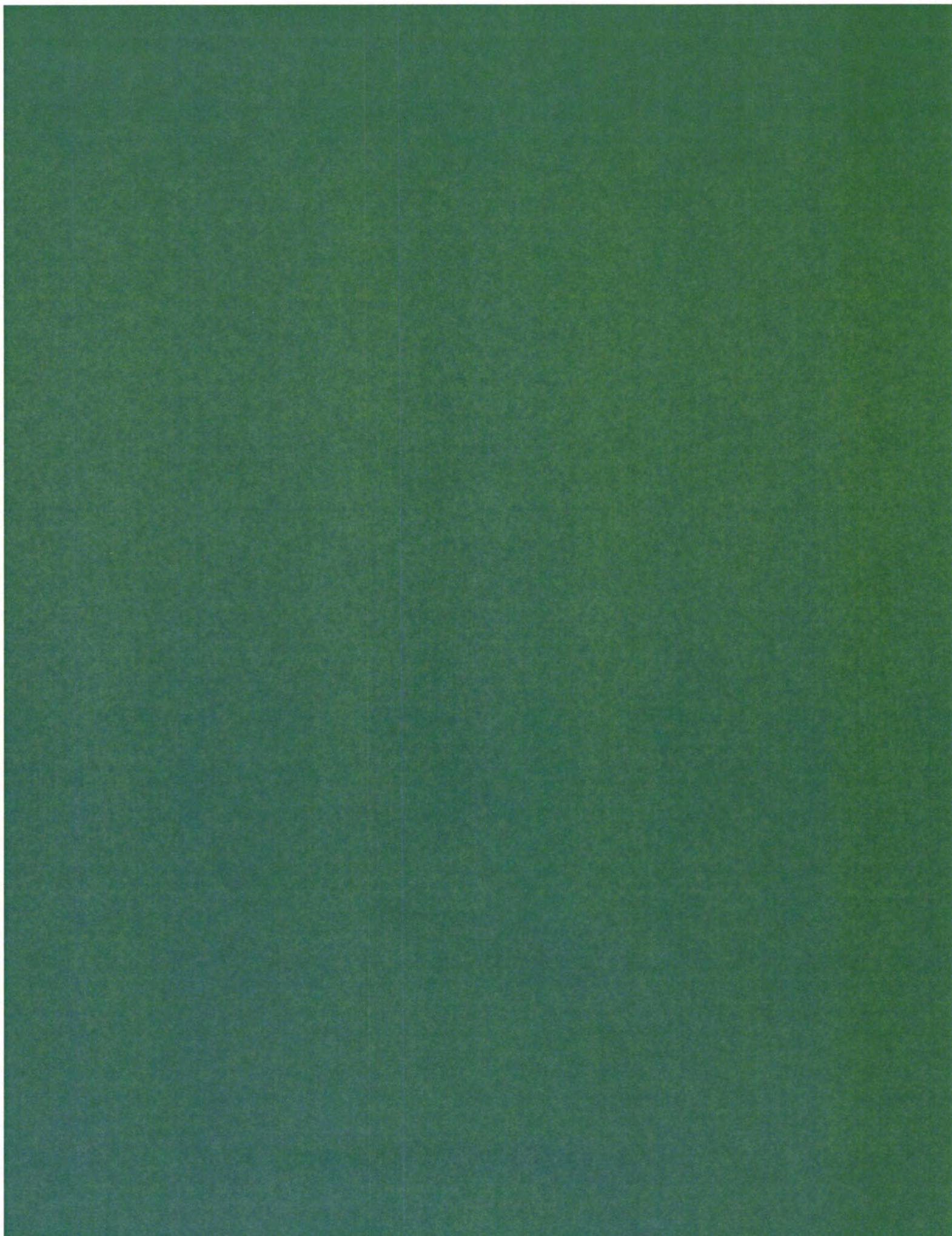
** Collection of demographic data depends on the state.

*** FEDES data cover federal civilian and military employees.

Employer Characteristics	Occupational Characteristics	Other	Characteristics					
			Publicly accessible	Authorized users only	Snapshot/trend analysis	Longitudinal analysis	Local analysis	Individual outcomes analysis
		✓	✓	✓	✓		✓	
		✓	✓		✓			
		✓	✓		✓			
✓			✓		✓			
	*		✓		✓		✓	
✓		✓		✓	✓	✓	✓	✓
				✓	✓	✓	✓	✓
				✓	✓	✓		✓
				✓	✓	✓	✓	✓
				✓	✓	✓	✓	✓
	✓		✓		✓			
✓			✓		✓			
	✓	✓			✓			
	✓	✓			✓			

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A graphic featuring a central teal-colored mechanical component with two large black gears on either side. The component is connected to a network of green circuit-like lines that snake across the page. The text is centered within the teal component.

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Five Ways to Connect
College and Careers*
can be accessed online at
cew.georgetown.edu/CareerPathways



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**JERRY D.
PARRISH, PH.D.**

**Chief Economist
Florida Chamber Foundation**

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Thousands of data points for state and counties

Each "tile" is live – links to downloadable chart

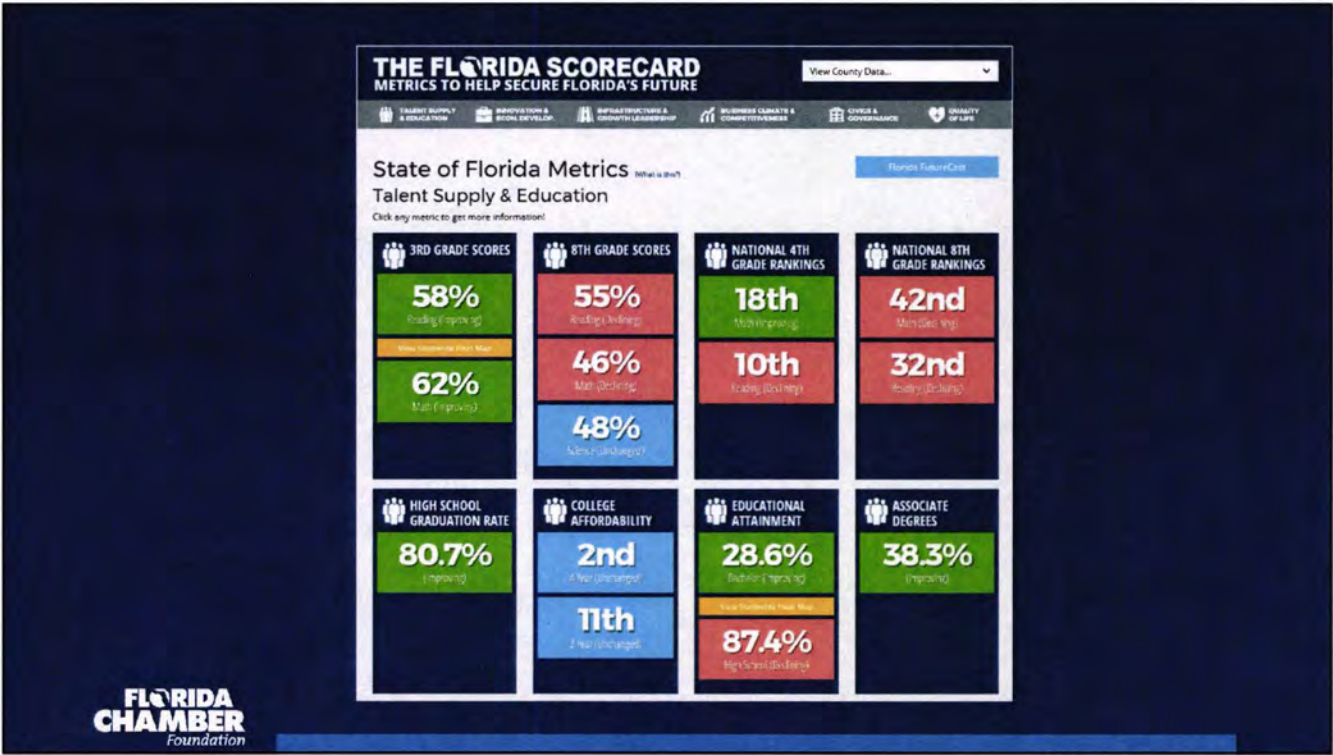
Raw data is downloadable

Sources are identified and linked

Each of Florida's 6 Pillars have additional data

Heat maps available for many metrics





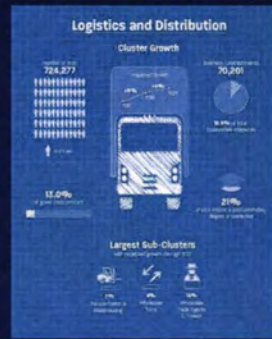
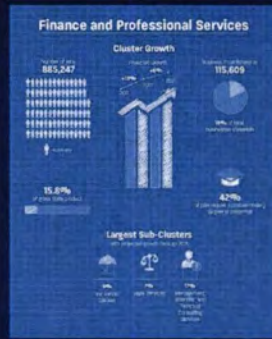
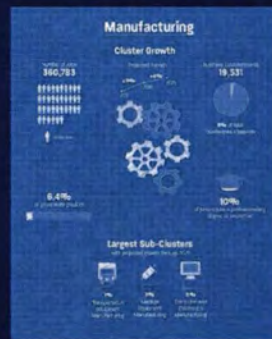
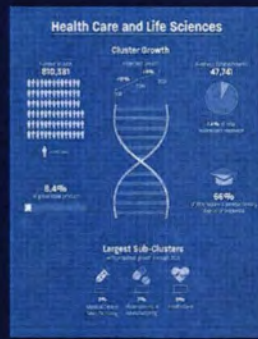
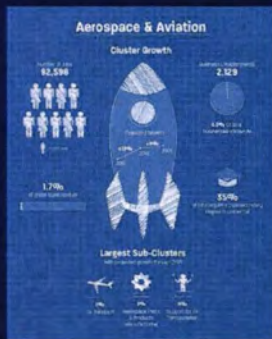
Planning the Future Through Research

- 2017 – Florida’s Fiscal Cliffs Report
- 2017 – Florida Jobs 2030
- 2016 – From Excuses to Excellence
- 2016 – Strategic Look at Medical Tourism
- 2013 – Florida Trade and Logistics Study 2.0
- 2011 – Immigration and Florida’s Economy
- 2010 – Florida Trade and Logistics Study
- 2010 – Closing the Talent Gap
- 2007 – New Cornerstone Revisited
- 2006 – Florida Summit on Affordable Living
- 2003 – New Cornerstone: Foundations for Florida’s Economy into the 21st Century
- 1999 – Transportation Cornerstone Florida
- 1997 – International Cornerstone Florida
- 1994 – No More Excuses: What Business Must Do To Improve Florida’s Schools
- 1991 – Enterprise Florida: Partnership for a Competitive Economy
- 1990 – Crossroads: Designing Florida’s Tax Structure
- 1989 – Enterprise Florida: Growing the Future
- 1989 – Cornerstone: Foundations for Economic Leadership
- 1986 – The Role of Privatization in Florida’s Growth

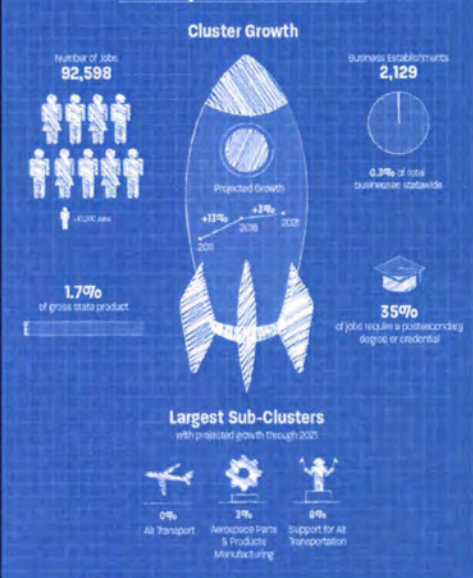


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Aerospace & Aviation

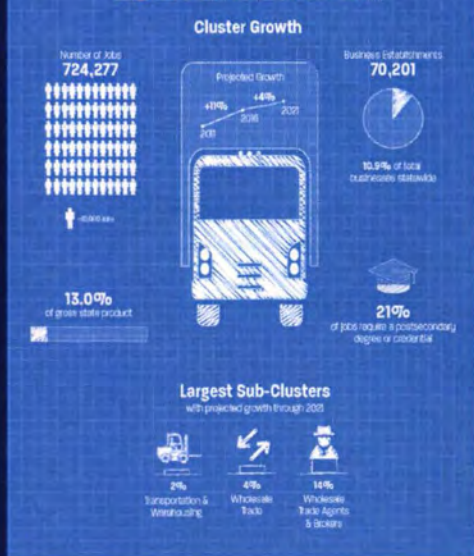


Potential Career Pathways

Aerospace and Aviation

ENTRY-LEVEL	<ul style="list-style-type: none"> Shipping and Receiving Materials Handler (High school diploma) Maintenance and Repair Worker (High school diploma)
MIDDLE-SKILL	<ul style="list-style-type: none"> Air Export Agent (High school diploma) Aeronics Technician (Postsecondary credential)
HIGH-SKILL	<ul style="list-style-type: none"> Logistician (Bachelor's degree) Aircraft Maintenance/Installation Supervisor (Postsecondary certificate or associate's degree)

Logistics and Distribution



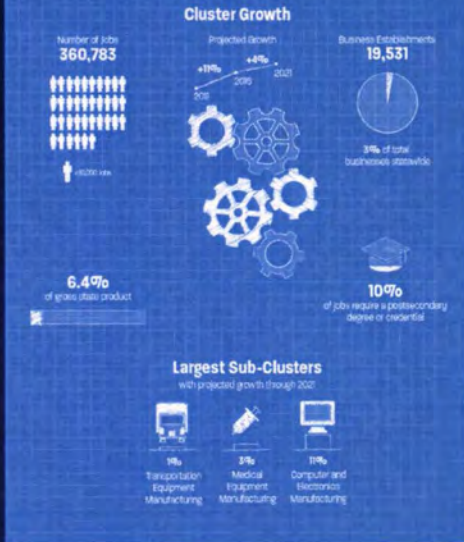
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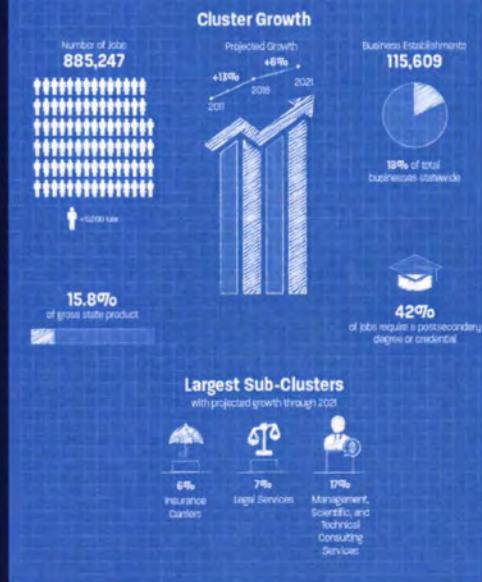
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Manufacturing

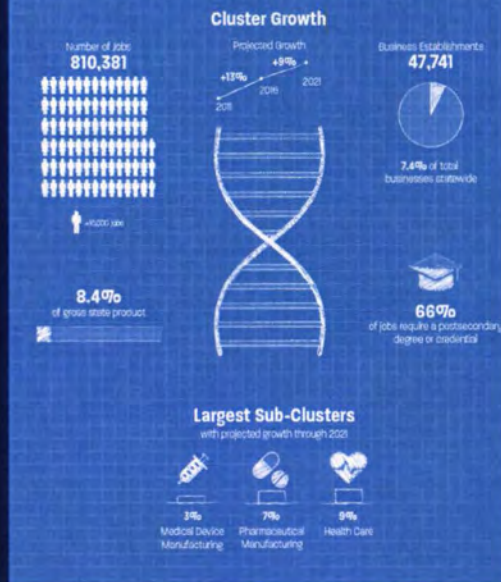


Job Description	Employed in 2016	2016-2021 % Change in Cluster	Median Wage	Typical Entry-Level Education
Machinists	6,671	6%	\$17.98	HS Diploma or Equivalent
Welders	7,266	1%	\$16.87	HS Diploma or Equivalent
Industrial Machinery Mechanics	5,140	3%	\$21.72	HS Diploma or Equivalent

Finance and Professional Services



Health Care and Life Sciences



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