THE ECONOMIC GRAPH

DECEMBER 2016

Linked in

EXECUTIVE SUMMARY

There are more than three billion people in the global workforce. LinkedIn's vision is to create economic opportunity for each and every one of them. The development of the world's first Economic Graph helps make that vision a reality.

The Economic Graph is a digital map of the global economy and a source of information for individuals, governments and private sector organizations that are making decisions about jobs, education and training. Today the Economic Graph is comprised of over 467 million members on LinkedIn around the world, seven million companies, over thirty thousand institutions of higher education and almost seven million open jobs.

The Economic Graph is the company's true north—something that all LinkedIn employees are building together. Within that broader effort, a small cross-functional team focused on public policy and research works on helping LinkedIn become a primary source of insights and ideas that guide leaders' decisions on workforce development across the globe. The team does this by bringing to life research and pilot projects that help leaders understand and address the future of the global workforce.

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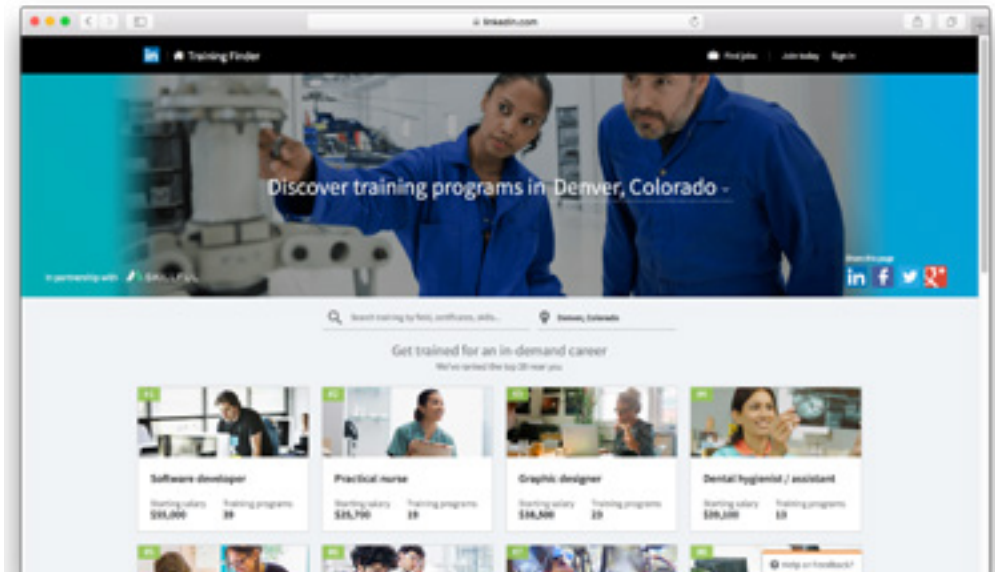
This document is a high-level overview of selected work completed by the team in the past 12 months. First, we examine each of the major pilots that our team has undertaken to better understand the workforce at the local level—from our work with the educational institutions, local governments and workforce investment boards in Colorado and Arizona, to our pilot in Utah, which seeks to understand the extent to which unemployed individuals receiving benefits can be impacted by LinkedIn Job Seeker assistance. Second, we outline partnerships we have engaged in with local governments, the White House, governments throughout Europe, the Middle East and Asia-Pacific, and international and multinational organizations, nonprofits and academia over the past year. Third, we outline some of the deeper research projects that have expanded our own thought leadership and impact in this space.

PILOT PROGRAMS

Training Finder Product Launch with Skillful in Colorado and Arizona

Over the past year, one of our team's largest focuses has been on narrowing the middle skills gap in Colorado and Arizona through policy and product initiatives in partnership with the **Markle Foundation's Skillful** program. The team launched **Training Finder**, a new tool to help job seekers in Colorado and Arizona who have a high school diploma and some or no college education find training to land middle-skill jobs in fields such as IT, advanced manufacturing and healthcare. In addition, our pilot provides a unique combination of online tools with offline events and training. Our city staff works closely with the governmental and community organizations

that directly support middle-skilled workers. In the first five months since launch, the ground game staff has trained almost 8,000 workers, career coaches and navigators across both locations. Our work is critical because 44 percent of the recruiters and hiring managers we surveyed in Colorado and Arizona said it's hard to find people with the right technical skills, and 54 percent of workers who have a high school diploma and some or no college education said they don't know what jobs are available, and whether or not they need additional training to acquire the skills required for those jobs. The Governor of Colorado has **repeatedly praised** LinkedIn for our investment in the state and the importance of this work for Colorado's economy.

Further Reading:

How LinkedIn is Helping Create Economic Opportunity in Colorado and Phoenix (by Allen Blue, co-founder of LinkedIn)

A Call to Value People's Skills, Not Just Degrees (by Zoë Baird, founder of the Markle Foundation)

Skillful Launches in Colorado, Creates Pathway to Good Jobs (by John Hickenlooper, governor of Colorado)

How Do I Master That Skill? LinkedIn, Markle Want To Help (Forbes)
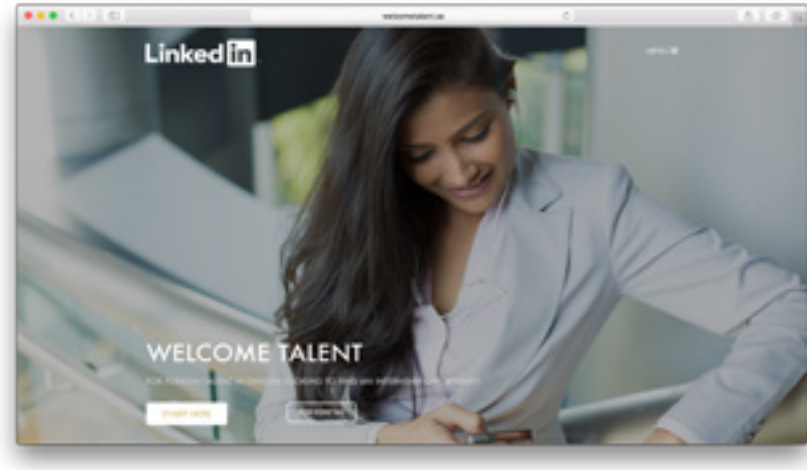
InPloyment:
Utah Unemployment Project

In June, the team launched the first-ever pilot to study the impact of LinkedIn on unemployment. In close partnership with the state of Utah, LinkedIn has been providing Job Seeker and Lynda subscriptions for 300-500 unemployed workers, plus training for staff employment counselors who provide counseling to those workers. The pilot's outcomes will be used by the state and U.S. government to shape government policy in an Unemployment Insurance program that operates 2,500 job centers, employs thousands of employment counselors and spends $45 billion on annual benefits. The pilot's outcomes will be used by LinkedIn to demonstrate our ability to partner with government to solve meaningful social problems and to learn how to create and engage members in an Unemployment Insurance program that services approximately 17 million potential members.

Utah State Employment Counselor Terry Hogan provides a LinkedIn consultation to an unemployed worker and InPloyment pilot participant in one of Utah's Job Centers.

Welcome Talent
for Syrian Refugees

As part of LinkedIn's mission to connect the global workforce to economic opportunity, we leveraged our core assets to connect refugees to employment through our program called Welcome Talent. In February 2016, LinkedIn launched its **Welcome Talent** pilot initiative in Sweden to help address the refugee crisis. Using the LinkedIn platform, we created a microsite that is an entry point to connect newly-settled refugees with employers who have committed to hiring them. The site has resources and case studies to help refugees create optimal profiles. To date, more than 1,000 jobs have been posted from companies including Coca-Cola, Swedbank, Spotify, Ericsson and Microsoft to hire refugees through our platform. We are taking a different partnership approach as we expand our efforts in


Canada by integrating LinkedIn training curriculum into economic empowerment and employment programs in collaboration with the Prime Minister's Office and two local NGOs. In addition, we are scaling this approach in partnership with the International Rescue Committee to grow our efforts across additional global markets.

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MULTILATERAL AND INTERNATIONAL GOVERNMENTAL ORGANIZATION PROJECTS
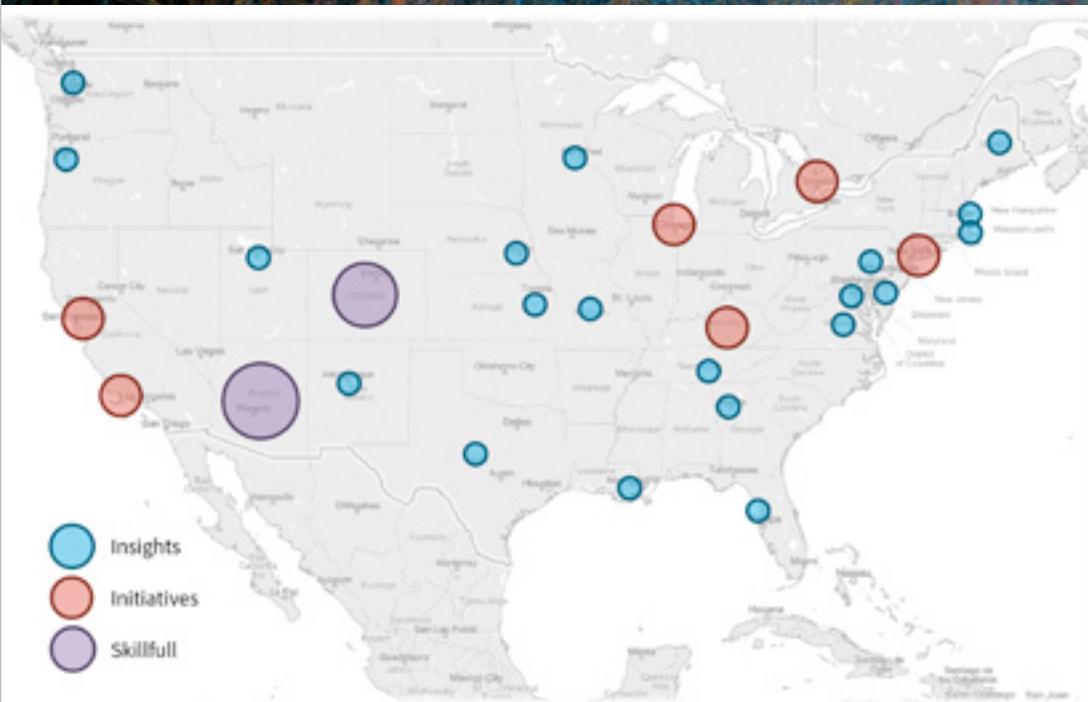
North America

City Research Projects

Our work in Colorado and Arizona is one of many examples of how we're using the Economic Graph and LinkedIn to help create economic opportunity.
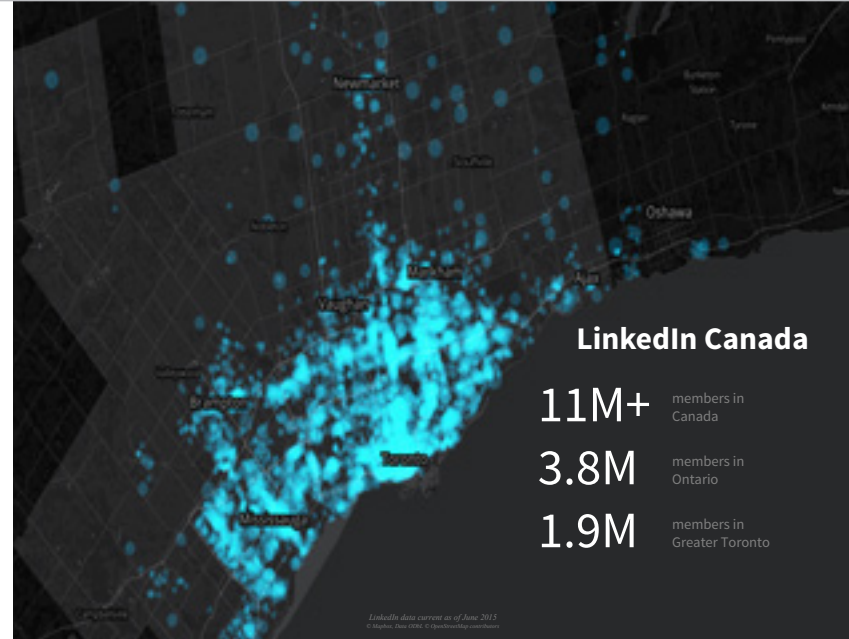
Apart from the work with Colorado and Arizona, the Economic Graph

team has engaged with more than 50 other city governments on smaller scale initiatives. Following are some of the major projects that we have done in North America, Europe, the Middle East and Asia-Pacific.

We used Economic Graph data **to provide New York City**, as part of its **Tech Talent Pipeline initiative**, with insights on the current state of the city's tech industry. The city used the insights to determine "how to deploy $10 million in funding to help NYC schools, government, nonprofits and companies better prepare New Yorkers for in-demand tech jobs and fuel the continuing growth of NYC tech businesses." This led to the launch of **10 new and expanded programs** focused on in-demand fields identified by LinkedIn including mobile development, web development, software engineering and cloud administration.

We partnered with Civic Action and the **City of Toronto** to examine ways in which the Economic Graph can assist with mitigating youth unemployment across the City of Toronto. We determined that the Toronto region has a strong, highly-skilled workforce when it comes to technology. Of the 1.9 million members in the Greater

LinkedIn Canada

11M+ members in Canada

3.8M members in Ontario

1.9M members in Greater Toronto

LinkedIn data current as of June 2015
© Mapbox, Data OEBE, © OpenStreetMap contributors

Further Reading:

LinkedIn Economic Graph Research: Helping New Yorkers Connect With The Jobs Of Tomorrow [Infographic]

LinkedIn Economic Graph Research: New York City [Slide Deck]

Unlocking New Insights & Potential From Our Technology Workforce (LinkedIn and Civic Action Report)

Toronto Area (GTA), 11 percent are sharing on LinkedIn that they have technology skills. We determined not only that tech-related skills are in high-demand, but also that a significant portion of tech-skilled LinkedIn members are in "early career roles," positions that generally require less than five years of experience. In fact, one in 10 GTA companies currently employs technology-skilled members in early career roles. LinkedIn also identified skills that were most likely to be found among Toronto area members who were recently hired into early career roles. Toronto is now using the data to help youth learn tech-related skills and bolster its tech sector. For example, Seneca College—one of the largest colleges in Canada—is updating its curriculum and offering new courses to help prepare youths for careers in tech.

In **Chicago**, the team analyzed the city's software engineering talent, the migration patterns of talent and the companies that are improving the local tech scene. This research directly informed outreach strategies for the city's ThinkChicago event, a workshop for aspiring graduates from top universities across the country.

In **New Orleans**, we analyzed the top industry demand and the skills on entry-level job postings to determine whether there are strong differences between job applicants and confirmed hires.

We determined that medical industries are the most prevalent across the entire metro area. Within the city, recreational industries are largest; in Greater New Orleans, manufacturing industries are largest. These employers make up about one-third of the local economy.

We also partnered with the Boston Consulting Group to analyze the connections between the two cities and the economic growth of the broader region of **Seattle** and **Vancouver**. LinkedIn's research suggests that while Seattle and Vancouver individually have rich human capital, there is a low level of connectedness between the two cities, which could be an impediment to regional growth.

Most recently, the City of **Ottawa** hosted the Education and Economy Summit at City Hall **and showcased** LinkedIn insights before 250 participants from local school boards, post-secondary institutions,

government and private sector partners, NGOs and students with the goal of increasing collaboration and creating employment opportunities for students, and ultimately, more start-ups and jobs in the city. Mayor Jim Watson opened the day discussing the importance of building stronger partnerships between educators and employers. In addition, his Excellency the Right Honourable David Johnson, Governor General of Canada, **shared the importance** of government, employer and educator collaboration.

"The sovereignty of nations will be defined by how we develop talent"
@GGDavidJohnston #OttEESummit before @JLListerCA @linkedin @ottawacity

Further Reading:

City to Host Education and the Economy Summit to Boost Collaboration and Generate Increased Economic Benefits

Education and the Economy Summit Fosters Increased Collaboration between Local Government, Education and Business Leaders to Promote Economic Opportunity

Governor General to Deliver Keynote Address at the City of Ottawa's Education and the Economy Summit

The White House Partnership on TechHire

In March 2015, President Obama **announced** that 21 communities are committed to taking action—with each other and with more than 300 national employers—to expand access to tech jobs as they surface and support local employer demand. In June, during the U.S. Conference of Mayors, President Obama specifically referenced LinkedIn as a part of his plan to connect individuals around the country to tech-related opportunities. By the end of 2015, the White House

*President Obama speaking at the National League of Cities
Annual Congressional City Conference: "We've got private sector leaders
who are supporting everything from scholarships to job-matching tools...so,
companies like LinkedIn will use data to help identify skills."*

Europe, Middle East and Africa (MENA)

Manchester

expanded its efforts to over 50 cities. The Economic Graph team has worked with almost all 50 TechHire communities, in addition to other cities, using our labor market insights to expand information for policy makers around the skills that are most in-demand in their local economies, and how to best attract, train and retain talent across the workforce.

In January, our team launched the **Greater Creators Insights** report jointly with the Greater Manchester Combined Authority. The report was launched by the UK Minister for the Cabinet Office, the Mayor of Manchester and Josh Graff, LinkedIn's UK Country Manager, alongside a number of other local leaders. The Minister described the potential of our research to fundamentally improve the management of the labour market. The UK Government's own **press release** headlined with "Pioneering LinkedIn project to change the face of recruitment in Manchester" and referenced how "the local authority uses this data to deploy its resources effectively and deliver a strong workforce that delivers economic prosperity for both the local area and the UK." The Mayor and leaders of Greater Manchester spoke very

highly of the partnership with LinkedIn and its impact on shaping their forthcoming Skills Action Plan.

Stockholm

Building on a study for the European Commission late last year, we launched Stockholm's Economic Graph at an **event** at City Headquarters this spring. The report was officially launched by the Mayor of Stockholm and the CEO of Stockholm Business Region Development, our main partners in delivering this research. The event included **media**, senior government representatives and corporate partners for LinkedIn. As a result of this partnership, the Mayor **published** a post about the importance of our work for mitigating the skills gap across the city. Copies of the full report are available on the city's **website**. The Economic Graph report we

Further Reading:

Stockholm Identified as Tech Talent Magnet

launched earlier this year was also cited in a **debate** by Mathias Sundin, Minister of Parliament in Sweden, to support his argument about the growth rate of particular sectors in Stockholm.

Amsterdam

In April of this year, we launched the first phase of the Economic Graph for Amsterdam with our Benelux Country Manager, **Marcel Molenaar**, and the **Alderman for Economic Affairs** and Deputy Mayor of Amsterdam, Kajsa Ollongren, at an event hosted by the city and targeted to international students. LinkedIn was lauded for its work and for the power of the Economic Graph to help the city grow and develop as a tech and talent hub. Senior representatives from the Amsterdam Economic Board (AEB), StartupAmsterdam, national stakeholders from the Ministry for Economic Affairs and the Ministry of Social and Employment Affairs attended the event, which received great **coverage**. The report is also available on the city's **website**. We continue to work with the AEB and StartupAmsterdam to help them develop a more targeted and responsive start-up growth strategy.
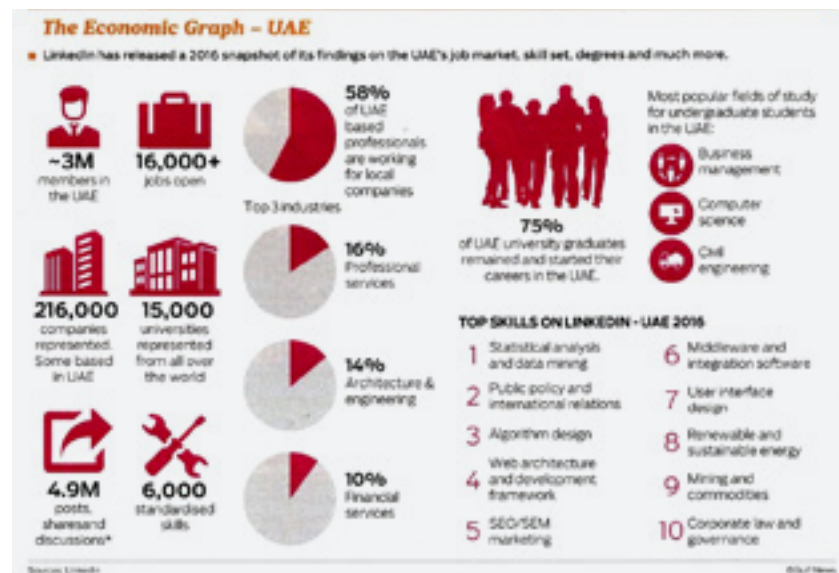
Launch of the Milan Economic Graph Project.

Milan

In June, we launched Milan's Economic Graph at an event at LinkedIn's Milan office. The report was officially launched by Marcello Albergoni, Head of Italy at LinkedIn, and Giuseppe Di Raimondo Metallo, Deputy Director of the Directorate General for Education, Training and Work of the Lombardy Region. A roundtable debate moderated by Enrico Banchi, Chief Operating Officer at Scuola di Palo Alto, offered the opportunity for our businesses and academia panelists to debate various topics suggested by the findings, including possible synergies between public authorities and businesses.

United Arab Emirates (UAE)

This October, we held an event at LinkedIn's Dubai office and worked with partners in the UAE, including the **Ministry of Higher Education** and **Smart Dubai office**, to focus on the areas of growth in the country and to identify which skills, **including tech-related skills**, are most in-demand as the country moves forward. The event included a roundtable discussion with UAE's private and public sectors on the challenges they face around talent acquisition and retention. The MENA Public Sector team will use the research to continue discussions with other government entities on how LinkedIn can play an even bigger role in economic growth. The Minister of

The Economic Graph – UAE

- LinkedIn has released a 2016 snapshot of its findings on the UAE's job market, skill set, degrees and much more.

~3M members in the UAE

16,000+ jobs open

58% of UAE based professionals are working for local companies

Top 3 industries

16% Professional services

14% Architecture & engineering

10% Financial services

216,000 companies represented. Some based in UAE

15,000 universities represented from all over the world

75% of UAE university graduates remained and started their careers in the UAE.

4.9M posts, shares and discussions*

6,000 standardised skills

Most popular fields of study for undergraduate students in the UAE:
- Business management
- Computer science
- Civil engineering

TOP SKILLS ON LINKEDIN – UAE 2016

1. Statistical analysis and data mining
2. Public policy and international relations
3. Algorithm design
4. Web architecture and development framework
5. SEO/SEM marketing
6. Middleware and integration software
7. User interface design
8. Renewable and sustainable energy
9. Mining and commodities
10. Corporate law and governance

Higher Education will also work with LinkedIn to ensure that our data informs the new curriculum of the UAE country project.

Asia-Pacific

Australia

In March, we contributed to the 2016 Australian Computer Society Digital Pulse **report**. The **event** was held at the National Press Club in Canberra with the report being launched by Trent Zimmerman MP and The Hon Susan Ryan AO, Commonwealth Age and Disability Discrimination Commissioner.

LinkedIn and Deloitte joined Ms. Ryan on a Q+A panel during the event to discuss the findings of the report. The report identifies

the massive growth potential for the Australian digital economy and cites using LinkedIn Economic Graph data, which uncovers the major skill shift underway in the country. Economic Graph data was used to identify: (1) the increasing demand for Information and Communication Technology (ICT) workers to also hold more generalist/balanced "soft skills," in addition to core technical skills; (2) demand for workers with ICT skills
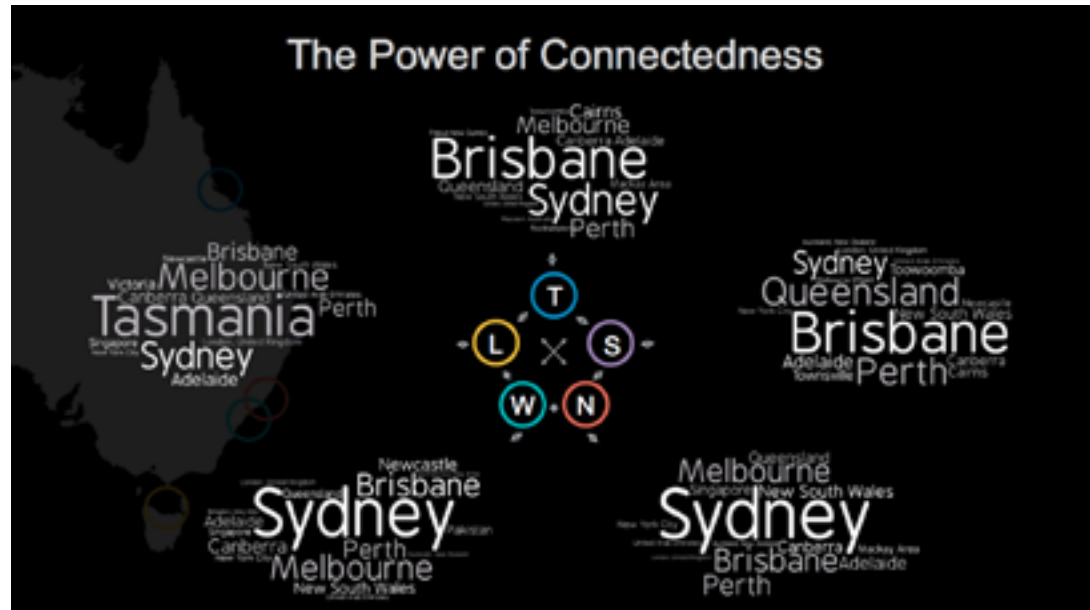
within the non-ICT sector; (3) top areas of study for ICT and non-ICT workers; and, (4) various other skills-related data points, which will help inform the decisions of policy makers who are creating programs and directing funding to ensure Australian workers are equipped with the necessary skills to drive economic growth in the face of future technological change.

Regional Cities, Australia: In September, we partnered with the Regional Australia Institute to launch the Economic Graph of five key regional cities in Australia. The report was launched at Australian Parliament House in October and provided valuable insights to leaders from regional centers around the country. Our work demonstrates the significance of connectivity and its relationship to the success and growth of small cities. Visit the Regional Australia Institute website for more information and to **view the infographic**.

Singapore

National Trades Union Congress: In August, we worked in collaboration with the National Trades Union Congress

and the Singapore Economic Development Board (EDB) to launch an Economic Graph study that analyzed the career paths of corporate executives leading Singapore-based multinational corporations. Our evidence-based analysis significantly contributed to the EDB's agreement to fund the "U Future Leaders Global Programme." The Programme is designed to financially incentivize companies to send their young Singaporean talent to gain international experiences, which will help them acquire the balanced skills necessary to be prepared to take on leadership positions later in their careers.

Collaboration with Ministry of Manpower and Ministry of Education: We are working with the Ministries and their relevant statutory boards on a deep collaboration designed to assist the government in its mission to promote, facilitate and guide the development and upgrading of skills and competencies

Further Reading:

Sharpening Digital Skills Key to Staying Ahead: ACS

of the national workforce in order to enhance competitiveness and employability.

India

We are examining potential Economic Graph partnerships in India, particularly in light of the visit Jeff Weiner, LinkedIn's CEO, made to our India office this past September and his successful meeting with Indian Prime Minister Shri Narendra Modi. We are in discussions with the Ministry of Human Resource Development regarding a partnership to analyze skills gaps in various cities, explore migration trends and identify emerging skills and jobs.

LinkedIn CEO Jeff Weiner meeting with Shri Narendra Modi, Prime Minister of India.

NON-GOVERNMENTAL ORGANIZATIONS AND THOUGHT LEADERSHIP

World Economic Forum

This year, the Economic Graph was featured in its second report with the **World Economic Forum on Human Capital**. The Human Capital report is an important component to the Economic Graph team's effort to bring our vision to life. The Human Capital report illustrates the importance of skills over job titles; introduces the idea of transferable skills; demonstrates the supply, demand and flow of talent; describes a new skills

The hundred largest talent flows between countries

diversity measurement of countries across the world; and explains the gig economy with job titles. Key highlights include the following:

- *LinkedIn data reveals that understanding an economy's human capital base at the actual skills level is crucial because formal qualifications alone are often insufficiently meaningful.*

- *Data from LinkedIn's Economic Graph makes it possible to visualize the inflow and outflow of human capital between countries ... identify the specific skillsets countries are gaining and losing in the global marketplace for talent.*

- *LinkedIn's data was able to shed some light on whether online gig-economy workers represent a new form of work or a continuation and digitization of existing analogue forms of own-account work.*

Further Reading:

Human Capital and Gross National Income

The Human Capital Report 2016 [PDF]

Farewell, job title. Hello, skill set

Does your job title matter anymore?

World Economic Forum: Human Capital and Gross National Income

John Herlihy's **post** at the WEF got 3.5k views and 2.4k shares (on top of the **LinkedIn** 1k Likes)

Spotlight on Early Caucus States

As part of our work examining early battleground states for the 2016 election, our team studied labor supply and demand trends across Iowa, New Hampshire and Texas in our Spotlight series. In February, we examined New Hampshire through our **LinkedIn Workforce Spotlight** about industries and skills that are shaping the U.S. labor market.

Later, we examined Iowa through our **LinkedIn Workforce Spotlight**. Over the past year, Iowan nonfarm payrolls grew by only 1.4 percent (slower than the 1.9 percent national pace) as measured by the BLS; however, jobs in the Professional, Scientific and Technical Services (PSTS) sector within Iowa grew by 4.2 percent—outpaced in this sector by only 11 other states.

We also analyzed the growing and declining industries across the major cities in Texas as a part of **LinkedIn's Workforce Spotlight** to surface new insights about the regions, industries and skills that are shaping the U.S. labor market. According to our data, Texas' vulnerable

energy-related jobs are not spread uniformly across the state. Of the four major metro areas in the state, Houston particularly has heavy exposure to the oil and energy industries.

Centre for European Policy Studies (CEPS) Information Technology Talent Mobility Study

The Brussels-based Centre for European Policy Studies (CEPS) published a **study** based on LinkedIn data highlighting mobility of IT workers and their core skills. The report confirmed that the EU is losing tech skills to the U.S., particularly among those who recently graduated. The analysis also showed that the best educated are more likely to move, both outside the EU and into another EU Member State. Furthermore, intra-EU flows of IT professionals follow a general pattern of intra-EU mobility: from East and South to West and North.

Millennials

Is it harder for employers to retain millennials in the workplace today than it was to retain previous generations? Our team analyzed LinkedIn data and found that, over time, job- and industry-hopping have steadily increased. Furthermore, our research shows that job-hopping most commonly occurs in the Media and Entertainment, Professional Services and Government/Education/Non-Profit industries, and that it has become increasingly more common for women to job hop (when compared to men).

Further Reading:

Millennials and Job Hopping

Secretary of Labor Thomas Perez at the White House referencing some of the great work through LinkedIn's Economic Graph.

The McKinsey Global Institute Report

The team collaborated with the McKinsey Global Institute to provide insights using LinkedIn global survey data of part-time and full-time workers. Example insights include how workers feel about the trade-off between time worked and pay, whether workers believe their jobs actually make use of their skills and the top reasons employees decided to leave earlier jobs.

Further Reading:

McKinsey Global Institute Report - A labor market that works: Connecting talent and opportunity in the digital age

The $2.7 Trillion Opportunity of Connecting Talent with Opportunity in the Digital Age

Tweet from Instacart of Nick DePorter showing an Instacart shopper how to use the Training Finder at our Instacart + LinkedIn event in Denver on September 15th.

Life at Instacart @LifeAtInstacart · Sep 15
❤️ supporting career development. Excited to work w/ @LinkedIn to help Denver @instashoppers advance their careers!

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Gig Economy Initiatives

The gig economy (defined here as the on-demand, peer-to-peer platform economy – e.g., Lyft, Instacart and DoorDash) is one of the fastest growing and most innovative parts of the labor market. Earlier this year, LinkedIn hosted a meeting with Labor Secretary Thomas Perez and leaders from the sharing economy. The companies discussed issues related to their business models, training, benefits and the ways in which companies like LinkedIn can measure training and upskilling outcomes for employees.

The team recently launched a new initiative, Project Gig, to understand (1) what the key career-related needs of gig workers are; (2) whether LinkedIn is fulfilling those needs; (3) if it is not fulfilling them, whether LinkedIn can fulfill those needs; and, (4) if so, how LinkedIn can fulfill those needs.

Further Reading:

Lyft And LinkedIn Team Up to Help Drivers Advance Their Careers [Lyft Corporate Blog]

How to Become an Executive

Millions of executives have mapped out their career paths on their LinkedIn profiles, so we decided to see if we could quantitatively identify their keys to success. We started by analyzing the career paths of approximately 459,000 LinkedIn members globally who worked at a Top 10 consultancy (per Vault Consulting Rankings) between 1990 and 2010 and became a vice president, C-level executive or partner at a company with at least 200 employees. Approximately 64,000 members reached this milestone. Then, from LinkedIn member profiles we analyzed both observable and inferred traits like educational background, gender, work experience and career transitions. At the end of the day, the probability of becoming an executive is merely 14 percent.

Further Reading:

How To Become An Executive