NEW AMERICA

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Automation Potential for Jobs in Indianapolis

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Work, Workers, and Technology

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About New America

We are dedicated to renewing America by continuing the quest to realize our nation's highest ideals, honestly confronting the challenges caused by rapid technological and social change, and seizing the opportunities those changes create.

About Work, Workers, and Technology

Today, work as we know it is shifting, and rapidly. Advanced technologies are changing the demand for skills, the nature of occupations, and what is required to earn a good living. Jobs are no longer so clearly defined. Workers cannot expect to stay in one job or industry for 40 years, while experience and seniority doesn't guarantee advancement. As a result, more people are proactively creating jobs for themselves, such as in creative fields or the gig economy. Automation and artificial intelligence drive some of these changes and will continue to profoundly change what it takes to earn a good living in the future -- a recent McKinsey study found that 45 percent of job activities could be automated with existing technology.

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Introduction

Today, work as we know it is shifting, and rapidly. Over the next decade and beyond, how will artificial intelligence and automation change work and opportunity in cities like Indianapolis?

The Indianapolis metro area and other communities across the country will be at the front lines of this change.[1] Of course, Indianapolis is no stranger to automation and technological change, including both the risks and rewards. Over the last few decades, the region's manufacturing sector has experienced job loss and technological change. Today, **Indianapolis's tech sector is growing** and the city was **shortlisted for Amazon's second headquarters**. Looking ahead, rapidly advancing technology will bring new opportunities and challenges for the region.

To prepare for this future, New America will host its second ShiftLabs on May 18th in Indianapolis, Indiana, with support with **support from the Rockefeller Foundation**. At the day-long design lab, leaders from the Indianapolis region and across the country—from technology, industry, policy, philanthropy and culture—will come together to consider the impact of technology and automation on work in the greater Indianapolis region and to develop a long-term, place-based vision for opportunity. The Indianapolis ShiftLabs follows the first **ShiftLabs** on April 20th in Phoenix, Arizona, which New America hosted in partnership with Arizona State University.

To bring a data-driven lens to ShiftLabs, New America partnered with leading labor market analytics company **Burning Glass Technologies** and their analysis of **data** to conduct a first-of-its-kind analysis of the potential of automation to impact jobs in the greater Indianapolis region. We ask: Of the thousands of jobs held by Indianapolis workers today, which could be performed by existing technology? Which occupations and skills are at greatest risk of automation, and who holds those jobs today? To answer these questions, we combined and analyzed Burning Glass data on the likelihood of a computer being able to do a job using existing technology, as well as data from the Bureau of Labor Statistics on occupations in Indianapolis and nationally.

To be sure, emerging technologies will also create many jobs, including entirely new jobs that don't even exist today. This is a familiar pattern—about **half of all job growth from** came from the creation and expansion of brand new jobs. On balance, automation and technology may create more jobs than they eliminate, but predictions of the number and types of jobs that will be created are outside the scope of this study.

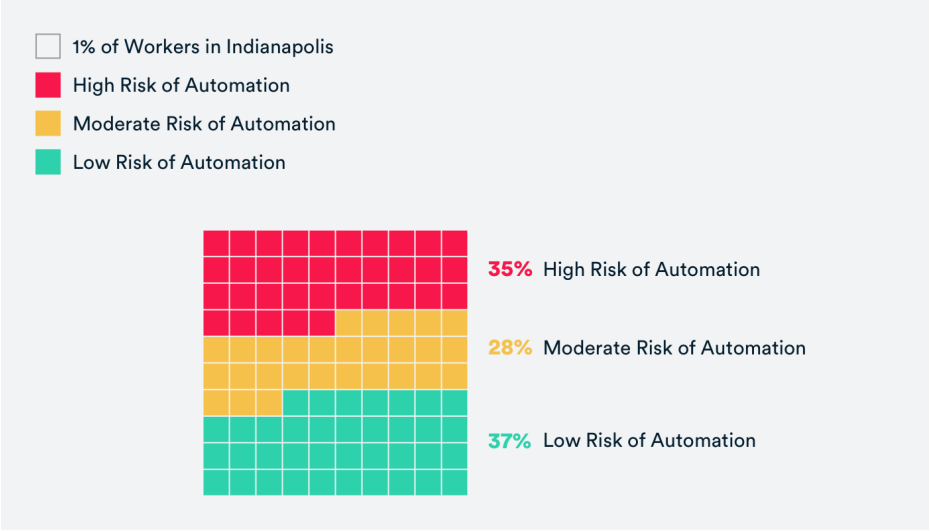
The findings of our analysis are clear: Automation will have a widespread impact on jobs in the Indianapolis region in the years ahead, and especially on low-

skilled jobs and especially on female workers. In some cases, technology will eliminate high-risk jobs. In many more cases, technology will change them—sometimes dramatically.

Overview: How Vulnerable are Indianapolis Jobs to Automation?

In the Indianapolis-Carmel-Anderson metro area, 337,900 people are employed in occupations that are at high risk of automation—35 percent of total jobs. Another 272,760 jobs (28 percent of total jobs) are at moderate risk of automation. Only a little more than a third (37 percent) are at low risk.

Figure 1 | How Vulnerable are Indianapolis Workers to Automation?

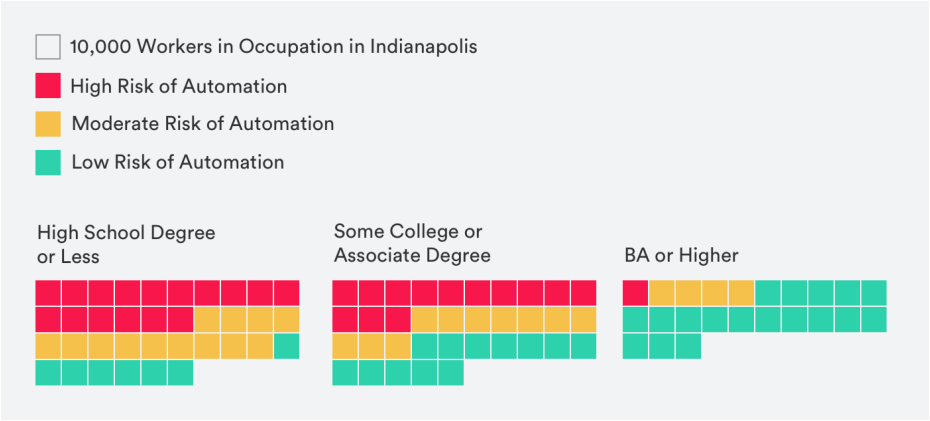


Which Workers in Indianapolis Are Most Vulnerable to Automation?

Workers with less education

Among workers, the least educated workers are at greatest risk of automation. This is especially true of workers with a high school degree or less, who comprise 47 percent of the workers at high risk of automation in Indianapolis and just 19 percent of workers at low risk. Those numbers are flipped for low-risk jobs: 49 percent of workers in low-risk occupations have a BA or higher, while just 19 percent have a high school degree or less.

Figure 2 | Indianapolis Workers by Education and Risk of Automation



Workers who earn the least money

The jobs at high risk of automation are nearly half as well paid, on average, as the jobs at low risk of automation. The average annual salary of workers in the more than 130 jobs that are at high risk of automation is $31,085. Meanwhile, the average salary of the workers in the more than 250 jobs that are at low risk of automation is $66,803—more than double that of the high-risk workers.

Figure 3 | Indianapolis Workers by Income Range and Risk of Automation

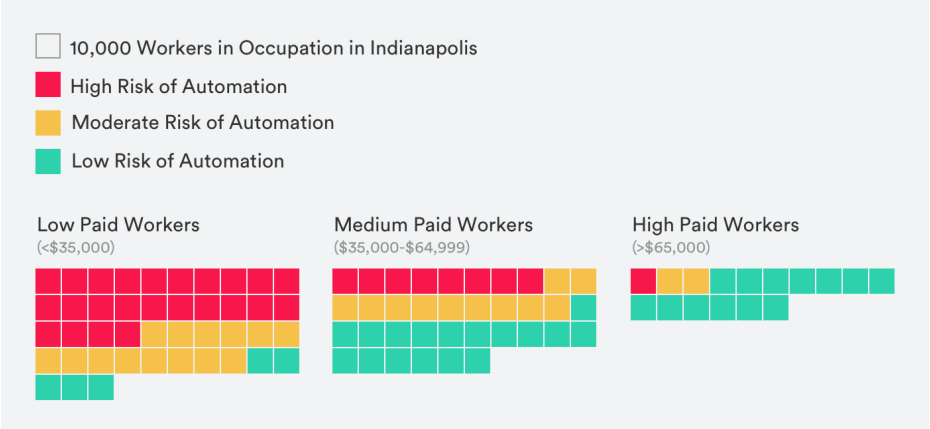
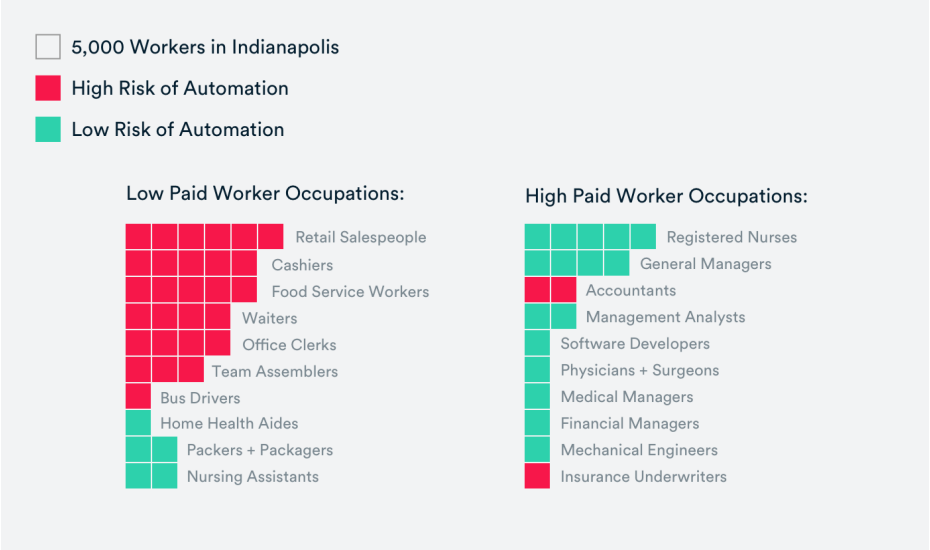


Figure 4 | Occupations by Pay and Automation Risk



Women

The high risk occupations in Indianapolis disproportionately employ women. Applying national averages of women employed across occupations, women constitute 55 percent of workers in high risk occupations in Indianapolis. When the high risk category includes the occupation "laborers and freight, stock and material movers, hand," which is the largest occupation in the Indianapolis region and is exactly at the border of high and medium risk (85 percent risk of automation), women still constitute just over half (51 percent) of the workers at high risk of occupation. Women dominate in many food and retail-related industries that are especially high risk. For instance:

1. **Cashiers:** Over 22,000 people in Indianapolis worked as a cashier - a job with a 97 percent risk of automation. Nationally, 73 percent of cashier jobs were held by women.
2. **Waiters and waitresses.** Just under 19,000 people in Indianapolis worked as a waiter or waitress, which has a 94 percent risk of automation. Nationally, 70 percent of those jobs were held by women.
3. **Office clerks:** More than 18,000 people in Indianapolis worked as office clerks - an occupation with a 96 percent risk of automation. Nationally, 83 percent of those positions were held by women.
4. **Secretaries and administrative assistants:** More than 12,000 people worked as secretaries and administrative assistants in Indianapolis, which carry a 96 percent risk of automation. Nationally, 95 percent of those positions were held by women.

Occupations at Highest and Least Risk

The Largest Occupations Most at Risk

Of the 50 occupations that employ the most people in the Indianapolis metro area (totaling just over half of all workers), the following 18 occupations are the most at risk of automation.

Pay Scale	OCCUPATION	# of people employed, 2016	Average salary, 2016
	Retail Salespersons	30,250	$24,960
	Combined Food Preparation and Serving Workers, Including Fast Food	23,890	$18,530
	Cashiers	22,760	$19,670
	Waiters and Waitresses	18,900	$22,240
Low paid < $35k	Office Clerks, General	18,490	$32,770
	Team Assemblers	13,100	$27,770
	Cooks, Restaurant	8,820	$23,590
	Shipping, Receiving, and Traffic Clerks	8,120	$28,700
	Food Preparation Workers	8,100	$20,540
	Industrial Truck and Tractor Operators	6,090	$32,740
	Receptionists and Information Clerks	6,020	$29,280
	Driver/Sales Workers	5,460	$23,790
	Bus Drivers, School or Special Client	5,410	$25,530
	Landscaping and Groundskeeping Workers	5,380	$26,170

Pay Scale	OCCUPATION	# of people employed, 2016	Average salary, 2016
	Construction Laborers	5,300	$38,990
Middle Paid	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	12,490	$35,060
($35k - $65k)	Bookkeeping, Accounting, and Auditing Clerks	10,570	$40,450
High paid > $65k	Accountants and Auditors	9,200	$69,420

Largest Occupations Least at Risk

Of the 50 occupations that employ the most people in the Indianapolis metro area (or about half of all workers), the following 18 occupations have a low risk of automation.

Pay Scale	OCCUPATION	# of people employed, 2016	2016 average salary
	Packers and Packagers, Hand	9,910	$22,880
Low paid (<$35k)	Nursing Assistants	8,770	$26,130
	Home Health Aides	5,190	$23,360
	First-Line Supervisors of Office and Administrative Support Workers	10,430	$56,880
	First-Line Supervisors of Retail Sales Workers	8,390	$43,130
	Elementary School Teachers, Except Special Education	8,150	$50,880
Middle paid ($35k - $65k)	Sales Representatives, Services, All Other	7,230	$58,450

Pay Scale	OCCUPATION	# of people employed, 2016	2016 average salary
	Business Operations Specialists, All Other	6,690	$64,360
	Secondary School Teachers, Except Special and Career/Technical Education	5,760	$54,560
	Human Resources Specialists	5,200	$57,360
	Licensed Practical and Licensed Vocational Nurses	4,880	$42,690
	Computer User Support Specialists	4,850	$54,400
	Registered Nurses	23,640	$63,340
	Management Analysts	6,740	$76,030
High paid ($65k - $90k)	Managers, All Other	5,690	$73,400
	Software Developers, Applications	5,470	$83,530
Top paid > $90k	General and Operations Managers	17,600	$107,990
	Physicians and Surgeons, All Other	5,250	$215,140

Top 50 Occupations by Number of People Employed

OCCUPATION	# of people employed, 2016	Risk level	Mean salary, 2016
Laborers and Freight, Stock, and Material Movers, Hand	34,190	Medium Risk	$28,630
Retail Salespersons	30,250	High Risk	$24,960

OCCUPATION	# of people employed, 2016	Risk level	Mean salary, 2016
Combined Food Preparation and Serving Workers, Including Fast Food	23,890	High Risk	$18,530
Registered Nurses	23,640	Low Risk	$63,340
Cashiers	22,760	High Risk	$19,670
Customer Service Representatives	22,470	Medium Risk	$37,350
Waiters and Waitresses	18,900	High Risk	$22,240
Heavy and Tractor-Trailer Truck Drivers	18,730	Medium Risk	$48,970
Office Clerks, General	18,490	High Risk	$32,770
General and Operations Managers	17,600	Low Risk	$107,990
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	14,660	Medium Risk	$24,630
Team Assemblers	13,100	High Risk	$27,770
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	12,490	High Risk	$35,060
Stock Clerks and Order Fillers	12,350	Medium Risk	$26,400
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	11,370	Medium Risk	$72,680
Bookkeeping, Accounting, and Auditing Clerks	10,570	High Risk	$40,450
First-Line Supervisors of Office and Administrative Support Workers	10,430	Low Risk	$56,880
Maintenance and Repair Workers, General	10,000	Medium Risk	$39,200

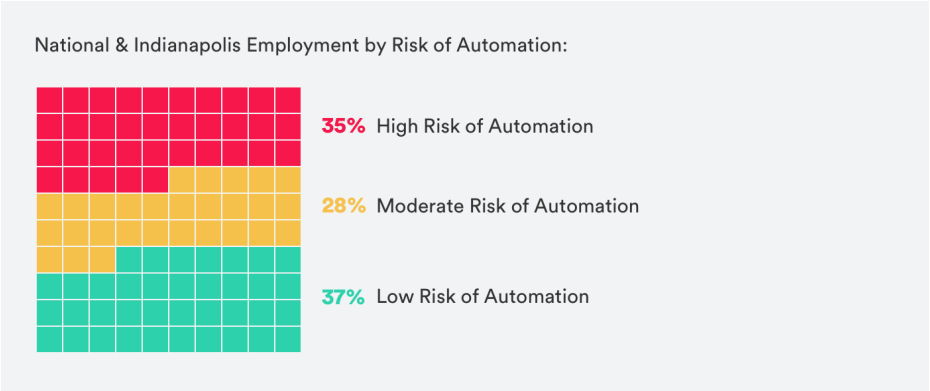
OCCUPATION	# of people employed, 2016	Risk level	Mean salary, 2016
Packers and Packagers, Hand	9,910	Low Risk	$22,880
Accountants and Auditors	9,200	High Risk	$69,420
Cooks, Restaurant	8,820	High Risk	$23,590
Nursing Assistants	8,770	Low Risk	$26,130
First-Line Supervisors of Retail Sales Workers	8,390	Low Risk	$43,130
Personal Care Aides	8,250	Medium Risk	$21,210
Elementary School Teachers, Except Special Education	8,150	Low Risk	$50,880
Shipping, Receiving, and Traffic Clerks	8,120	High Risk	$28,700
Food Preparation Workers	8,100	High Risk	$20,540
Security Guards	8,060	Medium Risk	$25,200
First-Line Supervisors of Food Preparation and Serving Workers	7,240	Medium Risk	$32,790
Sales Representatives, Services, All Other	7,230	Low Risk	$58,450
Teacher Assistants	6,900	Medium Risk	$23,940
Management Analysts	6,740	Low Risk	$76,030
Business Operations Specialists, All Other	6,690	Low Risk	$64,360
Light Truck or Delivery Services Drivers	6,550	Medium Risk	$33,410
Industrial Truck and Tractor Operators	6,090	High Risk	$32,740
Receptionists and Information Clerks	6,020	High Risk	$29,280

OCCUPATION	# of people employed, 2016	Risk level	Mean salary, 2016
Maids and Housekeeping Cleaners	5,760	Medium Risk	$21,410
Secondary School Teachers, Except Special and Career/Technical Education	5,760	Low Risk	$54,560
Managers, All Other	5,690	Low Risk	$73,400
Software Developers, Applications	5,470	Low Risk	$83,530
Driver/Sales Workers	5,460	High Risk	$23,790
Bus Drivers, School or Special Client	5,410	High Risk	$25,530
Landscaping and Groundskeeping Workers	5,380	High Risk	$26,170
Construction Laborers	5,300	High Risk	$38,990
Physicians and Surgeons, All Other	5,250	Low Risk	$215,140
Human Resources Specialists	5,200	Low Risk	$57,360
Home Health Aides	5,190	Low Risk	$23,360
Carpenters	4,980	Medium Risk	$44,490
Licensed Practical and Licensed Vocational Nurses	4,880	Low Risk	$42,690
Computer User Support Specialists	4,850	Low Risk	$54,400

How Does Indianapolis Differ From the U.S. Average?

Overall, the risk of automation facing workers in the Indianapolis region is exactly on par with the rate of risk across the U.S. workforce overall.

Figure 5 | Indianapolis vs National Workers by Risk of Automation



Looking more closely at specific occupational groups within the economy, there are some pockets of greater vulnerability and greater resilience.

Ways the Indianapolis area workforce is more resilient to automation than the nation overall

- Management, business and finance have a low risk of automation. As a percent of employment, Indianapolis's population has 10 percent more workers in management positions than the national average, and 10 percent more workers in business and financial operations, both of which carry a low risk of automation.
- Compared to the national average, Indianapolis has 17 percent more workers in healthcare practitioner and technician positions, such as pediatrician or audiologists. These healthcare positions have a low risk of automation.

Ways the Indianapolis area workforce is more vulnerable to automation than the national overall

A far greater share of Indianapolis's workforce is employed in transportation and material moving than the rest of the country. Indianapolis has 46 percent more of these jobs compared to the U.S. overall. This overall group of occupations has a medium risk overall, and includes several occupations with a high risk of automation including several types of drivers.

Indianapolis area employees are less well-represented in certain low-risk occupational groups than the national average. For instance, education, training and library occupations are at very low risk of automation. Indianapolis has 34 percent fewer workers in these occupations than the national average. Nationally, 73 percent of those positions are held by women. Thus, compared to the rest of

the country, Indianapolis has significantly fewer low-risk jobs in education that overwhelmingly employ women.

Data and Methodology

What Do We Mean by Automation and Risk of Automation?

In our analysis, the rankings of automation risk describe the technical feasibility that an occupation can be computerized or automated with start-of-the-art technology available today. This data comes from Burning Glass Technologies, and is derived largely from a well known 2013 study from two researchers at Oxford, Carl Benedikt Frey and Michael A. Osborn. To calculate the automation risk, the Oxford researchers evaluated the ability of computers to perform the underlying tasks associated with the given occupation.

- "High risk" occupations are the top quartile of risk, with at least 85 percent risk of automation for a given occupation.
- "Medium risk" occupations are in the second quartile of risk, between 50 percent and 85 percent risk of automation for a given occupation.
- "Low risk" occupations are in the bottom two quartiles, with less than 50 percent risk.

A few key caveats are important to consider when interpreting the data.

First, the rankings are *not* a probability that a given job will actually be automated. Because a job or task can *technically* be done by a computer does not mean that it *will*. A range of legal, logistical, business, financial, political, and social factors could lower the real rate at which businesses and employers adopt technology and automate functions. Moreover, predictions about technology have a relatively high degree of uncertainty.

Second, jobs that have some tasks that can technically be automated will not necessarily be displaced. Instead, the nature of many jobs will change—in some cases, dramatically—but will not be eliminated. (McKinsey estimates that **just 5 percent of jobs** will be outright eliminated, but that half of job tasks could be automated.) The implication of this change is the need for workers in at risk occupations to continuously upskill to keep pace with the changing requirements of their occupation.

Finally, while technology and automation will displace some jobs and change others, new jobs will also be created and other jobs will expand. Our analysis does not capture the impact of projected job creation.

Notes on the Data

- The data on automation potential comes from Burning Glass Technologies, which is derived largely from a well known 2013 study from two researchers at Oxford, Carl Benedikt Frey and Michael A. Osborn, titled "**The Future of Employment: How Susceptible are Jobs to Computerisation?**"
- Occupational and wage data for the Indianapolis metropolitan area is from the Bureau of Labor Statistics and covers the period from January 1, 2017 to December 31, 2017. The geographic area spans Indianapolis, counties.
- Data on national averages of women in occupations comes from the Bureau of Labor Statistics.
- Data on education levels of employed individuals comes from the American Community Survey (ACS) five-year estimates (2011 - 2015).

Notes

1 Throughout this report, when we refer to Indianapolis, we are referring to the Indianapolis metropolitan area of Indianapolis-Carmel-Anderson.

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