

## **Automation and the Connecticut Job Market – Bird’s Eye View**

**Authors:**  
William Kelvie  
Joseph Smialowski

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Labor markets in the United States are being affected by the changing nature of work, including the decline of paid labor in the production of goods and services. Some would say that a shift is underway that will lead to a “world without enough work”. While there are many factors that are contributing to this change, technology is and will continue to play an important role. Some estimates suggest that up to 47% of jobs in the United States are at high-risk of being eliminated as a result of automation.

In mid 2017, a study was launched to understand the impact of automation on Connecticut’s job market. This effort utilized the results of recent studies and information that was available from the Connecticut Department of Labor to determine the level of potential job losses, its timing, and whether new job creation could keep pace with the changes in the job market.

The following is a summary of the conclusions that were reached based on an analysis of 648 occupations (using the United States Department of Labor Bureau of Labor Statistics Standard Occupation Classification system) that are represented in Connecticut’s job market.

- Of a total of 1,692,200 Connecticut jobs, 39% or ~660,000 jobs are at high-risk (>75% probability) of being eliminated as a result of automation.

The jobs that fall into the high-risk category represent \$28.4 billion in wages, which is 29% of the total for the state.

<b>Automation Impact on Jobs and Wages by Risk Quartile</b>					
<b>Description</b>	<b>Risk of Job Loss</b>				<b>Total</b>
	<b>0 – 25%</b>	<b>25 – 50%</b>	<b>50 – 75%</b>	<b>75 – 100%</b>	
Total jobs by risk quartile	659,958 39%	84,610 5%	287,674 17%	659,958 39%	1,692,200
Total Wages (\$ billions)	\$51.0 52%	\$4.9 5%	\$13.7 14%	\$28.4 29%	\$98.0
<b>Source:</b> Fry and Osborne, The Future of Employment (2013), Connecticut Department of Labor’s Occupational Employment and Wages (Q1 2016), and Labor Market Information (October 2017), and authors’ calculations					

- The risk of job loss by income level indicates that jobs at the lower end of the income spectrum tend to fall into higher-risk categories, while higher paying jobs fall into the lower-risk categories.

<b>Mean Wages by Risk Quartile</b>					
<b>Description</b>	<b>Risk of Job Loss Quartiles</b>				<b>Overall</b>
	<b>0 – 25%</b>	<b>25 – 50%</b>	<b>50 – 75%</b>	<b>75 – 100%</b>	
Mean Wage	\$77,278	\$57,912	\$47,623	\$43,033	\$57,913
<b>Source:</b> Connecticut Department of Labor’s, Occupational Employment and Wages (Q1 2016), and authors’ calculations					

- The effect of automation varies by labor market area, with Norwich – New London – Westerly RI having the highest percent of jobs at high-risk and Bridgeport - Stamford the lowest. The following is a summary of the impact of automation on Connecticut’s labor market areas.

Summary of Impact of Automation by Labor Market Area (LMA)				
Labor Market Area	Composite Risk Score	Total Jobs in LMA	High-Risk (>75%)	
			% of Jobs at High-Risk	Jobs at High Risk
Bridgeport - Stamford	49.1	412,800	36.8%	151,900
Danbury	56.1	79,700	44.7%	35,600
Hartford	51.1	575,900	39.2%	225,800
New Haven	53.3	286,700	41.3%	118,400
Norwich – New London – Westerly RI	56.8	130,000	48.3%	62,800
Waterbury	55.1	67,300	43.6%	29,300

**Source:** Fry and Osborne, The Future of Employment (2013), Connecticut Department of Labor’s Occupational Employment and Wages (Q1 2016), and Labor Market Information (October 2017), and authors’ calculations

This analysis didn’t include the small labor market areas, i.e. Enfield (45,200 jobs), Torrington (33,300 jobs) and Willimantic – Danielson (27,300 jobs).

- An analysis of the occupation groups based on variables related to perception and manipulation, creative intelligence, and social intelligence, indicates that their risk profiles varies widely, with some groups at very high-risk of being impacted by automation. The following is a summary of the composite risk scores for the occupation groups that were examined.

Summary of Automation Risk Scores by Occupation Group (Ranked from Highest to Lowest Risk)					
Rank	Occupation Group	Risk Score	Rank	Occupation Group	Risk Score
1	Food Preparation and Serving	84.5	12	Personal Care and Service	41.0
2	Transportation and Material Moving	74.0	13	Healthcare Support	30.8
3	Production	72.3	14	Life, Physical and Social Science	26.0
4	Office and Administrative Support	71.5	15	Architecture and Engineering	24.0
5	Building and Grounds Cleaning & Maintenance	69.8	16	Education, Training and Library	23.8
6	Sales and Related Occupations	68.3	17	Arts, Design, Entertainment, Sports and Media	21.8
7	Construction and Extraction	57.5	18	Healthcare Practitioners and Technical	21.3
8	Installation, Maintenance and Repair	56.3	19	Farming, Fishing and Forestry	19.5
9	Business and Financial Operations	49.5	20	Management	16.5
10	Protective Services	45.8	21	Computer and Mathematical	15.5
11	Legal	43.5	22	Community and Social Science	12.5

**Source:** Fry and Osborne, The Future of Employment (2013), Connecticut Department of Labor’s Occupational Employment and Wages (Q1 2016), and authors’ calculations

- While it is difficult to separate the role of automation from other considerations (such as the state's job generation capability, desirability as a place to do business, contribution of "legacy" businesses to employment, trends related to new business formations, workforce readiness and productivity, and quality of life issues), it is the confluence of these factors that will shape the future, with technology assuming a progressively larger role over time.
- While residents of certain labor market areas benefit from their proximity to other labor markets, e.g. Bridgeport – Stamford and Danbury (Northern New Jersey, New York City and Westchester County New York), Hartford (Springfield), and Norwich – New London (Providence), no attempt was made to assess the automation risk in these locales.
- The timing of the impact of automation is not certain, but there is evidence in recent employment statistics and WARN (Worker Adjustment and Retraining Notification) data that the impact is already being felt, esp. in industries whose employees' principal activities fall into high-risk occupation group, e.g. retail trade.
- It is possible that Connecticut will feel significant impact within the next 8 – 10 years, and new job creation may not be able to keep pace with the jobs that are being eliminated.
- While the range of the impact of automation varies by region and occupation group, it is likely that the safety net programs will be overwhelmed by the magnitude of the change that is underway.
- In addition to the impact on social programs, the loss of wages related to the elimination of jobs in the high-risk category will impact tax revenues and the ability of state and local government to fund essential services, and meet pension, retiree health and debt obligations.

At this time, there is limited, specific research that is available to assist policy makers and planners understand the impact of automation on Connecticut. In addition, the political dialogue at the state and local level may not be sufficient when you consider the critical issues related to the future sources of job growth in an era of increased automation, the need to build new digitally oriented economic clusters, the effectiveness of existing economic development programs in the creation of higher paying / "sticky" jobs, and steps that should be taken to prepare the state's workforce to effectively compete for jobs in the economy of the 21<sup>st</sup> century.

While the transition to a "world without enough work" is inevitable, steps can be taken to slow the impact, but there is a need to focus on this challenge now. It is not clear how this will end, but we have a choice, i.e. we can manage or fall victim to the transition that is underway. One thing is certain; we need to prepare for a fundamentally different world.