

# CREC Future of Work Report Discussion with Contributors 4.25.2023

## Agenda

- Welcome and Introductions
- Report Out from CREC and Feedback
  - Skill Demand and Supply Dynamics
  - Measurement
  - Implications for public LMI data systems and projection analysts
- Discussion
- Next Steps

## Background and Summary of Findings

In 2021, CREC and LMI Institute launched a Future of Work agenda to raise awareness of the dynamics affecting work in regional economies and to begin integrating advancements in methods with state labor market information agencies. LMI Institute and the Projections Management Partnership hosted a series of conversations about dynamics specific to single industries and regions, related measurement opportunities and issues, and published an occupational automation score.

Moving forward, CREC will continue to invigorate the work of regional analysis with the perspectives and contributions of scholars and scholar-practitioners considering these issues. An initial cohort of contributors have helped us to better identify the various ways that technology change differentially affects regions and industries, the nature of occupational transformation due to automation, and, for manufacturing specifically, the increase in technology-related roles despite an overall decline in manufacturing jobs over the last 20 years.

Contributors reported and suggested approaches to measurement, such as regionalizing existing data and insights from national employment projections and real time job postings. Each promising measure of skills has shortcomings which limit our understanding of the current and future skills landscape. The papers imply that these challenges are not insurmountable and that improvements to these measurements and their analysis could significantly improve practitioners and policy makers ability to tailor their investments and enhance regional competitiveness.

Demand and supply dynamics that will affect the competitiveness of regional economies include growth in technology-related roles, occupational transformation, and regional response. Broadly recognized and highly valued measurement tools include ONET (for occupational skill profiles) and Occupational Employment and Wage Statistics (OEWS, for deriving staffing patterns). New tools include real time job postings from Lightcast, National Labor exchange (NLx), and electronic job boards. New methods include data regionalization, organizational skills transformation analysis, and skill content analysis from descriptive text.

Based on these observations, CREC's initial recommendations for public LMI data systems and projection analysts include:

- Increase integration of real time data, not just on skills, but also industry and technology change that informs skill requirements, as well as on the function of job chains that shape supply of skill
- Demonstrate more practical modeling for planning purposes, such as consideration of multiple scenarios, to help regional decision makers consider various skill futures
- Reflect on past predictions and real results, demonstrating a learning mindset that competitive regions must adopt to respond effectively to technology change

## Contributors

### The Digitalization of the U.S. Labor Market: Lessons from Technology Adoption and Advanced Manufacturing Initiatives in Indiana

Leighton Johnson provides his perspective on industrial automation trends across global and United States markets, centering his perspective as a practitioner and commenting on the tools that are available to understand and anticipate change in the mix of skills required. He offers data-driven perspectives on the manufacturing landscape, and the uneven impact technology has had on occupations within the industry. He concludes with recommendations for Labor Market Data Tools and how those tools can be improved to offer additional benefits to practitioners and policy makers.

Leighton Johnson



Leighton Johnson is the Director of Innovation and Digital Transformation at Conexus Indiana. As a part of the Digital Transformation team, Leighton implements strategies for effective program administration, data and analytics, and reporting to ensure that the organization is meeting its programming goals.

<https://www.conexusindiana.com/about/team/>"<https://www.conexusindiana.com/about/team/>

### Tools for Regional Competitiveness to Meet an Era of Labor Scarcity

Christophe Combemale places regional economic development within the national labor market context. He offers empirical resources for evaluating regional capabilities and needs and identifies analytical barriers for regional decisionmakers in meeting workforce demand challenges, with attention to the comparative advantages (and differential needs) of their populations.

Christophe Combemale



Christophe Combemale is an assistant research professor of Engineering and Public Policy at Carnegie Mellon University, with a research appointment at the Block Center for Technology and Society at CMU's Heinz College. His research focuses on the implications of technology choices and process design for skill demand, and on workforce supply chain levers to meet industry skill demand needs.

<https://www.christophecombemale.com/>

### New Data Sources and Opportunities for Forecasting Labor Demand and Skills Mix

Henry Renski considers how emergent technologies will impact the demand for certain occupations and the skill, tasks, and knowledge associated with these jobs. Henry discusses the current approach for constructing sub-state occupational employment projections and the potential for integrating information from online job postings. He finds that electronic job postings, valuable for documenting trends in the Skills, Tasks and Knowledge (STK) content of occupations, would be difficult to directly

incorporate into the current (industry-derived) occupational projection system. He suggests possible avenues for more detailed investigation.

#### Henry Renski



Henry Renski is a professor of Regional Planning at the University of Massachusetts Amherst. Henry's research focuses on understanding the technological and social forces driving regional economic competitiveness and transformation, building upon this knowledge to improve the effectiveness of economic development policy. This past year, he served on a committee to review methods of the Projections Management Partnership. <https://www.umass.edu/larp/people/henry-renski>

#### How will Language Modelers like ChatGPT Affect Occupations and Industries?<sup>1</sup>

In their working paper published in parallel to this effort, Ed Felten, Manav Raj, and Robert Seamans present a methodology to systematically assess the extent to which occupations, industries and geographies are exposed to advances in AI language modeling capabilities. Ed, Manav, and Robert find that the top occupations exposed to language modeling include telemarketers and a variety of post-secondary teachers such as English language and literature, foreign language and literature, and history teachers. Ed, Manav, and Robert find the top industries exposed to advances in language modeling are legal services and securities, commodities, and investments.

#### Manav Raj



Manav Raj is an Assistant Professor in the Management Department at the Wharton School of the University of Pennsylvania. Manav's research studies how firms respond to innovation and technological change, with a focus on digital platforms and technologies and how institutional features and non-market forces affect innovation and entrepreneurship. <https://www.manavraj.com/>

#### Robert Seamans



Robert Seamans is an Associate Professor at New York University's Stern School of Business. Robert's research focuses on how firms use technology in their strategic interactions with each other, and also focuses on the economic consequences of AI, robotics and other advanced technologies.

<https://www.stern.nyu.edu/faculty/bio/robert-seamans>

#### Paper Forthcoming

Andrew Reamer will describe sector-specific federal efforts that aim to catalyze workforce skills. He will investigate forward-looking planning efforts and skills gap analysis, general approach to supply-demand analysis, and information needed to inform workforce development efforts.

#### Andrew Reamer



Andrew Reamer is a research professor at the George Washington Institute of Public Policy. Andrew's research efforts aim to encourage U.S. national economic development and competitiveness. Areas of focus include strategic economic analysis and policy,

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<sup>1</sup> [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4375268](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4375268)

innovation and entrepreneurship, workforce development, and the federal economic statistics system.  
<https://gwipp.gwu.edu/andrew-reamer-research-professor>

## Discussants

Yustina Saleh



Yustina Saleh is the Managing Director of Innovation Solutions at The Burning Glass Institute, where she leads projects that advance data-driven research and practice on the future of work and of workers. She is also a founding member and advisor to Equity Cities.

Anuraag Singh



Anuraag Singh is the Co-Founder and CTO of Technext Inc. Their research helps predict yearly performance improvement rates for nearly all definable technologies for the first time using the patent system network. Technology decision makers use their insights to better understand and optimize their long-range budget, capability development, and investment priorities.

Michael J. Handel



Michael Handel is a Research Analyst at the Bureau of Labor Statistics (BLS). Their research focuses on workforce development, occupational skills, and the effects of automation on the labor force. He is also a member of the American Sociological Review's editorial board.

## Discussion themes for review

- While recognizing its shortcomings, O\*NET can provide a baseline for understanding skills mix.
  - Occupational skills mix and bucket of required skills are still important to the conversation and understanding of the skills landscape, which O\*net serves as a source of high-quality information on.
  - O\*NET is used as the base for much of the “FOW” automation and AI exposure work being done.
  - O\*NET captures important skills that help workers to adapt for a flexible career pathway; a basis for assessing the combination of skills needed.
- Further data improvements could support localization to better understand occupational skills at the regional level.
  - O\*NET, the national occupational skills requirements constructed and maintained by BLS, national staffing patterns and occupational employment trends are important and relevant sources of occupational and skills data, but improvements come from localization of the data.
  - Localization of O\*NET and skill requirement trends would provide practitioners and policy makers with a better picture of their region's skills landscape.
  - Innovations in the space of regionalizing occupational skills data have come from private sector data firms such as Lightcast.
- Potential of real-time data sources

- Job posting value add is not in numbers but in putting "flesh to the skeleton" about jobs, how jobs are changing, what is changing, and some of the regional skills DNA has been useful for identifying regional advantage.
- There is a need for further investigation to better understand the availability of relevant real-time data beyond job postings.
- Potential for private sector insights and partnerships
  - Organizational data and aligning understanding of actions companies will take (e.g., to upskill or not to upskill) based on common characteristics (e.g., large vs small firms).
    - If Industries and jobs are not structured in a way that is useful for upskilling and adaptation, then there will be regional losses and implications for labor availability in the future.
  - The IMB approach: utilizing two specialized positions within the company. One to manage the supply side of the company's skill demands, and the other to manage the demand side, with the two working in tandem for the matching process.
- Potential for scenarios vs point estimates
  - There is potential for scenario construction to be useful at the 2-year and 5-year outlook.
  - Scenarios would be difficult for public consumption.
  - Scenarios may be interesting to policymakers and scholars.
  - Policymakers / administrators are making their own projections in planning investments even if not always explicit.

## Additional Materials

- The LMI Automation Exposure Score report: <https://www.lmiontheweb.org/automation-exposure-score/>
- Automation Exposure Score - About the Data: <https://www.lmiontheweb.org/automation-exposure-score/about/>
- Automation Exposure Score – Related Research and Applications: <https://www.lmiontheweb.org/automation-exposure-score/related-research-and-applications/>

## Glossary for Future of Work Terms

### Labor Market Information

Labor market information includes all quantitative or qualitative data and analysis related to employment and the workforce. The goal of LMI is to help customers make informed plans, choices, and decisions for a variety of purposes, including business investment decision making, career planning and preparation, education and training offerings, job search opportunities, hiring, and public or private workforce investments.<sup>2</sup>

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<sup>2</sup> [https://www.lmiontheweb.org/wp-content/uploads/sites/4/2020/02/2014-06-27\\_-\\_Defining\\_Labor\\_Market\\_Information.pdf](https://www.lmiontheweb.org/wp-content/uploads/sites/4/2020/02/2014-06-27_-_Defining_Labor_Market_Information.pdf)

## Public

Public sector Labor Market Information consists of robust labor market measures such as the Bureau of Labor Statistics (BLS) data, State Labor Market Information, O\*net, and many more. These data sources tend to be considered reliable but slow and therefore can lag behind the current needs of practitioners.

## Private

Private sector Labor Market Information involves data from a variety of different private sources and databases. These sources tend to be less unified as each company employs its own approach to the data. Popular sources include Lightcast, National Labor Exchange (NLX), real-time job posting data, etc. Newer real-time sources such as these offer up-to-date information but present concerns about data quality.

## Projections

One of the most important uses of the projections is to help individuals make informed career decisions. Information on this site allows projected employment growth for an occupation to be compared among States. It also allows projected employment growth among occupations to be compared within one state.<sup>3</sup>

The Bureau of Labor Statistics (BLS) education and training classification system consists of three categories of information that BLS analysts have assigned to each detailed occupation. The categories are: 1) typical education needed for entry, 2) commonly required work experience in a related occupation, and 3) typical on-the-job training needed to obtain competency in the occupation.<sup>4</sup>

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<sup>3</sup> <https://www.projectionscentral.org/>

<sup>4</sup> <https://www.bls.gov/emp/documentation/definitions.htm>