



# Sharing experiences in combining big data with other methods

ILO, Skills and Employability Branch

20 September, 2019



# Outline

- Challenges in Big Data for developing countries
- Some examples of the current ILO efforts
  1. Combining different data sources: *Skills for a greener future*
  2. Validating of results of qualitative studies on skills and trade
  3. Adding granularity and “realtimeliness” by combining LFS and big data
- Way forward on big data use for skills analysis



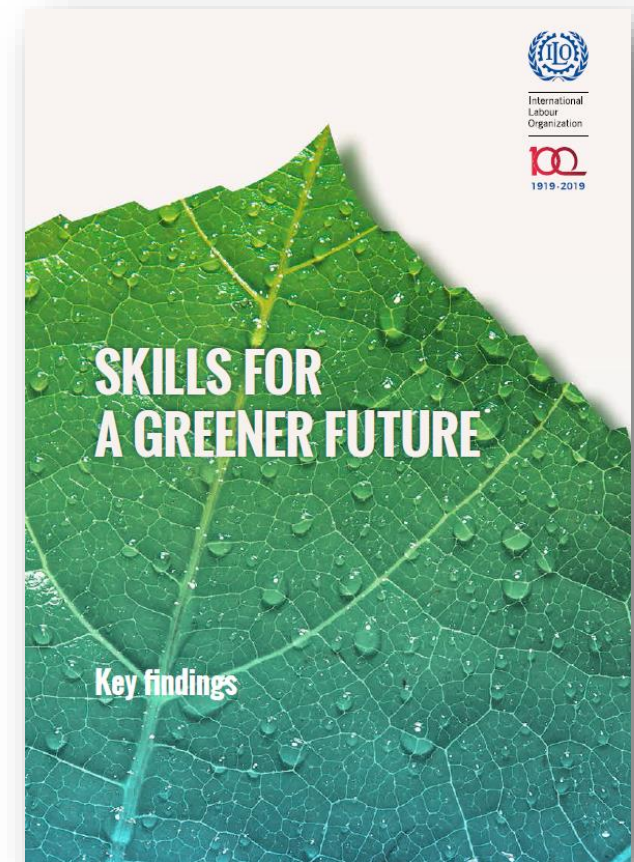
# Challenges for developing countries and beyond

- Multiple issues with the quality and coverage of big data even in advanced economies
- In developing countries:
  - Weak statistical systems
  - Irregular Labour Force Surveys (LFS), poor LMI
  - Insufficient coverage
  - High costs
  - Poor governance mechanisms
- Vacancies Big Data offers opportunities
  - Outputs that are easily understood, and accessible and relevant to policy-makers, providers of education and training, and industry
  - Reasonable cost, and not dependent on collaboration between organizations
- Technical challenges to vacancies Big Data greater than for industrialized countries – how do we overcome?

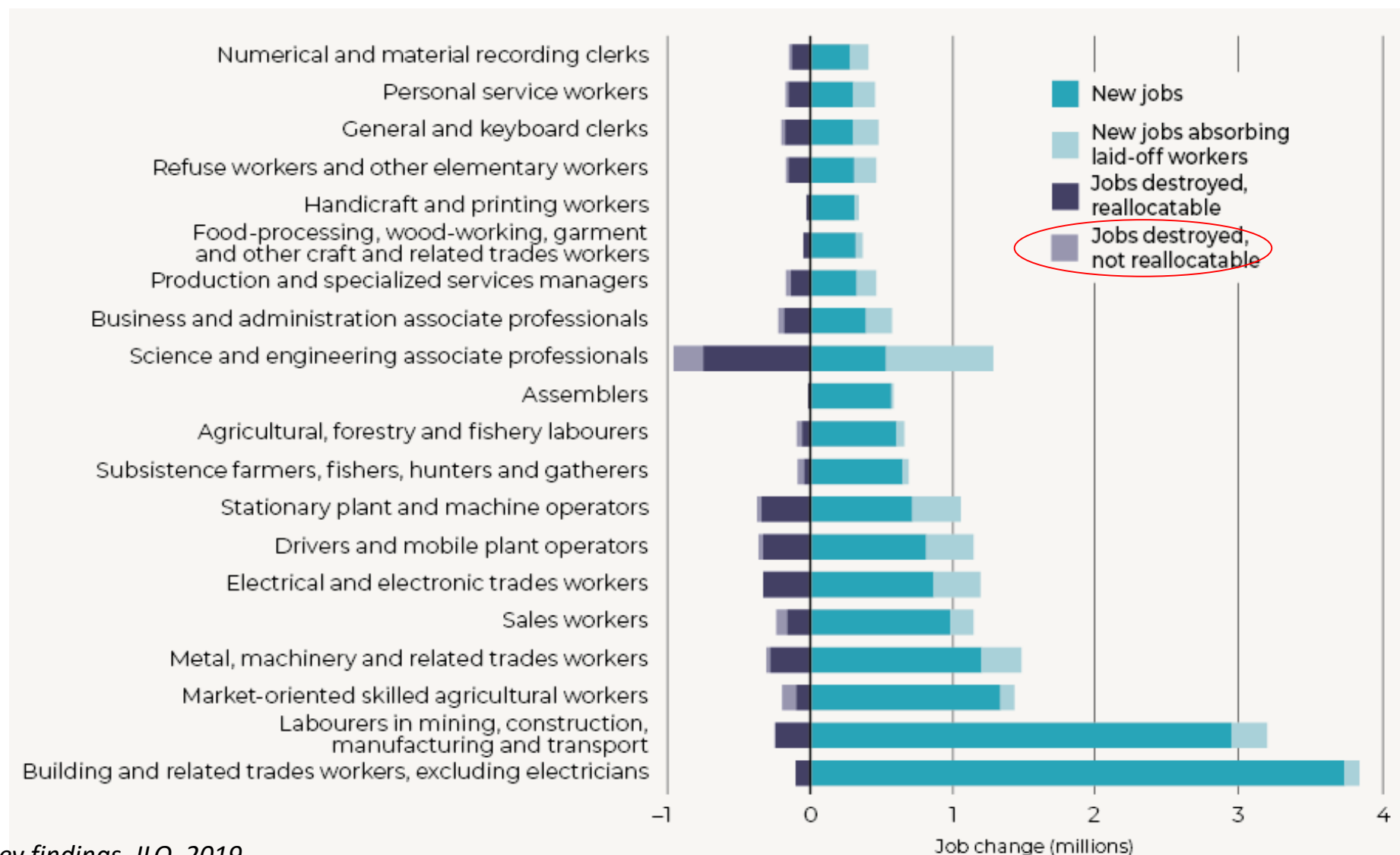


# 1. Complementing different data sources: *Skills for a greener future*

- Input/Output modelling (Exiobase V3) for 163 industries across 44 countries
- Weighting the results by the use of LFS to produce global employment scenarios: energy transition and circular economy scenario

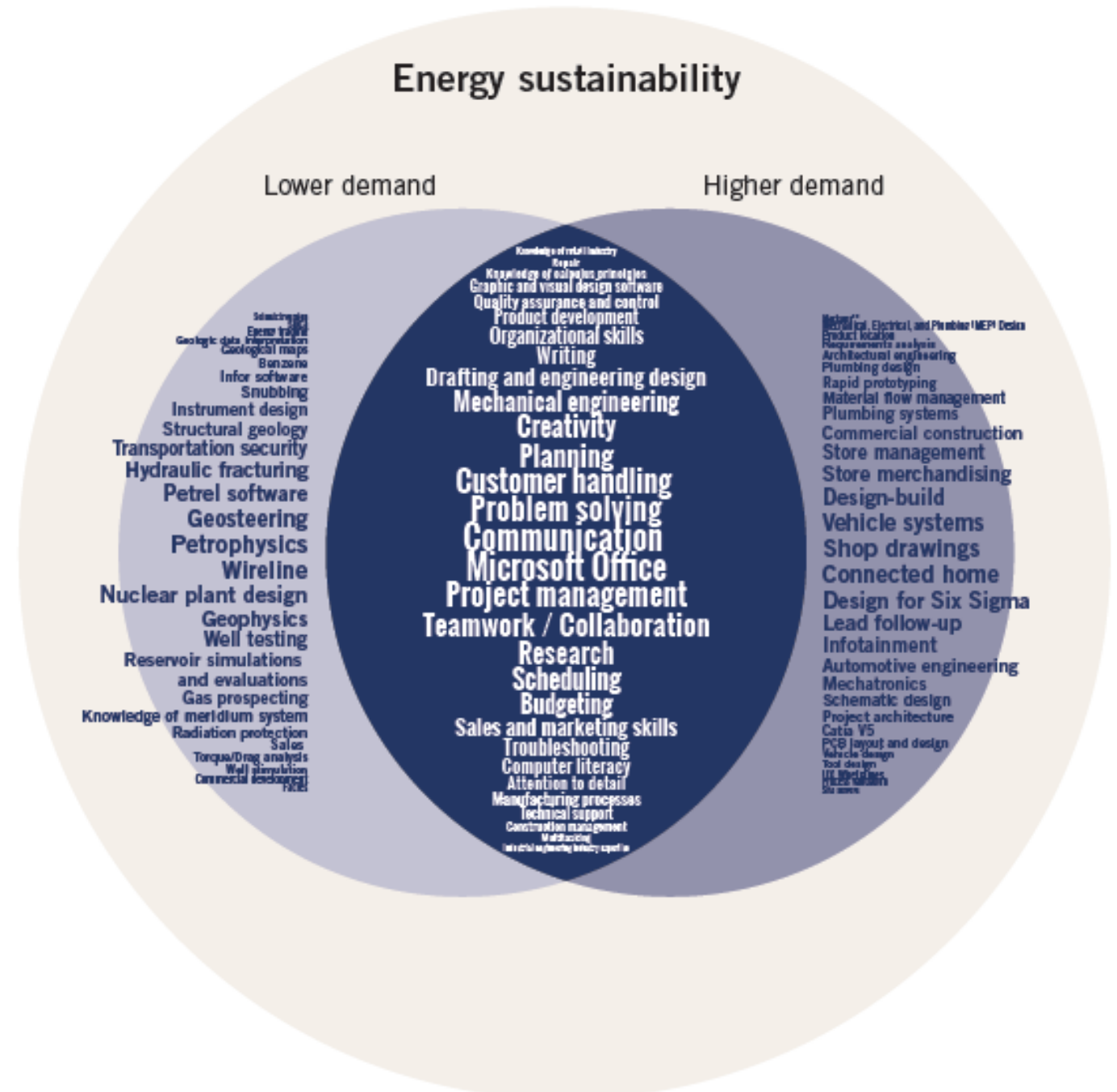


# Energy Sustainability Scenario



# Overlap of core and technical skills

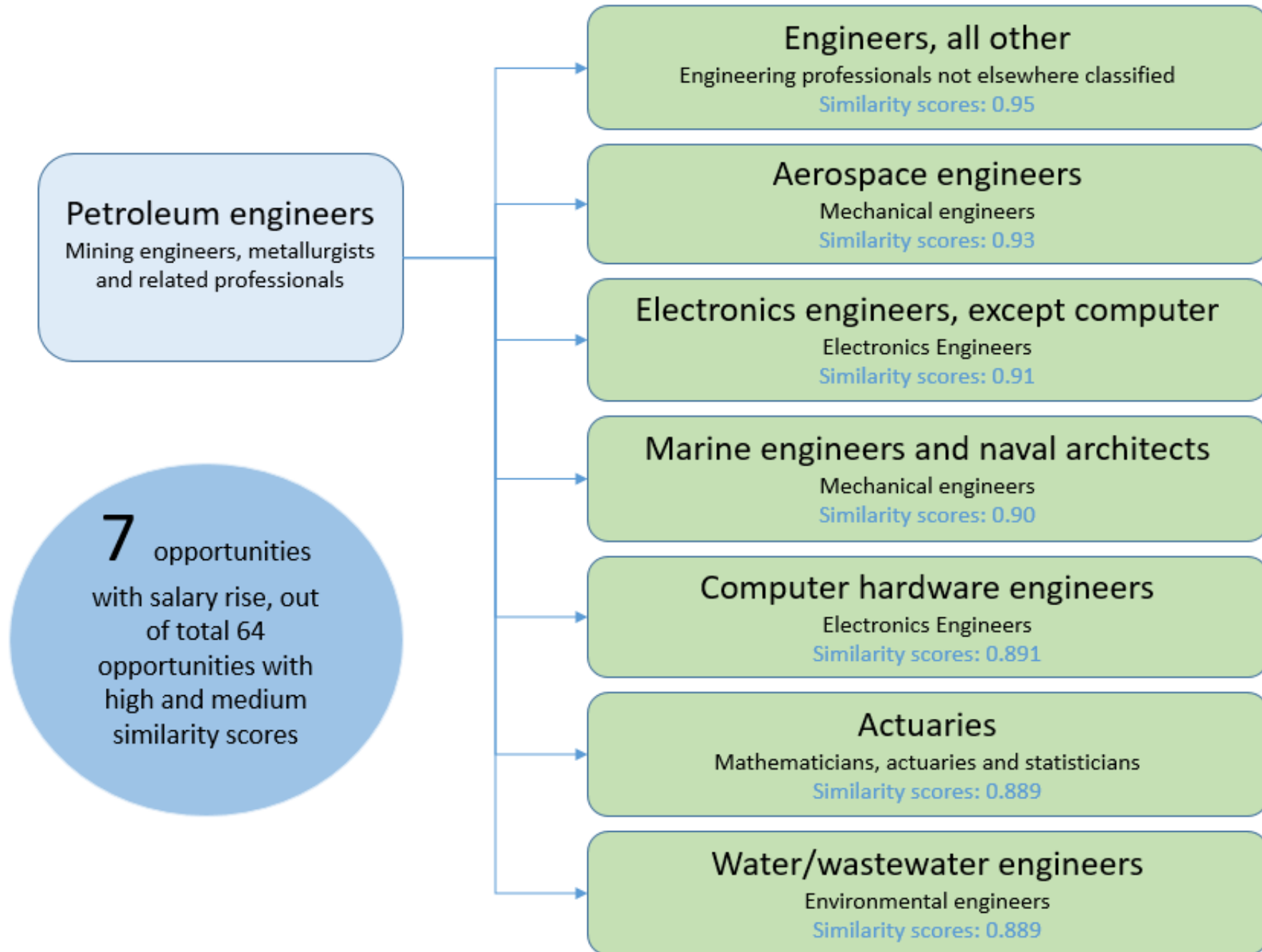
for Science and Engineering Professionals  
(ISCO 21)



Source: Skills for a greener future – Key findings, ILO, 2019

# Job transition path

ISCO 21 – Petroleum Engineers



Source: Skills for a greener future – global synthesis report, ILO, forthcoming







## 2. Validating of results of qualitative studies on Skills for Trade and Economic Diversification (STED)

### STED experience

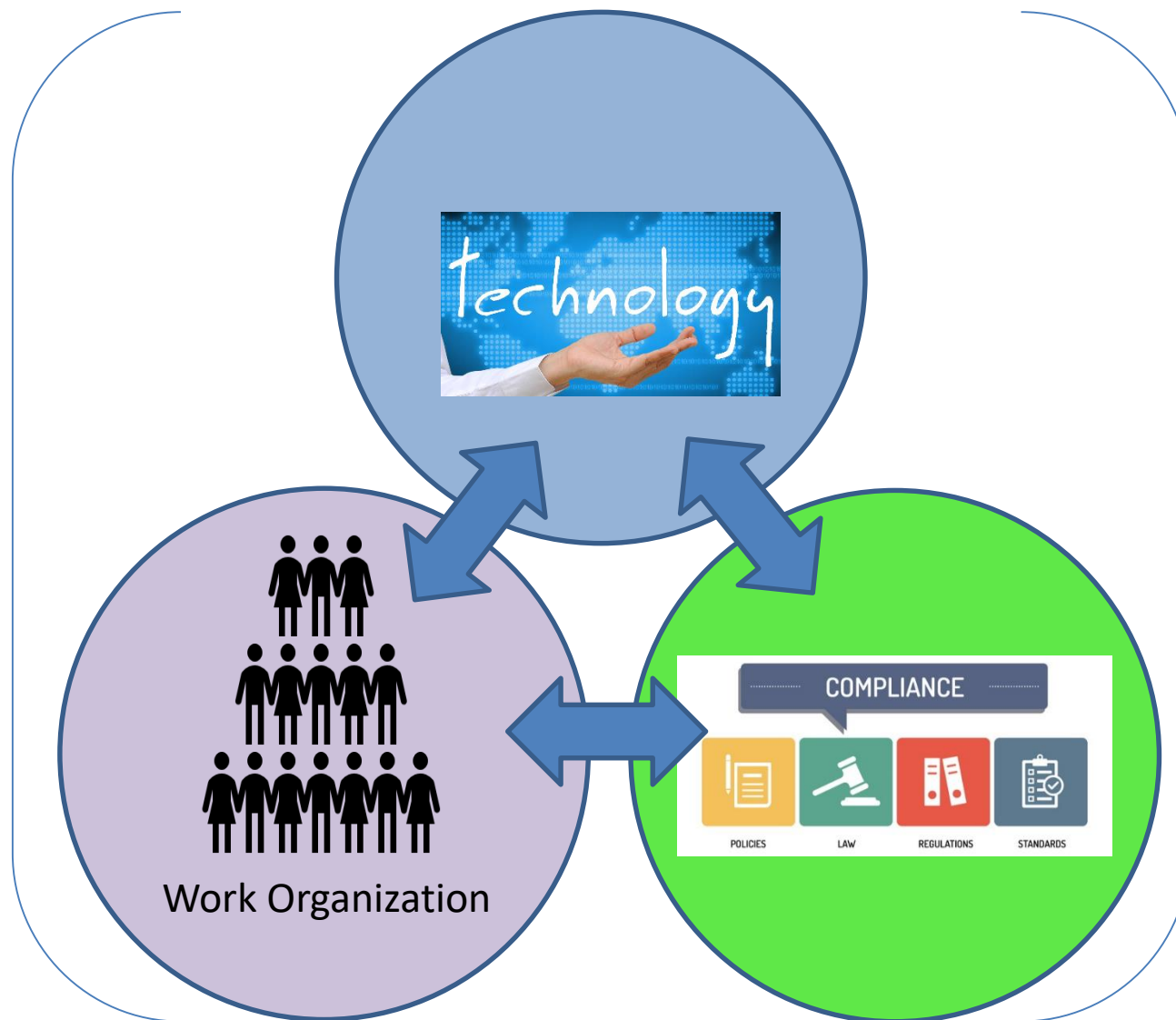
- Close to 20 countries, over 30 sectors
- Qualitative sector diagnostic skills studies
- ILO-WTO joint study (2017)

### Case study on skills needs

- US Manufacturing Industry
- focuses on recovers from trade shock to employment
- aiming to bridge theory and qualitative findings with data analysis from big data (BGT)



# Trade and skills



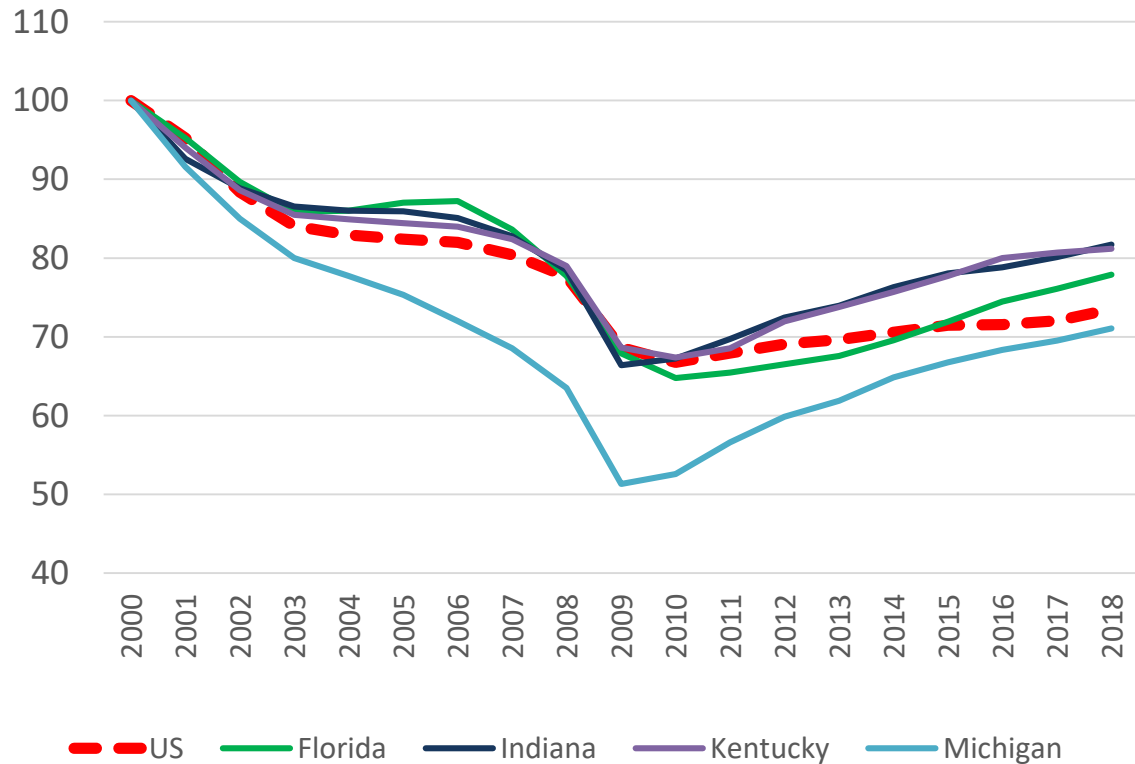
Skills requirements:

- Core employability
- Transferable
- Specialized technical skills



# Case Study on Skills Needed When Manufacturing Employment Recovering

Manufacturing Employment Indexed to 100 in Year 2000

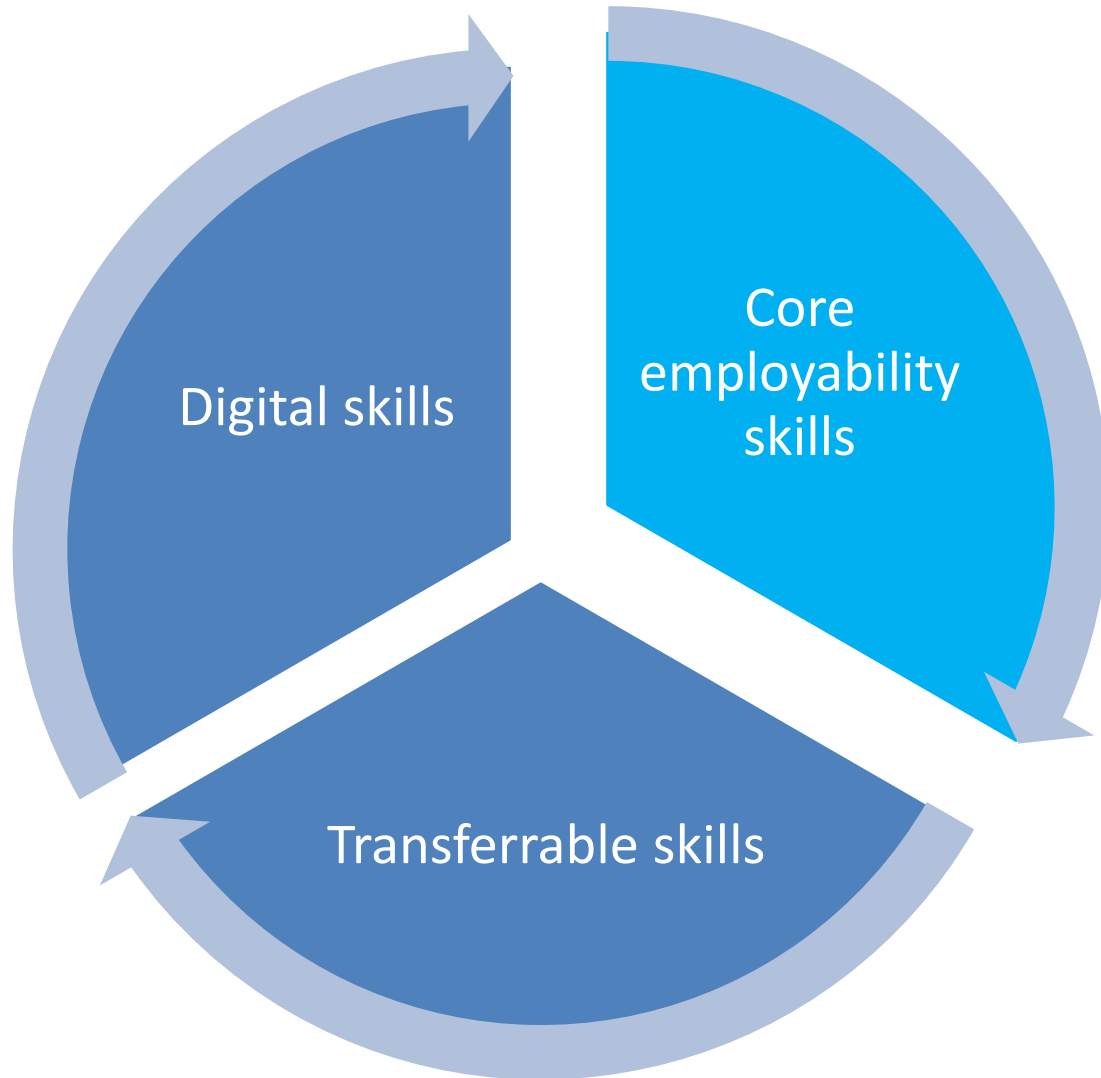


Source: Calculations from Bureau of Labor Statistics, State and Metropolitan Area employment data

- Which skills have increased in incidence in job advertisements from manufacturing employers?
- For which of these skills has the increase in incidence been above the average for US manufacturing industry?
- Consistently across these 4 US States



# Case Study continued: Core Employability Skills and Skills for Modern forms of Work Organization

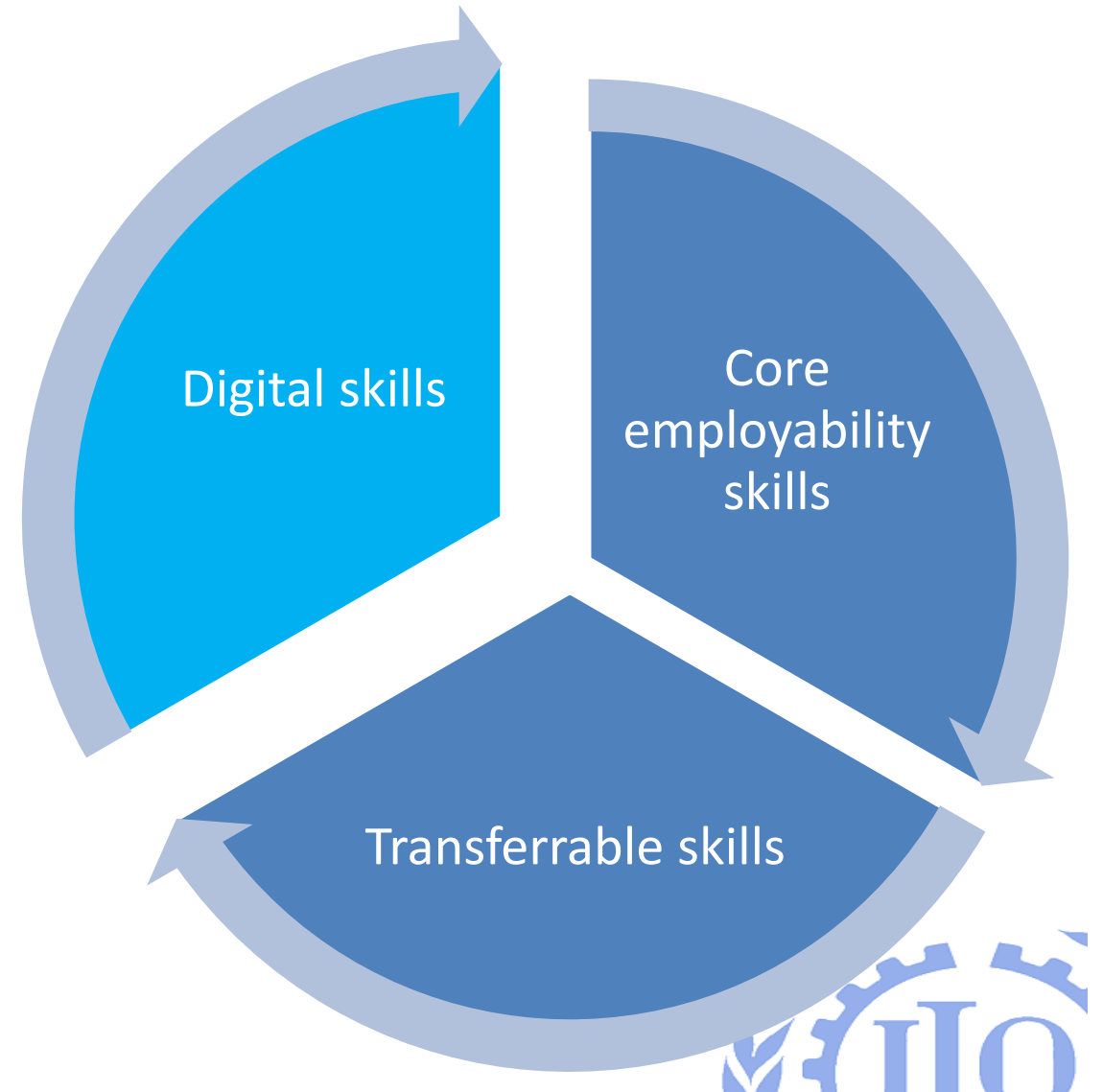


- ❑ Core employability skills
  - Communication
  - Customer handling
  - Orientation to detail
  - Positive Disposition
  - Energetic
- ❑ Modern forms of Work organization (these build especially on core employability skills)
  - Quality Management
  - Quality assurance and control
  - Advanced product Quality Planning
  - Lean manufacturing
  - 5S methodology
  - Root Cause Analysis
  - Preventive maintenance
  - Work Area Maintenance
  - Troubleshooting
  - Direct Store Delivery

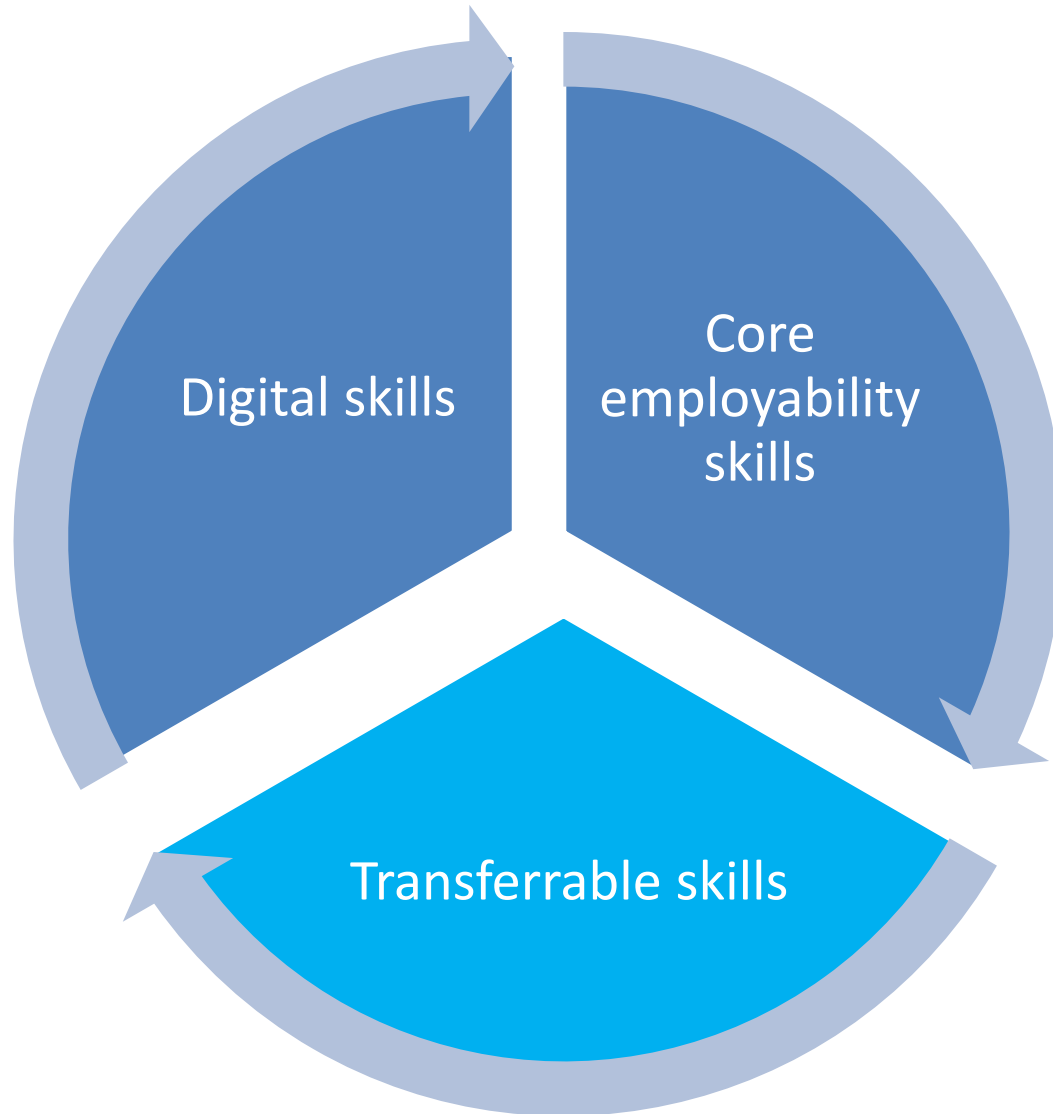


# Case Study Continued: Digital skills

- ❑ Digital user skills
  - Microsoft office
  - Spreadsheets
  - Data entry
  - Computer literacy
- ❑ Specialized digital user skills
  - ERP system
  - Graphic and Visual Design Software
  - Siemens TeamCentre
  - SolidWorks
- ❑ Specialized digital skills
  - Big data
  - Robotics



# Case Study Continued: Transferrable Skills



- ❑ “Middle ground” skills – that lie between
  - Generic skills, soft skills, core employability skills
  - Transferrable technical skills
- ❑ Examples
  - Managerial skills
  - Organizational skills
  - Customer handling skills
  - Prioritizing skills
  - Administrative support skills
  - Micrometers
  - Engineering drawings
- ❑ Benefits of Transferrable skills
  - Career resilience
  - Relevant to workers at risk from employment shock



### 3. Adding granularity and “realtimeliness” by combining the LFS and big data

- OECD Skills for Jobs Indicator
- Initially constructed using LFS and O\*NET taxonomy
- Work in progress:
  - Instead of using taxonomy, try to capture real-time information on skills requirements
  - Online job vacancy data
- → combine occupational shortage indicator with information from BGT data



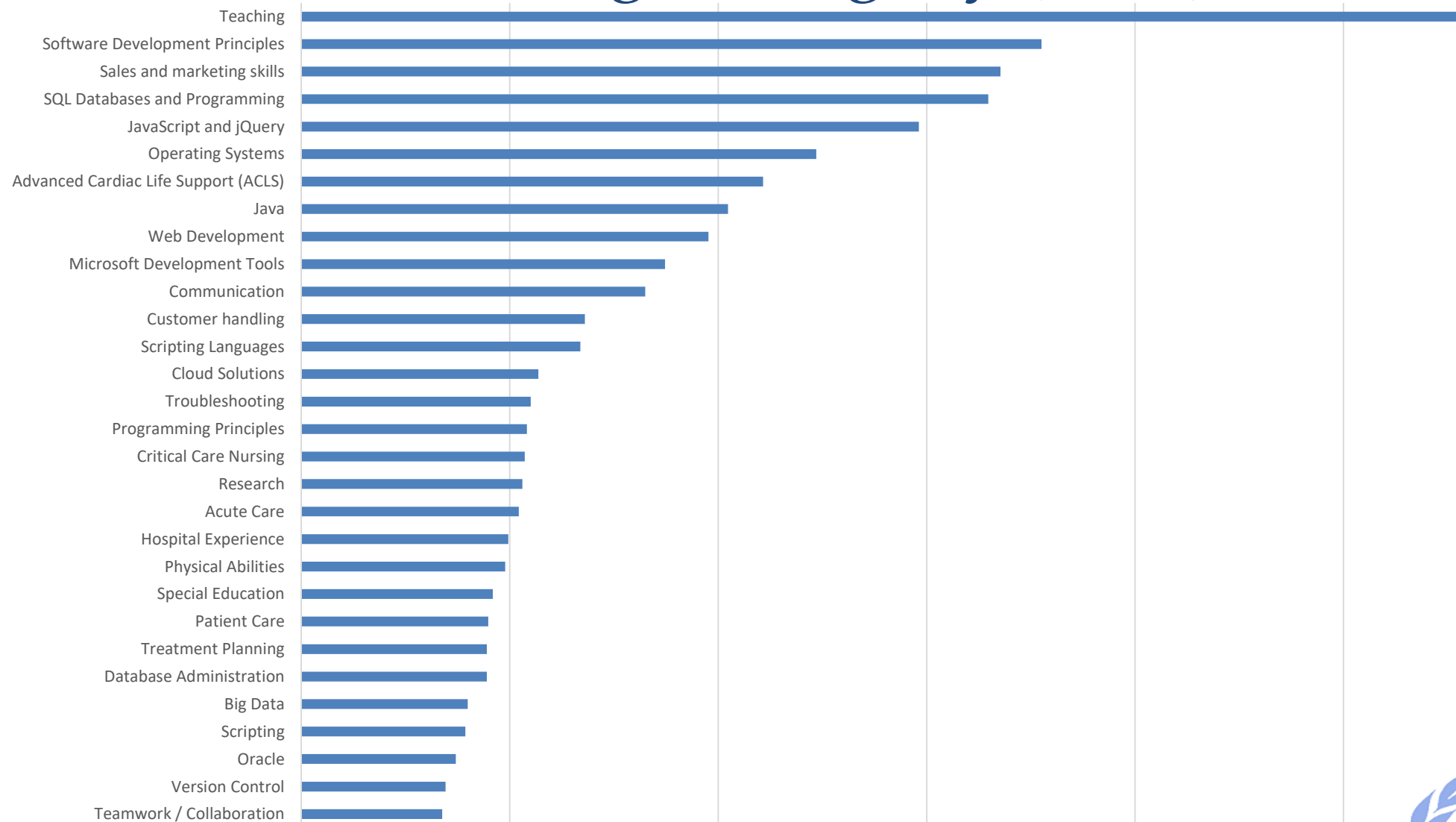


# Approach

- Example: occupational shortage index used for Uruguay (2017)
- Big Data derived from Burning Glass Technologies for the US (also 2017)
  - Why US combined with Uruguay? In order to be able at a later stage to compare with the skills shortage/surplus indicator based on O\*NET Taxonomy (also for the US)
- Advantages of using big data:
  - Rich information
  - Real-time
- Disadvantages
  - Some skills may be omitted as not listed in vacancies – considered as implicitly required skills!
- Disaggregation by broad skill level included



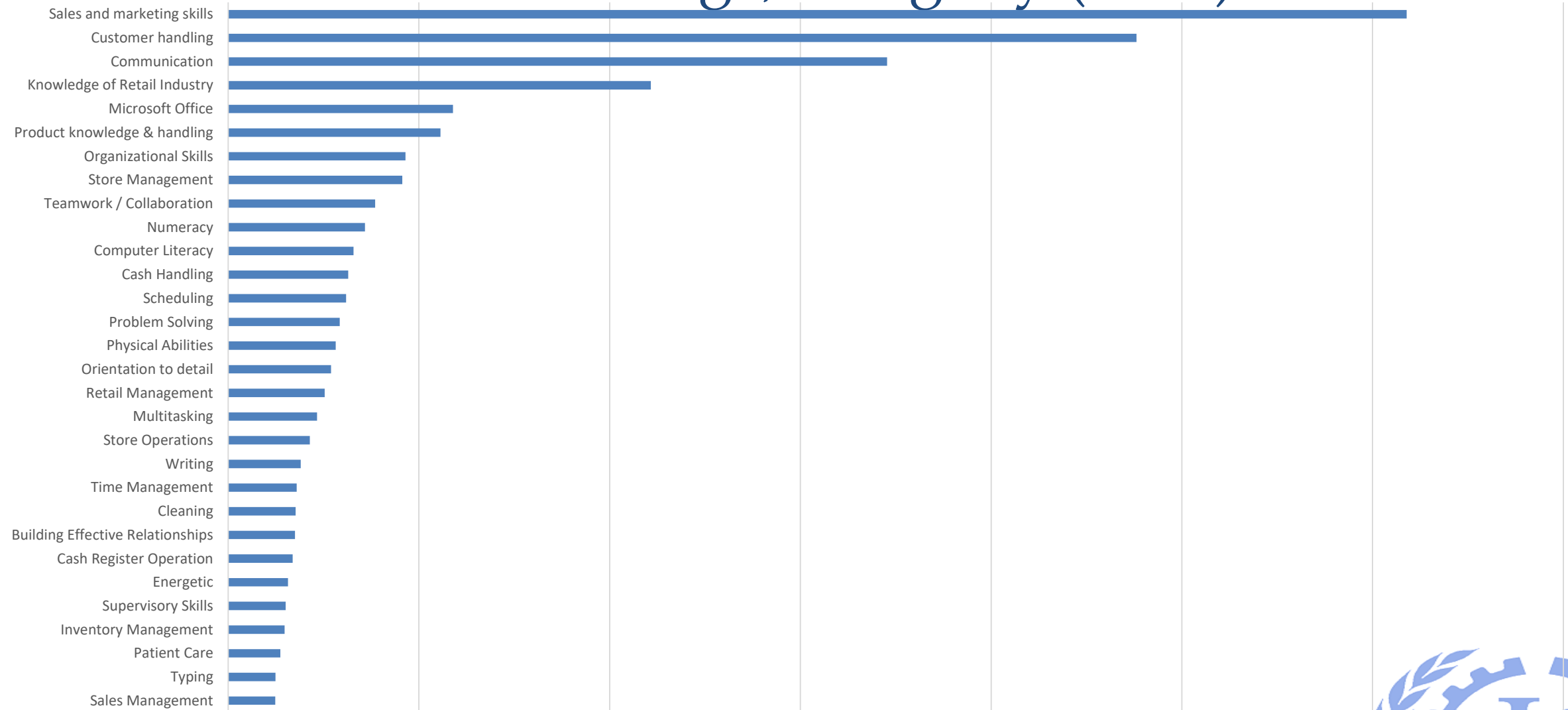
# Top 30 skills related to high-skilled occupations in shortage, Uruguay (2017)



Source: Own calculations based on Uruguayan Household Survey (Encuesta Continua de Hogares) and US online vacancy data from Burning Glass Technologies



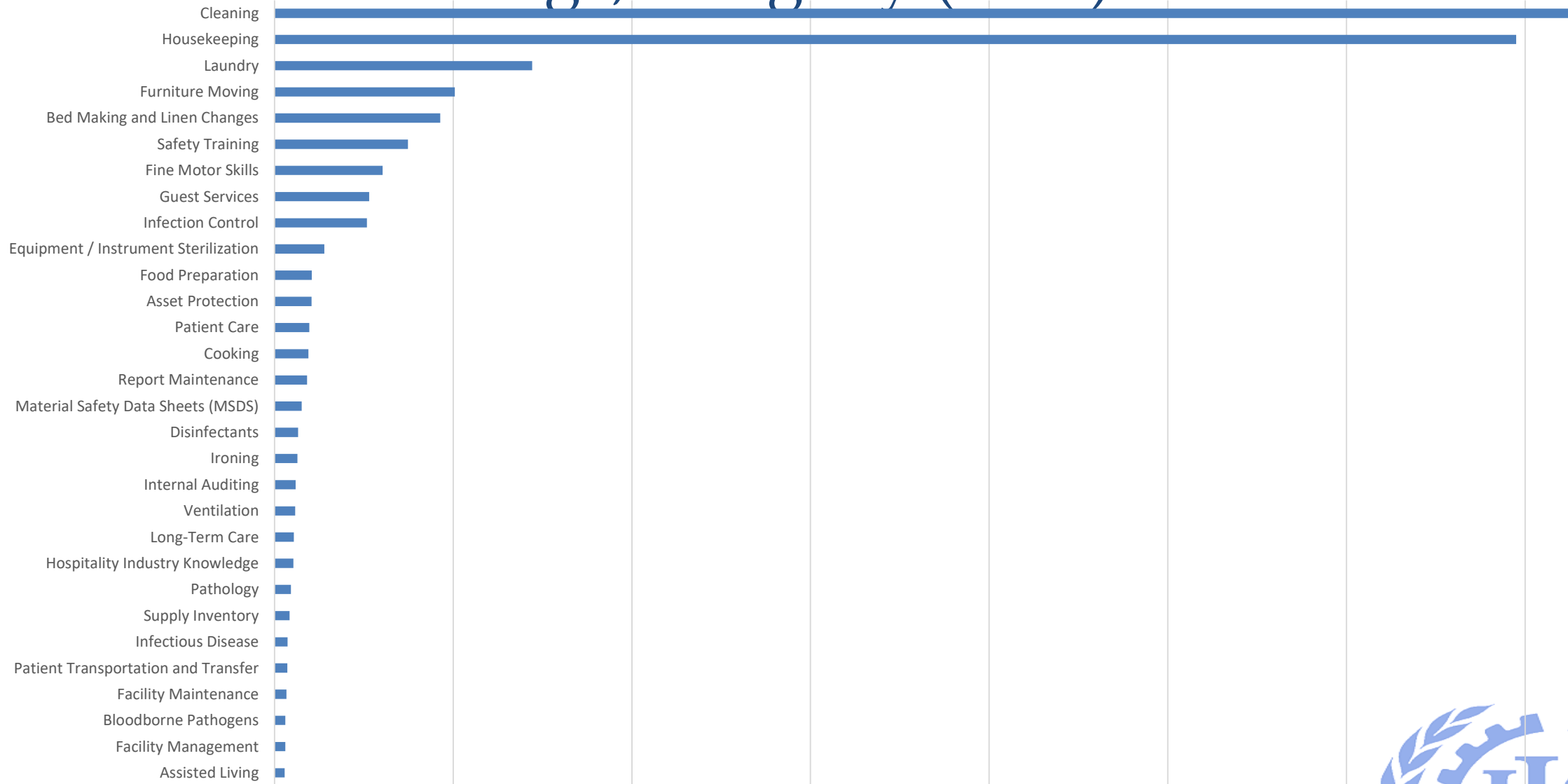
# Top 30 skills related to medium-skilled occupations in shortage, Uruguay (2017)



Source: Own calculations based on Uruguayan Household Survey (Encuesta Continua de Hogares) and US online vacancy data from Burning Glass Technologies



# Top 30 skills related to low-skilled occupations in shortage, Uruguay (2017)



Source: Own calculations based on Uruguayan Household Survey (Encuesta Continua de Hogares) and US online vacancy data from Burning Glass Technologies





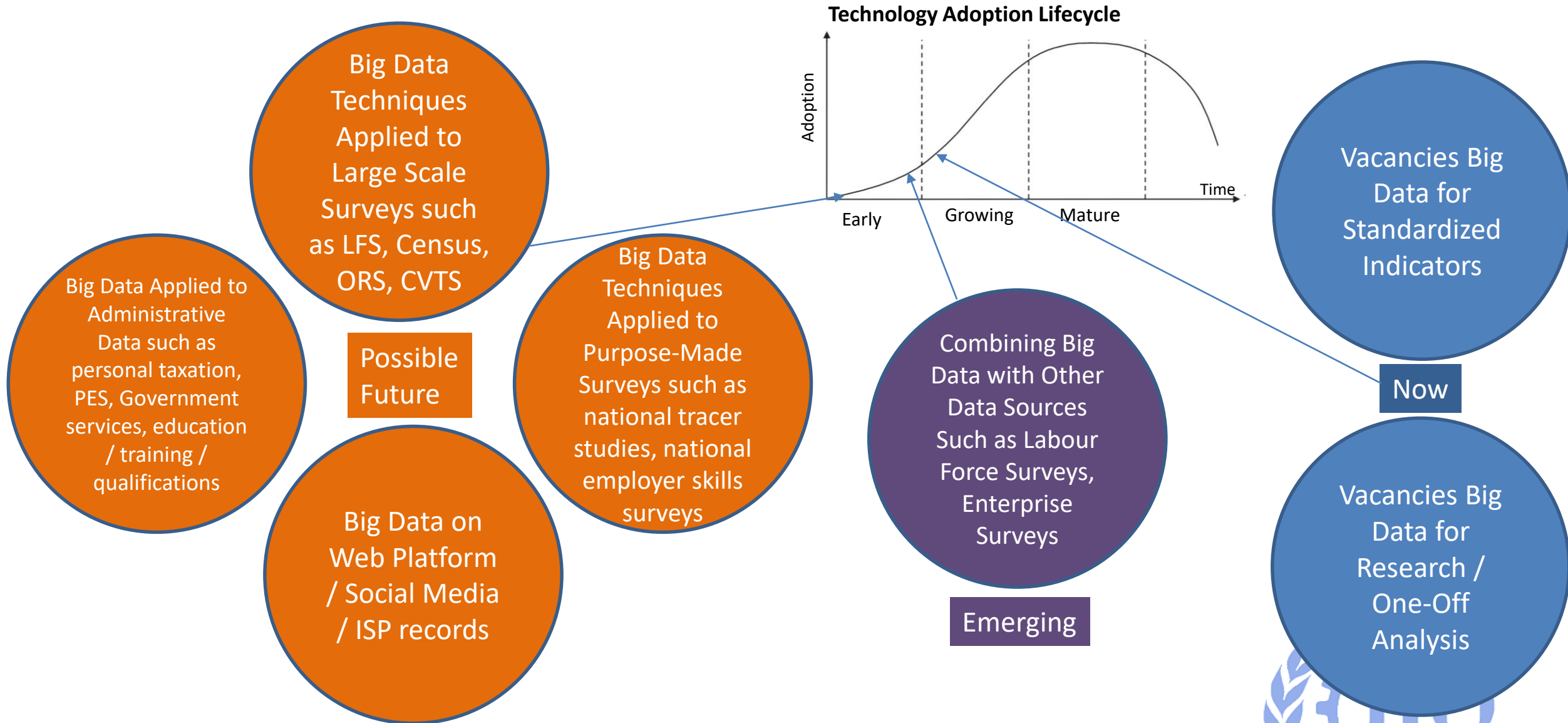
# The Way Forward

# Scraped vacancies data not the only type of large dataset with skills information

Internet Platforms and Social Media	National Internet Infrastructure	Public Internet	Large-Scale Purpose-made Skills Survey microdata	National Statistical Office microdata	Wider Government microdata
Google Amazon Linked-In CV services etc.	Mobile/Cell Networks and ISPs <ul style="list-style-type: none"> <li>- Unique identifier</li> <li>- Government services</li> <li>- Web traffic</li> <li>- etc.</li> </ul>	<b>Aggregators of public vacancies data</b> <ul style="list-style-type: none"> <li>- <b>CEDEFOP</b></li> <li>- <b>OVATE</b></li> <li>- <b>Burning Glass Technologies</b></li> <li>- <b>EMSI</b></li> <li>- <b>etc.</b></li> </ul>	<ul style="list-style-type: none"> <li>- National tracer studies</li> <li>- National Employer skills surveys and Vacancies surveys</li> <li>- etc.</li> </ul>	Statistical surveys <ul style="list-style-type: none"> <li>- Labour Force Survey Census of Population</li> <li>- Other household surveys</li> <li>- Occupational Requirements Survey (US)</li> <li>- Adult Education Survey (Eurostat)</li> <li>- Continuing Vocational Training Survey (Eurostat)</li> <li>- etc.</li> </ul>	Administrative records <ul style="list-style-type: none"> <li>- Personal taxation</li> <li>- Education, training and qualifications systems</li> <li>- Public Employment Service</li> <li>- Social Credit (China)</li> <li>- etc.</li> </ul>



# Possible future directions





# Issues in possible future Big data sources

- Privacy
- Information Security
- Access (National Statistical Office, web platforms, national skills analysis units, researchers)
- Policies on data integration across Government
- National strategies on big data
- Mobile/Cell – unique identifier
- Resources
- Not a substitute to other LMI and analysis
- Potential for developing countries with weak statistical systems to leapfrog?
- What more can be done with big data analysis and governance?



# Thank you!

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