



CLEARER SIGNALS

Building an Employer-Led Job Registry for Talent Pipeline Management



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Executive Summary

Employers today are struggling to fill open positions because of a growing skills gap. Many have argued that the skills gap is caused, in part, by an inability of employers to signal their hiring requirements consistently and at scale in a rapidly changing talent marketplace. Prior attempts to improve employer signaling have been met with limited success. Employer signaling will remain elusive and the skills gap will continue to grow unless employers have the tools needed to provide clearer signals in talent markets especially to their education, training, and credentialing partners.

The U.S. Chamber of Commerce Foundation's (USCCF's) Talent Pipeline Management (TPM) initiative is exploring how employers can close the skills gap by improving how they communicate or "signal" their hiring requirements. Based on lessons learned from TPM, the USCCF now proposes to develop and pilot test an employer-led job registry service that can assist employers and their HR technology partners in the following:

- Developing more accurate, complete, and comparable job descriptions that can better communicate competency and credentialing requirements based on:
 - open HR standards that enable more structured job data that can be more easily exchanged and analyzed through leading software tools; and
 - open-licensed frameworks, taxonomies, competency lists, and other conceptualizations of domains using a defined vocabulary (e.g., ontologies) that provide a shared language for describing both similarities and differences in jobs and hiring requirements and can be constantly updated and extended by employers through job registry services
- Distributing these more structured and comparable data on both jobs and job openings through multiple talent sourcing channels, including:
 - state and regional TPM employer collaboratives;
 - business and industry associations;
 - talent sourcing partners such as education and training providers;
 - corporate websites, social media sites, and online job boards; and
 - online systems that communicate and capture information on whether employers require, prefer, or otherwise recognize specific credentials (e.g., Credential Engine)
- Maintaining a repository of de-identified job description data that can be used for developing, comparing, and benchmarking job requirements and analyzing major trends

Many have argued that the skills gap is caused, in part, by an inability of employers to signal their hiring requirements consistently and at scale in a rapidly changing talent marketplace.

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These services would provide significant benefits to employers in reducing the time and costs of recruiting and hiring the talent that best meet their hiring requirements and can be easily integrated with existing human resource information systems and services provided by existing HR technology partners. These services also could provide benefits to education and training partners and job seekers and students in meeting these requirements. Finally, these services would provide benefits to those seeking to improve information in the talent marketplace. They would provide more complete and structured online job posting data to real-time labor market information providers. It also would provide useful data for government labor market information systems. In the future, this job registry service could provide more comprehensive job data beyond job description data that could improve labor market information without increasing employer reporting burden and risk.

In addition, this job registry service could also provide a needed building block for a more comprehensive public-private data infrastructure in cooperation with other registries (e.g., Credential Engine); new platforms and data vaults for job seekers and students that can also be supported by a registry service; and more comprehensive individual-level data systems that capture education and training as well as credentialing and employment patterns in the talent marketplace. This employer-led job registry service should be designed and pilot tested with employers and their HR technology partners in cooperation with other stakeholders. If this service is proven effective, this pilot testing also should explore how it could be scaled and maintained through an employer-led nonprofit organization.



Introduction

In America, companies are struggling to close a skills gap that is negatively impacting their ability to compete and grow in a global economy. For companies, the ability to succeed in today's economy will increasingly depend on finding, onboarding, and retaining a skilled and competitive workforce that can drive growth and innovation. At the same time, it is becoming increasingly difficult for companies to locate talent, resulting in positions going unfilled for longer periods of time with higher onboarding and training costs.

The skills gap is also negatively impacting our workforce. Recently credentialed students are struggling to communicate their competencies and many are unable to connect with jobs, resulting in longer periods of unemployment or underemployment. And, education and workforce intermediaries are finding it more difficult in assisting employers and job seekers and students in closing the skills gap.

There are many theories for why there is a real or perceived skills gap. However, most agree that one major factor is the disconnect between how employers communicate or "signal" their hiring requirements and how students and job seekers communicate how they can meet these requirements. The most serious disconnect is how employers communicate competency and credentialing requirements. And, this problem is getting worse in a dynamic innovation-based economy with constantly changing competency and credentialing requirements.

Since 2014 the U.S. Chamber of Commerce Foundation (USCCF), through its Talent Pipeline Management (TPM) initiative, has been engaging the business community to leverage lessons learned from supply chain management to close the skills gap for their most critical and hard-to-fill job vacancies. The TPM approach encourages employers to play a stronger "end-customer" role in managing their talent supply chains by working with other employers to more clearly communicate or signal their competency, credentialing, and other hiring requirements for their most critical jobs.

Over the past two years, states and regions have pilot tested the TPM approach and have demonstrated that, when given the space and incentive, employers can and will work together through new collaboratives to manage their talent pipelines. This includes more clearly communicating their hiring requirements in ways that can improve and complement information now provided through real-time and government labor market information. The TPM movement also has demonstrated the potential power of providing employers and employer collaboratives with new online tools and resources (e.g., surveys, templates, libraries) to more clearly develop, align, and communicate their competency and credentialing requirements. However, these pilots have identified the need for additional tools and resources that can be more easily integrated with their human resource information systems (HRIS) and services provided by leading HR technology vendors (e.g., recruitment, applicant tracking, job description, and competency management). This integration is necessary to reduce the time and costs involved in employer signaling, especially in signaling competency and credentialing requirements.

The challenge is not whether employers will collaborate in improving employer signaling, but whether they have the tools and resources necessary to do this in new and unprecedented ways to close the skills gap. To answer this challenge, the USCCF is now exploring a job registry service that can provide online tools and resources linked directly to employer HRIS and related HR vendor services. This job registry service will be designed to help employers develop, align, and distribute information on their hiring requirements in collaboration with other employers and with their most trusted education and workforce partners. In addition, this service also will be designed to communicate information to other stakeholders as well as improve real-time and government labor market information that addresses changing job requirements in national, state, and regional markets.



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The USCCF is in the early stages of exploring the development and use of a job registry service in cooperation with the George Washington Institute of Public Policy and the University of Chicago's Center for Data Science and Public Policy. This paper provides the vision and rationale for an employer-led job registry service. It addresses why the time is now to advance a job registry solution and describes the unique data services it can provide to employers and other major stakeholders. It also addresses how a job registry service can leverage existing web-based technologies and standards as well as be integrated within a larger, evolving data infrastructure, including implications for real-time labor market information and government data services. This paper concludes with a discussion of how the registry service could be designed and pilot tested with employers and other major stakeholders.

Talent Pipeline Management

Launched in 2014 by the USCCF, the TPM initiative is an employer-led movement designed to close the skills gap. The TPM approach encourages employers to play an expanded leadership role in education and workforce partnerships by leveraging lessons learned from supply chain management and applying them in new and innovative ways to source talent. In TPM, employers play a stronger end-customer role in managing their talent supply chain partnerships by working in collaboration with other employers to more clearly communicate their competency, credentialing, and other hiring requirements for their most critical jobs.

As shown in Figure 1, the TPM approach consists of six major strategies that when performed together and in sequence make for a talent supply chain approach. In the first strategy, TPM encourages employers to form collaboratives through employer-led organizations and business associations to provide better leverage when organizing performance-based partnerships with preferred education and workforce providers. In the second and third strategies, TPM encourages employers to focus attention on improving signaling by developing short-term projections of openings for their most critical jobs (Strategy 2) and then clearly communicating the hiring requirements for those jobs, including competency and credentialing requirements (Strategy 3). The remaining strategies focus on identifying current and future sources of talent as well as managing performance and aligning employer incentives.¹

1 This paper builds on employer signaling in USCCF's Talent Pipeline Management initiative. To learn more about this initiative visit www.TheTalentSupplyChain.org. The initiative's original white paper and implementation guide are cited below. Also, employer signaling is described in even greater detail along with the tools available to aggregate and distribute employer signals on competency and credentialing requirements, in the forthcoming TPM Academy curriculum to be published in the fall of 2017.

Robert Sheets, Jason Tyszko, and Joseph Fuller, *Managing the Talent Pipeline: A New Approach to Closing the Skills Gap* (Washington, D.C.: U.S. Chamber of Commerce Foundation, 2014).

Robert Sheets and Jason Tyszko, *Building the Talent Pipeline: An Implementation Guide* (Washington, D.C.: U.S. Chamber of Commerce Foundation, 2015).



Figure 1: TPM Strategies

TPM Strategy	Strategy Objective
Strategy 1: Organize Employer Collaboratives	How to organize employers to address a skills gap for critical jobs
Strategy 2: Engage in Demand Planning	How to forecast the number of jobs needed across companies
Strategy 3: Communicate Competency and Credentialing Requirements	How to create a shared language for communicating hiring requirements
Strategy 4: Analyze Talent Flows	How to identify current and future sources of talent
Strategy 5: Build Talent Supply Chains and Manage Performance	How to manage performance for employer partners and designate preferred providers of talent
Strategy 6: Continuous Improvement	How to engage in continuous improvement

Employer Signaling in Talent Pipeline Management

TPM is unique in its approach to employer signaling of hiring requirements, which provides the foundation for an employer-led job registry service. What makes it stand out is entrusting employers with communicating more specific, granular, and actionable information that pertains directly to their companies and collaboratives. This information can be used to improve the hiring process as well as provide better information on hiring requirements to trusted education and workforce partners. As shown in Appendix A, the TPM approach is designed to build on and complement information provided through government data sources and real-time labor market information systems that use online job postings.

The TPM approach encourages employer collaboratives to develop and align their hiring requirements for their most critical jobs. In most cases, employer collaboratives use government and real-time information systems to start a conversation on which business functions and jobs they will focus on. Employer collaboratives then conduct a survey using job description information and related competency and credentialing frameworks and taxonomies that can provide the starting point for developing a common language for describing shared needs. Through the survey employers both signal the level of demand for their most critical positions based on clearly defined market assumptions, and specify the competency and required or preferred credentialing requirements associated with those positions. The process is meant to identify similarities and differences across companies, which can then be used to either harmonize requirements or better communicate differences across companies using a shared language.

For example, an employer collaborative may choose to focus on one or more business functions, such as software development or welding, that cover a number of jobs that are similar but called something different within companies. An employer survey is then designed to identify all relevant hiring requirements using a consistent organizing framework and language for describing these requirements. When reviewing competency requirements, employer collaboratives look for existing competency frameworks and taxonomies (e.g., essential skills) to provide more employer-neutral language for describing the full range of competency requirements at the required levels of granularity and the relative importance of these requirements. The results of the survey process can be shared to help companies improve their job descriptions and on-line job postings. They can also be used to communicate aggregated or individual-level employer information to trusted talent supply chain partners (e.g., education and workforce providers) that are the major sources of talent for these targeted jobs.



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Lessons Learned in Improving Employer Signaling

Over the past two years, the USCCF has pilot tested the TPM approach in states and regions throughout the country. These pilots have explored how employers can work together through employer collaboratives to more clearly communicate hiring requirements in ways that can improve and complement information provided to education and workforce partners through real-time labor market information and government data services. More recently, the USCCF and some pilot partners have experimented with new TPM web-based tools and resources to better compare and align these requirements across employers so that all employers can more clearly communicate both similarities and differences in their hiring requirements to their talent pipeline partners.

These piloting efforts have provided useful lessons in how to improve employer signaling, including the following:

- 1. Valid and Trusted Signals:** Employers must play a stronger end-customer role in identifying their most critical jobs and the work tasks and competency and credentialing requirements associated with those jobs through a strategic job analysis. Employer job descriptions should document the results of this analysis. Employers should use their job descriptions as the primary mechanism for providing accurate, validated, and trusted information to employer collaboratives and talent sourcing partners.
- 2. Transparency and Flexibility:** To be fully transparent, employers must provide more comprehensive and granular information that is comparable to other employers so talent sourcing partners can determine how employer requirements are similar or different. Employers can use shared terminology and language in ways that do not significantly reduce their flexibility in how they organize work and determine hiring requirements. The challenge is finding the right balance in order to be more transparent without revealing proprietary information in the process. The TPM experiment has demonstrated that when given the opportunity and incentive, employers will provide more comprehensive and granular information and will use a common, shared language and terminology to signal their requirements.

However, this must be a collaborative and bottom-up alignment and harmonization process based on shared information among employers through a trusted business-led organization. This requires more open and shared job classification systems and competency frameworks and taxonomies that are widely available to employers and their talent sourcing partners. However, this cannot be accomplished by imposing a predefined occupational classification system, competency frameworks, taxonomies, or broader content models using a predetermined language for communicating hiring requirements.

- 3. Risk Management:** Employers can benefit significantly by sending clearer signals, but they also must manage the potential associated risks. One major risk is providing proprietary information about hiring requirements that may be used by competitors for sourcing talent. Another risk is government regulations, including how government could use this information to put additional reporting burdens and regulatory constraints on employers and their talent sourcing partners. The TPM approach has shown that employers can manage these risks by working through trusted employer-led partners and intermediaries to address their shared needs. They also can share in the capacity building and cost of communicating to their trusted education and workforce partners and with other stakeholders, including government.



- 4. Time, Cost, and Scale:** Employer signaling has the potential to provide employers real value in acquiring talent that best meets their needs, but improving how employers provide these signals cannot impose excessive time and cost. And this process must be feasible and cost effective for all types of employers—especially small to mid-size employers—and operate at the scale needed to provide employers with sufficient leverage in the labor market.

The TPM approach has demonstrated that employers can reduce time and cost through online tools and resources and increased integration of these tools and resources with HRIS and related vendor tools. This is the major challenge—and opportunity—in moving to the scale needed at the national, state, and regional levels.

- 5. Employer Diversity:** Employer collaboration around signaling hiring requirements between small, mid-size, and large employers can yield many benefits and achieve economies of scale. Many small to mid-size employers do not have sophisticated human resources departments, job analytic capabilities, or HR systems and technologies. This is particularly problematic since these employers are also the largest job creators in the country. Through collaboration across employers—and with potential input from large employers with more sophisticated capabilities—shared language around hiring requirements can improve employer signaling for the majority of job creators.

In summary, the TPM movement has demonstrated the potential power of providing employers and employer collaboratives with online tools and resources to more clearly develop, align, and communicate their hiring requirements for their most critical jobs. These pilots also have clearly identified the need for additional online tools and resources, including open competency frameworks and taxonomies that can support the development of a common language and be more easily integrated with HRIS and other services provided by leading HR technology vendors (e.g., recruitment, applicant tracking, competency management).

The Job Registry: Why This Approach, and Why Now

Based on these lessons learned from TPM pilot testing, the USCCF is now planning to create a job registry service for employers that can provide web-based tools and resources linked directly with employer HRIS and related HR vendor services. These services will focus on the development, benchmarking, and alignment of competency and credentialing requirements. The proposed job registry will provide a suite of services that can improve the quality and granularity of employer signaling at scale while also leveraging technology in a way that allows for faster, clearer signaling to stakeholders such as education, training, and credentialing providers. This paper now describes the job registry approach and its feasibility due to recent developments in HR standards and technology and open competency and credentialing frameworks, taxonomies, and content models.²

Creating More Transparent Job Descriptions and Hiring Requirements

The job registry service provides a set of web-based services to employers and their HR technology providers to promote greater employer transparency and collaboration in talent sourcing and management. The registry focuses on improving how job descriptions (sometimes called job profiles) address major hiring requirements, especially competency and credentialing requirements. The employer-led job registry will provide the following:

² The job registry is a set of services provided to employers and their HR technology partners including a job data repository. In some cases, this paper refers to the “job registry” which is a short-hand way to refer to these same services.



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- 1. Job Analysis and Description Services:** Services for developing (e.g., job analysis), benchmarking, and distributing job description information (e.g., competency requirements). These services could include the following:
 - Job description templates and formats based on HR open standards that define the essential components of job descriptions
 - Job description benchmarking tools that guide the development of job descriptions based on leading business and industry models, including competency and credentialing requirements
 - Job analysis tools including validation surveys that allow incumbent workers, managers, and experts to rate the importance levels of job responsibilities/work tasks and other competencies (e.g., knowledge and skill requirements)
 - Data exchange tools that allow employers to send and receive information from employer collaboratives that are aligning and harmonizing competency and credentialing requirements for building talent pipelines
 - Communication and publishing tools for distributing job descriptions or selected elements of these descriptions (e.g., job title, competency, and credentialing requirements) to talent sourcing partners and other stakeholders, including:
 - state and regional TPM employer collaboratives;
 - business and industry associations;
 - talent sourcing partners such as education and training providers;
 - corporate websites, social media sites, and online job boards;
 - online systems that communicate and capture information on whether employers require, prefer, or otherwise recognize specific credentials; and
 - these services also will provide an option to post to the job registry data repository.

- 2. Resource Library:** These services will utilize an online library of open-licensed resources for developing more comprehensive, transparent, and comparable job description data. This library will leverage Web 3.0 linked data principles and will work with resource partners to maintain and share their resources using open-linked data in cooperation with related initiatives (e.g., Credential Engine).
 - **Job Description Templates and Job Description Language.** The job registry will work with global standardization initiatives including Schema.org and the HR Open Standards Consortium to increase employer support and use of job description standards and specifications designed to support HR system interoperability (e.g., job description systems, background check systems, competency management systems, and applicant tracking systems). The registry will work with these standardization efforts to develop and support (1) job description templates that describe the major elements of job descriptions as defined by Schema.org and HR Open Standards Consortium and (2) a job description language that provides more detail for how to describe jobs for each of the elements using common definitions, controlled vocabularies, and open-source frameworks and taxonomies.
 - **Open-Licensed Frameworks, Taxonomies, Content Models, and Ontologies.** Comprehensive HRIS providers and more specialized technology providers now provide job description templates, tools, and libraries with proprietary job and competency taxonomies and related resources that may draw from government sources (e.g., O*NET). The registry resources provide access to these same government sources as well as other open-licensed resources that can also be used by talent sourcing partners, including:



- competency frameworks for organizing and aligning competencies for specific sectors (e.g., manufacturing, cybersecurity) and cross-cutting competencies (e.g., employability skills);
- competency lists (e.g., detailed work activities) for specific content areas (e.g., industrial maintenance);
- competencies developed and validated by industry and professional certification organizations;
- content models that further define major components of job descriptions (e.g., job responsibilities and work tasks, knowledge, and skills); and
- competency taxonomies and other conceptualizations of domains using a defined vocabulary (e.g., ontologies) that define types and levels of competencies and links to data resources.

This library will build on the resource library now being developed by TPM in cooperation with national partners. As with TPM, the intent is not to develop common job descriptions similar to how government now standardizes common occupational descriptions (e.g., Standard Occupational Classification [SOC]) and content (e.g., O*NET). Rather, the job registry services will be designed to allow employers to compare and benchmark similar job descriptions and encourage employers to develop more transparent and comparable job descriptions that show both similarities and differences in job requirements. In addition, the job registry services will allow employers to publish additional open-licensed competency taxonomies and list and update and extend existing frameworks and taxonomies to better meet their needs. This would encourage a more open, bottom-up and market driven process in determining which frameworks and taxonomies best capture employer requirements and how these open-licensed resources can be changed over time. In this way, the job registry will provide a better view into how employers are organizing the labor market while providing information about changing requirements, all in real time.

- 3. Job Data Repository:** These services also will utilize a job description data repository consisting of—at a minimum—de-identified and anonymized employer job description data that can be used by employers and employer collaboratives to benchmark and align hiring requirements and track major changes in job design and hiring requirements. This job data repository could start with the data elements defined in HR standards (see Figure 2) and then could expand over time.

For example, the registry in the future could hold job data that describe the importance levels of job responsibilities/work tasks and other competencies such as knowledge and skill requirements that were determined using job analysis and benchmarking tools. The registry also could hold data on the number of positions associated with each job description to show staffing patterns for critical business functions and entire organizations. This job data repository could be expanded further to become a better resource for improving employer benchmarking and government labor market information.

This job registry service will be designed to provide valuable benefits to employers and their HR technology partners in better managing their talent pipelines. Through this service, employers will be able to communicate more accurate and comprehensive information on hiring requirements, especially competency and credentialing requirements. As described below, these services will support important applications that will improve the cost-effectiveness of talent pipeline management from sourcing to retention. The job registry service also will provide benefits to education and training partners in reducing the time and cost of working with employers in determining their hiring requirements. The job registry service also would provide benefits to those seeking to improve information in the talent marketplace. It will also be designed to provide more accurate, up-to-date, and historical labor market information that can be used by government without increasing the reporting burden and regulatory risk on employers. To provide these services, the registry should be operated by an employer-led nonprofit organization that will ensure that the registry is developed and managed by employers, for employers with input from major stakeholders and experts.



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Why Now?

This job registry approach should be explored further because it is a unique approach designed to address the most pressing needs of employers in closing the skills gap. It leverages existing and proven technologies and new developments in HR standards and technology open linked data principles used by related initiatives, including Credential Engine and its Credential Registry.

This job registry approach should be explored and pilot tested now for the following reasons:

- 1. Employer Collaboration in Closing the Skills Gap:** Employers must work together to close the skills gaps by sending clearer signals. Many employers have demonstrated a willingness to collaborate in improving how they communicate their hiring requirements. They also have shown willingness to begin to standardize how they communicate these requirements and the language they use to describe similarities and differences in competency and credentialing requirements.
- 2. HR Standards for Job Descriptions and Postings:** Leading global standardization organizations have developed schema and standards for defining the major data elements for job descriptions for posting online job openings and managing job data in HRIS and more specialized HR vendor systems. These include the Schema.org job posting schema³ and the HR Open Standards Consortium standards. As shown in Figure 2, these standards provide the basis for managing and exchanging data on the major components of job descriptions that address hiring requirements.

Figure 2: Example Elements Addressed in HR Job Description/Posting Schema and Standards

- Employer: Hiring organization offering the job
- Industry: Industry associated with the employer and position
- Job Title: Name or title of the job
- Occupational Category: Category or categories describing the job (e.g., SOC)
- Employment Type: Type of employment relationship (e.g., full time, part time, contract, and internship)
- Job Location: Geographic location associated with the job
- Job Responsibilities: Work performed in the job
- Job Requirements: Description of skills and experience needed for the job
- Education Requirements: Education and credentials
- Compensation: Base salary or wage rate and benefits

- 3. HR System Integration and Interoperability:** Employers now have access to web-based HR technologies that have leveraged these standards and related interfaces to improve the interoperability of HRIS and more specialized HR technology services including these job registry services. These standards and web services could substantially reduce the time and costs in improving how employers signal hiring requirements. This will enable the job registry service to be easily integrated with existing HRIS and related HR technology services as a critical linkage to complementary services, open-licensed resources, and rich job data repository.

3 The Schema.org job posting schema can be found at <http://schema.org/JobPosting>.



- 4. Open-Licensed Frameworks, Taxonomies, Content Models, and Ontologies:** Employers now have access to a wide variety of open-licensed resources for describing job responsibilities and competency and credentialing requirements. These include competency frameworks, taxonomies, content models, and ontologies that provide organizing structures, conceptualizations and controlled vocabularies that can form the foundation for developing a shared language for industry or occupation-specific tasks and skills as well as cross-cutting employability skills. These open-licensed resources can be converted into open-linked data formats and used by both the job registry and related initiatives (e.g., Credential Registry) to promote a shared language between employers, students and job seekers and talent development and sourcing organizations.
- 5. Open and Dynamic Approach Leveraging Advanced Technologies:** TPM and the job registry promote an open and dynamic approach in using these open-licensed resources in improving employer signaling. The job registry will use existing technologies to allow employers to use these resources to develop a common language for describing both similarities and differences in hiring requirements and will enable employers to constantly add to and extend these resources to address their needs. This approach also will leverage leading developments in artificial intelligence and related HR technologies to improve how job information is used in improving talent pipeline management.
- 6. Public-Private Data Infrastructure for the Talent Marketplace:** The job registry could complement related initiatives in developing a new public-private data infrastructure for talent pipeline management. For example, the Credential Engine is using Web 3.0 linked data guidelines to develop a Credential Transparency Description Language (CTDL) and a Credential Registry. This initiative shows the potential of building on web standards and technologies to provide services and create a repository of comparable data. The Credential Registry is designed to support a wide variety of applications, including employer applications. The web-based job registry, along with the Credential Registry, could support employer applications that signal competency and credentialing requirements including employer recognition of specific credentials. These initiatives could then provide the basis for developing additional student and job seeker platforms and data vaults that could also be supported by a similar registry service. And these initiatives could complement and leverage promising initiatives to build more comprehensive individual-level data systems that capture education and training, credentialing and employment patterns in the talent marketplace.

Job Registry Applications

The registry will be successful only if it is designed to address the most important applications and uses of employers and other stakeholders. As shown in Figure 3, the registry could support applications for employers and a variety of stakeholders, including talent sourcing partners, students and workers, and government statistical agencies. The most important uses are those for employers because they will have to see sufficient value in the job registry to voluntarily structure and submit their job description data. The following are some possible employer applications:

- **Improving Job Analysis, Design, and Validation of Competency and Credentialing Requirements:** Employers could use the job registry to build and benchmark job descriptions in ways that improve job design for critical business functions and processes based on leading practices and trends in their own sector captured in the resource library and job data repository. The registry could be used to define the main work tasks and responsibilities for major jobs and job families. Employers also could improve how they define competencies based on leading competency frameworks and taxonomies and leading practices and trends in their own sector as well as competency

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frameworks used by their talent sourcing partners. Employers could also better manage their internal jobs data, including competency and credentialing data.

- **Aligning and Harmonizing Job Descriptions and Hiring Requirements:** Employers also could use the job registry to work with other employers through employer collaboratives and their respective business and industry organizations to align and harmonize job descriptions and hiring requirements. This could be accomplished through the use of industry frameworks and taxonomies and the analysis of employer job description data in the job repository. This alignment and harmonization could be used to more clearly communicate similarities and differences across employers, even within the same job family.

Figure 3: Job Registry Benefits



- **Communicating Employer Hiring Requirements:** Employers and employer collaboratives could use the job registry to distribute job descriptions or selected elements of these descriptions (e.g., job title, competency and credentialing requirements) to talent sourcing partners. This would provide information on all of their most critical jobs so talent sourcing partners can better understand changing job requirements so they can be ready to respond to future job openings. This also could be used to provide more accurate and complete information on job opportunities for existing workers to improve the leveraging and use of existing talent.

- **Job Postings:** Employers also could use the registry to improve job postings based on HR standards to improve how they communicate hiring requirements to potential talent sourcing partners and job seekers. These job postings would have the same information as the job description data provided to talent sourcing partners but could more easily be accessed and integrated into other web applications used for talent pipeline management.



- **Discovering Talent Partners:** Employers could use their job descriptions to find talent sources that best match their requirements through related registries based on the same underlying technologies that maintain information on credentials, institutions, and programs.
- **Improving Search for Potential Job Candidates:** Employers could also use the job registry to search and discover active and passive job candidates. This could be done through linking to resume and transcript systems and repositories as well as student and job-seeker platforms that utilize a similar standards-based approach and linked data technologies. This would improve the job fit of new hires and could potentially reduce or streamline the onboarding process and training.
- **Business-to-Business Customer Training:** Businesses could expand use of the job registry to include changing skills and competencies associated with jobs that are tasked with using their products and services. This is of particular importance for products and services that are agile and undergo frequent improvements that require rapid skill changes.

Overall, these applications and more would provide employers with significant benefits in sourcing talent, including:

- Reducing time and cost in developing and updating job descriptions
- Expanding the number of qualified job seekers and students applying for job openings
- Reducing screening and on-boarding time and costs
- Reducing the time in filling job openings
- Improving retention due to better fit between requirements and new hires
- Improving career advancement and retention for existing workers because of improved transparency in job opportunities
- Improving responsiveness of education and training partners to changing requirements

In addition to providing value to employers, the job registry could also provide value for talent sourcing partners, especially credentialing organizations such as certification bodies, universities, and colleges. Applications include the following:

- **Learning Outcomes Assessment:** Credentialing organizations could use the registry to develop and validate learning outcomes associated with their programs and credentials, which would save time and money in surveying employers or conducting advisory group meetings. It would also allow for credentialing organizations to more quickly adapt to changing employer requirements by having a more direct line of sight into the shifting needs of target employers and industries.
- **Career Readiness Systems:** State and local partners could leverage the data provided by the job registry to align career pathway initiatives that span the K-12 and postsecondary education system. This includes identifying employer-preferred and -required competencies and credentials in priority industry sectors and the careers within them. This data could be used to inform, improve, and update curricula as well as to align funding streams around credentials of value.



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- **Job Placement Services and Employer Partnerships:** Credentialing organizations, workforce providers, and staffing agencies could use the job registry to better target job applicants to open positions based on improved signaling of employer requirements. They also could track changes in job requirements that may be reflected in job openings in the future. Credentialing organizations could also use the job registry to improve alignment between their learning outcomes and employer hiring requirements. In this way, credentialing organizations could better market their credentials and target new employer partnerships that would support more effective job placement and career services.
- **Connecting Military and Civilian Job Opportunities:** The military and organizations providing career services to veterans could improve how they analyze similarities and differences between military and civilian jobs and credentials and how they make connections. This would be used to improve transitions from military to civilian careers and improve how employers can fill critical job openings with qualified veterans.
- **Alumni Services:** Postsecondary institutions and programs could use the job registry to track changing employer requirements and use this information to benchmark gaps between alumni credentials and the labor market. This information could be used to develop and make available opportunities to upskill alumni education and credentials to stay up to date with changing employer demand.

Another key stakeholder group includes the students and workers who can directly benefit from data found in the job registry. Use cases targeted to students and workers include the following:

- **Career Information:** Through consumer information systems, students could access better information on which jobs are most critical to employers in a given industry, which skills they prioritize in their job postings, and which credentials they require or prefer.
- **Skills Gap Analysis:** Applications could be developed to support students in assessing the gaps between their validated skills and competencies and what employers are seeking in a qualified job applicant. They can then find those providers and credentials that are best able to address those gaps in the most efficient and streamlined way.
- **Upskilling Incumbent Workers:** Workers too could benefit from the job registry by undergoing a similar skills gap analysis as described above, in which workers could better understand what is needed to gain upward mobility within a company or industry to move into a destination job. Professional development and training plans could then be customized to address the skills and competencies that are missing.

An additional key stakeholder group includes real-time labor market information providers, government labor market information services, and researchers who use these resources to analyze changing job trends. Use cases targeted to these groups include the following:

- **Analyzing Employer On-Line Job Postings:** Real-time labor market information providers could have access to more structured, complete, and comparable job posting information as more employers adopt leading HR standards and use open-licensed resources. This could allow these providers to investment more time and resources in analyzing job postings and providing more value to their customers.



- **Improving Government Labor Market Information:** Federal and state agencies could leverage the job registry repository to improve occupational classification systems, workforce and labor market information programs, and occupational information tools. These potential applications are explored in more detail in Appendix C.
- **Labor Market Researchers:** The job registry data repository and related data services could provide labor market researchers in academia, think tanks, and government with up-to-date and comparable information about changing job structures and requirements.

How the Job Registry Works

We now use the first employer application—improving job analysis, design, and validation of competency and credentialing requirements—to illustrate how the registry could work. As shown in Figure 4, the job registry service is designed to support employer talent management systems and more specialized HR applications in developing and distributing job description data including competency and credentialing requirements.

To illustrate how this could work, we can explore an employer scenario or use case which is described in more detail in Appendix B and summarized in Figure 4. In this scenario, an employer is interested in updating and benchmarking a job description to improve the information it now provides to a regional employer collaborative and its talent sourcing partners, as well as the job postings it puts on its corporate website and selected job boards.

The employer first compares the existing job description addressing work responsibilities, competencies, and technologies with taxonomies and frameworks provided through the resource library. This includes a summary table of job descriptions from comparable companies and those from their regional employer collaborative.

Next, the employer compares its credentialing requirements with those defined by other employers with comparable job responsibilities and competency requirements. The employer uses these resources to modify the current job description to make it more consistent with language of similar job responsibility and competency statements and the standard terminology to describe the technologies and credentialing requirements. From there, the employer identifies some elements that may be missing from the job description.

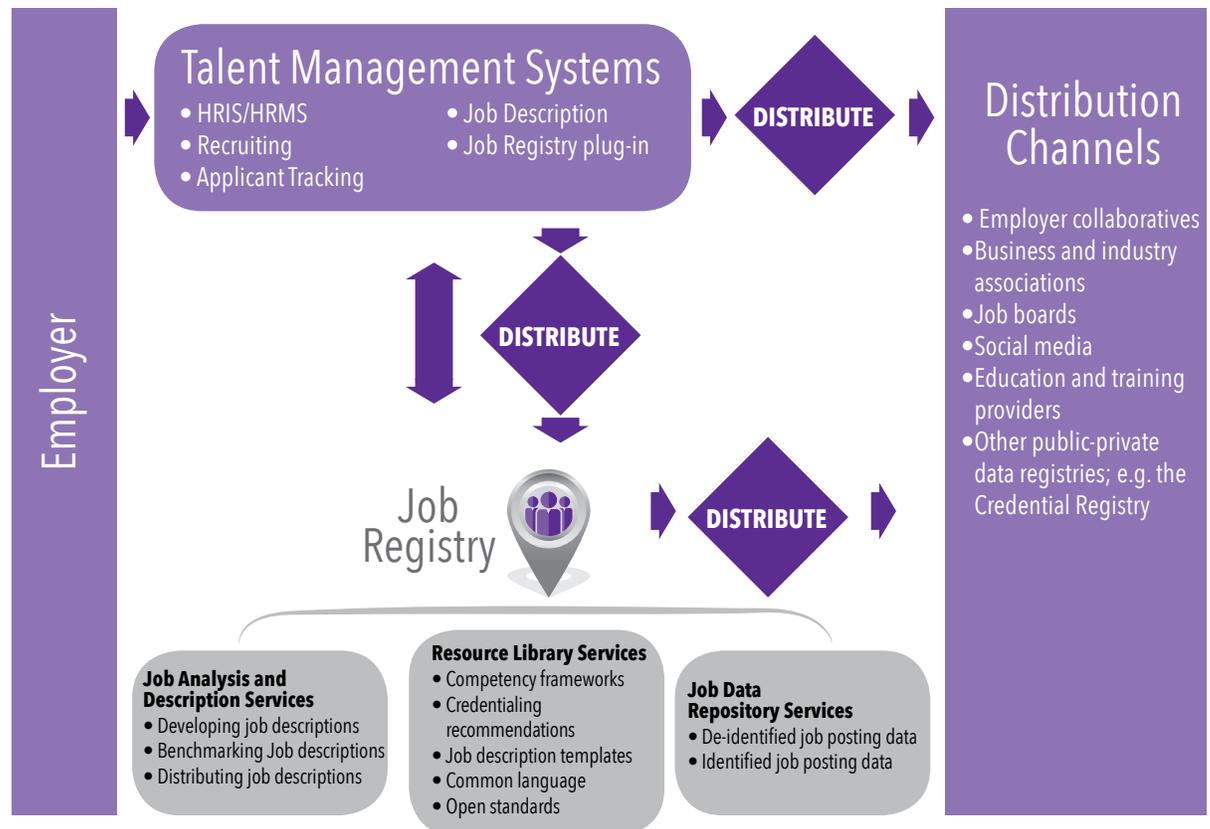
The employer then selects a job analysis survey for sending to incumbent workers, managers, and experts to identify the most important work responsibility and competency requirements plus what is missing and get feedback on the credentialing requirements. The results of the survey are analyzed by the employer and the decision is made to update the requirements in the new job description.

Finally, having successfully updated the job description, the employer distributes this information to job boards, social media sites, and other employers and to preferred talent sourcing partners. The new job description is also sent to the job registry's job repository so it can be used by other employers.

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Figure 4: Job Registry Use Case

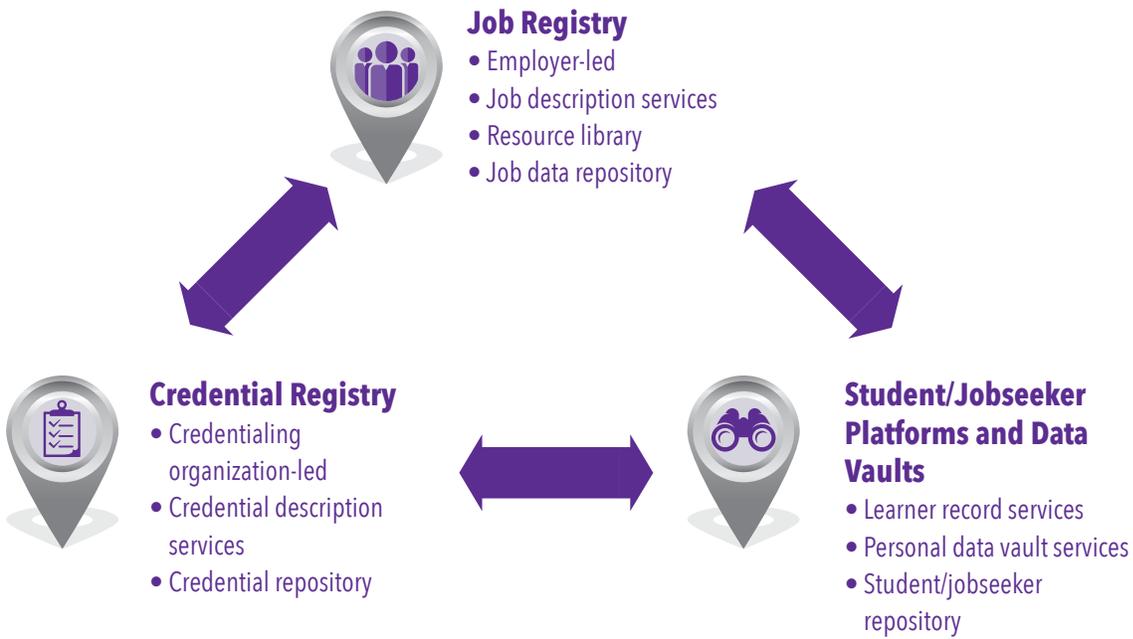


Exploring Implications for Government Information Systems and a New Public-Private Data Infrastructure

As shown in Figure 4, the job registry service is designed to distribute more complete and structured job openings data to corporate websites, social media sites, and online job boards. This will provide better data for real-time labor market information providers and government statistical systems that use job postings data. In addition, the job registry potentially can substantially enhance the value and impact of federal and state workforce statistics and information efforts—including occupational classification systems, workforce statistical programs, and information tools for career and job seekers. Major government information systems that could potentially benefit from the job registry are listed in Appendix C. In particular, the job registry would provide a rich data source for exploring changing jobs that inform occupational classification systems and changing competency and credentialing requirements for improving and validating occupational information.

To address the needs of employers and other stakeholders, the job registry service also should be designed as one major building block for a larger public-private data infrastructure designed to improve transparency in the talent marketplace based on open web standards and competency and credentialing frameworks, taxonomies, and ontologies.

Figure 5: A Vision for a Public-Private Data Infrastructure



As shown in Figure 5, the job registry services should support employer applications that distribute more complete and transparent signals to both credentialing organizations—especially talent sourcing partners—and students and job seekers.

These applications should be able to communicate to credentialing organizations and other talent sourcing partners what competencies and credentials are required or preferred. These applications also could communicate this same information to data repositories like the Credential Registry for showing which credentials on the registry are required, preferred, or otherwise recognized by employers and employer collaboratives.

This information also could be shared with platforms that allow job seekers and students to publish information about themselves on the open web and into registries while still maintaining the capability for private and secure data management (e.g., vaults) and transmission of their data to employers and credentialing organizations through open standards and more secure technologies (e.g., block chain technologies). Finally, the job registry could complement and support promising initiatives to build more comprehensive individual-level data systems that capture education, training, credentialing, and employment patterns in the talent marketplace.



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Major Challenges

Any future job registry would fill a major missing piece of the new and emerging public-private data infrastructure of the future. Credential Engine now provides a set of services to credentialing organization as well as a repository of linked and comparable data provided by a wide variety of credentialing organizations. Similarly, the job registry service could provide complementary services to employers, including a repository of data around changing hiring requirements for the most critical positions on which our economy depends. In addition, the job registry service could be designed to communicate information to improve real-time and government labor market information that identifies changing job requirements in national, state, and regional markets.

However, any future job registry service will face five major challenges that will need to be addressed in its design and explored more fully through a pilot:

- 1. Employer Buy-In and Use:** Will a proposed job registry have a sufficient value proposition to get a critical mass of employers to participate and share their data? Will it be designed in a way that addresses their most pressing talent management needs? Will the value outweigh any burden in organizing hiring requirements using structured data?
- 2. Shared Value Creation:** Will the job registry create sufficient shared value across all other major stakeholders—including education and workforce providers as well as government and “real-time” data providers—to build demand and support for an employer-led job registry?
- 3. Interoperability and Transparency:** Will the system be designed in a way that is interoperable with other data initiatives and repositories? Can the data organized by employers be integrated with data provided by the Credential Registry, student and job seeker platforms, and data systems that manage individual level data on employment, education, training, and credentialing? Can it be done in a way to create greater transparency around the qualifications of job candidates and the relevance of credentials to employer hiring?
- 4. Application Access and Use:** Will the data be accessible to groups other than employers, and how will access to the data be managed? Will the job registry support an open applications marketplace that allows for a variety of user groups to access data within the repository to support labor market analysis, research, and credential alignment reports?
- 5. Government and Public Policy Leverage:** Will the job registry be able to provide complementary data to current labor market information collected by state and federal agencies? Can it be used to improve public policy and to improve the alignment of public incentives to support education and training investments as well as employment services?



Organizing a Job Registry Pilot

With the vision of a job registry in place, we now turn to addressing how it can be pilot tested in a way that addresses the value to employers and other key stakeholders and the major challenges to be addressed. The technology that can power a solution is already available today. What remains to be tested is whether employers see sufficient value to overcome any concerns in aligning and sharing their job description and hiring requirements data.

For a successful pilot to take place, multiple partners would need to be involved, none more important than the employers who will need to structure and share their job data in ways they have not historically done. Employers would need to be supported in the pilot testing with their chosen HRIS and other HR technology partners, who would be asked to integrate the job registry services with their own systems. There would also need to be clear consensus among the participating employers and HR technology partners on what the priority use cases should be addressed in developing and testing a viable job registry service that could be improved and expanded over time.

The USCCF should identify employers and their HR technology partners to assist in designing and testing the job registry. Employers could choose to serve on the advisory committee and work groups for further designing the job registry services and resources, and/or volunteer to be pilot partners for testing the registry.

From there, the first adopter employers and their HR technology partners could integrate the job registry services into their talent management systems and test whether this integration resulted in improved signaling to talent sourcing partners without adding excessive time and cost. This could be done with some leading employers and HR technology vendors addressing one or more critical skill shortage areas such as software development, cybersecurity, or industrial maintenance.

This also could be done with TPM pilot sites that have employer collaboratives in one or more sectors. This could involve the integration of the job registry service with existing TPM tools in ways that could promote integration with the HRIS and HR technologies used by participating employers. These TPM employer collaboratives also could test whether the job registry services provide value in aligning and harmonizing hiring requirements in communicating with talent sourcing partners. This pilot testing could also involve talent sourcing partners and whether they gain value through employer use of the job registry services. These two types of pilots also could involve testing whether the resulting job descriptions and online job postings provide improved value to real-time labor market information providers and government statistical agencies.

Based on the results of this development and testing, the employer advisory committee could then propose the next steps for further piloting as well as develop a business model for the future non-profit organization to take the registry to scale.



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Conclusion

Consistent and scalable employer signaling of hiring requirements has long been a challenge that has frustrated the business community, educators, workforce providers, and policymakers alike. If employers are going to be successful in the new economy and close the skills gap, it will require that they revisit the tools and practices used to find and source talent. It also requires that they communicate their needs in new and inventive ways given the challenges posed by a dynamic and changing economy.

The USCCF is leading the way with its TPM initiative and is developing and testing the next generation of tools and strategies that can transform HR systems and talent management solutions. To that end, the USCCF, in partnership with the George Washington Institute of Public Policy and the University of Chicago's Center for Data Science and Public Policy, is exploring the opportunity and potential of a first-ever employer-led job registry.

This paper has attempted to lay out the rationale for an employer-led job registry and why the time is now right to develop and pilot test it. The paper has also laid out a vision of what the registry is and the major functions it can perform to organize structured data around employer hiring requirements, and how it can do so by leveraging new technologies and leading industry practices. This paper has identified how a job registry service can uniquely unlock a value proposition for key stakeholders and what priority use cases may be for employers, credentialing organizations, students and workers, and public agencies. Last, this paper identified how employers can work with partners to advance the discussion and co-design a pilot of the job registry to demonstrate its feasibility and its value.

The time is now. We invite you to join us in exploring this unprecedented opportunity.

To learn more about the job registry, please contact Jason A. Tyszko, executive director at the U.S. Chamber of Commerce Foundation's Center for Education and Workforce, at 202-463-5566 or jtyszko@uschamber.com.



Appendix A: Comparing Labor Market Information With TPM Demand Planning

Feature	State Occupation Projections	Real-Time Labor Market Information	Demand Planning
Objective	To determine which occupations are growing—or declining—in the short term and long term and whether growth or decline is due to employment demand, technological changes, or occupational separation	To assist workforce planning by providing information on current projected demand based on actual job postings by companies	To determine a more precise level of demand across employer collaborative members to assist in building a talent supply chain
Data Source	Federally administered state employer surveys for current occupation employment; U.S. BLS for technological change and occupation separations; state industry employment projections (2-year and 10-year) based on historic industry trend data	Job postings scraped from job boards or company websites	Direct from employer collaborative members based on agreed upon key assumptions
Time Period Covered	2- or 10-year projections based on recent trends	Current, based on active online job postings	Short term, determined by the business collaborative members based on business cycles and talent development lead times
Targeted Positions	More than 800 detailed occupations defined by SOC	Like jobs aggregated from open job board websites and online job ads posted by companies; coverage uneven across occupations and industries	Positions selected by employer collaborative members; coverage uneven across occupations and industries
Key Assumptions	Average projected growth of occupations is due to occupation separations, technological change, and historic industry trends	Online job postings represent employer demand based on current worker recruiting strategies	Employers are capable of accurately producing, sharing, and making adjustments to their projections for new and replacement positions

Source: Forthcoming TPM Academy curriculum to be published in the fall of 2017.



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Appendix B: Employer Use Case: Designing Jobs and Defining Competency and Credentialing Requirements

The employer accesses the HRIS vendor's tool for developing, validating, and distributing job descriptions that is powered by services offered through the job registry.

The employer then does the following:

1. The employer accesses the online tool and sees a guidebar at the top that shows the steps in developing and validating a job description along with links to background resources for exploring the process in more depth.
2. The employer selects or builds the job description template using the list of elements addressed in HR standards with the option to add additional elements (e.g., job responsibilities, credentialing requirements).
3. The employer selects the business function (e.g., software development) for updating or developing a job description and enters a job title or enters key words to get a list of the most widely used job titles from the registry or other online resources.
4. The employer selects the first element on the template—job responsibilities/tasks—and sees resources provided by industry frameworks and taxonomies, employer collaboratives, and job responsibility/task data from the job repository, including data provided by collaborative partners and comparable employers. The employer selects job responsibilities/tasks from the online resources and adds additional ones from the most recent previous job analyses that reflects how the job is now designed within the business function at the company.
5. The employer selects the second element on the template—competencies—and sees resources from competency frameworks and taxonomies and employer collaboratives, and competency data from the job repository. The employer selects competencies from the online resources and adds additional ones.
6. The employer selects the third element—credentialing—and sees resources on education requirements and additional credentialing requirements, along with credentials that are required or preferred by collaborative partners and comparable organizations. The job registry also includes links to other data repositories, including the Credential Registry, and other sources of information on credentials. The employer enters credentialing requirements.
7. The employer selects additional elements and repeats the process to complete the job description based on the template.
8. The employer selects the option to “validate” the job responsibilities and competency requirements with managers, experts, and/or workers carrying out these roles through the registry job analysis tool.
9. The employer gets information back on the relative importance of job responsibilities, competencies, and technologies, as well as of additional items that were not previously captured in their job analysis, and decides to make changes.
10. Before leaving the job registry, the employer is given the option to import the resulting job description into their HRIS system used for job descriptions and postings and to choose how it wants to distribute the job description information, including to:
 - state and regional TPM employer collaboratives;
 - business and industry associations;
 - talent sourcing partners such as education and training providers;
 - corporate websites, social media sites, and online job boards;
 - online systems that communicate and capture information on whether employers require, prefer, or otherwise recognize specific credentials; and
 - an option to post to the job registry data repository.



Appendix C: Registry-Related Government Statistical and Data Systems

Potentially, the job registry can substantially enhance the value and impact of federal and state workforce statistics and information efforts—including occupational classification systems, workforce statistical programs, and information tools for career and job seekers.

Occupational Classification Systems provide the framework for collecting and presenting occupational statistics.

- **Standard Occupational Classification (SOC) System**

- The SOC is the federal framework for classifying and describing the full array of occupations. At present, the SOC has 840 detailed occupations, each with a description of duties.
- The job registry has the potential to enhance the accuracy of SOC classifications and descriptions. Because by design all federal occupational statistics and information efforts are based on the SOC, an improved SOC would have a substantial positive impact.

- **Occupation-Skills Crosswalk**

- Using O*NET, the Employment and Training Administration (ETA) has constructed a crosswalk between occupations and skills.
- The job registry has the potential to improve the accuracy and value of an occupation-skills crosswalk, which in turn would aid educators, trainers, and people changing careers.

Workforce Statistical Programs

- **National Compensation Survey (NCS), Bureau of Labor Statistics (BLS)**

- The NCS is an establishment-based survey that provides comprehensive measures of (1) employer costs for employee compensation, (2) compensation trends, and (3) the incidence of employer-provided benefits among workers.
- NCS economists have developed a point system to determine the work level of a job within an occupation, based on four factors: knowledge, job controls and complexity, contacts, and physical environment.
- By providing much more information on the nature of individual jobs and the association compensation, the job registry has the potential to improve the accuracy and utility of the NCS work-level point system.

- **Occupational Requirements Survey (ORS), BLS**

- The ORS gathers occupation-related information regarding physical demands, environmental conditions, mental and cognitive demands, and vocational preparation requirements. Types of mental and cognitive demands include decision making, supervision received, the pace of work, the amount and type of adaptability required, and personal interactions required to conduct the work.
- The Social Security Administration (SSA) has contracted with BLS to conduct the ORS to inform SSA's disability claims review process. BLS can use the information to enhance its other occupations-related data efforts.
- The job registry has the potential to enhance and supplement the ORS data collection effort.

- **Occupational Employment Statistics (OES), BLS**

- The OES produces employment and wage estimates annually for over 800 occupations. These estimates are available for the nation, individual States, and metropolitan and nonmetropolitan areas. National occupational estimates for specific industries are also available.
- The job registry has the potential to enhance the accuracy and reliability of OES data by geography and industry.

- **Employment Projections (EP), BLS**

- Every two years, for each detailed occupation the EP estimates the number of jobs ten years out and the number of job openings over that ten-year period. BLS regularly conducts an evaluation of the accuracy of its estimates.



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- Through an improved SOC and better understanding of occupational attributes and prerequisites, the job registry has the potential to improve the accuracy of the EP's industry-occupation matrix (occupational mix by industry) and occupational projections overall.

Occupational Information Tools

- **Occupational Information Network (O*NET) and related products, ETA**
 - Based on the SOC, O*NET currently covers 974 occupations. These distinguishing characteristics of an occupation are described by the O*NET Content Model, which defines the key features of an occupation as a standardized, measurable set of variables called "descriptors." This hierarchical model starts with six domains, describing the day-to-day aspects of the job and the qualifications and interests of the typical worker. The model expands to 277 descriptors.
 - O*NET supports a number of web-based information tools for career seekers, such as My Next Move and mySkills myFuture.
 - The job registry has the potential to facilitate a continuous updating of O*NET to reflect changes in occupations.
- **Competency Model Clearinghouse, ETA**
 - The goal of the Industry Competency Model Initiative is to promote an understanding of the skill sets and competencies that are essential to educate and train a globally competitive workforce. It does this by providing competency models for key industry sectors. There are currently 26 models in industries as diverse as the economy itself, including transportation, hospitality, cybersecurity, and engineering, to name just a few.
 - The job registry has the potential to expand the number of industries covered by the Competency Model Clearinghouse and improve the quality of the information provided for each industry.
- **Occupational Outlook Handbook (OOH), BLS**
 - The OOH provides information on what workers do; the work environment; education, training, and other qualifications; pay; the job outlook; information on state and area data; similar occupations; and sources of additional information, for 329 occupational profiles covering about 83 percent of the jobs in the economy.
 - The job registry has the potential to improve the accuracy, detail, and value of the OOH.



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Notes:



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