

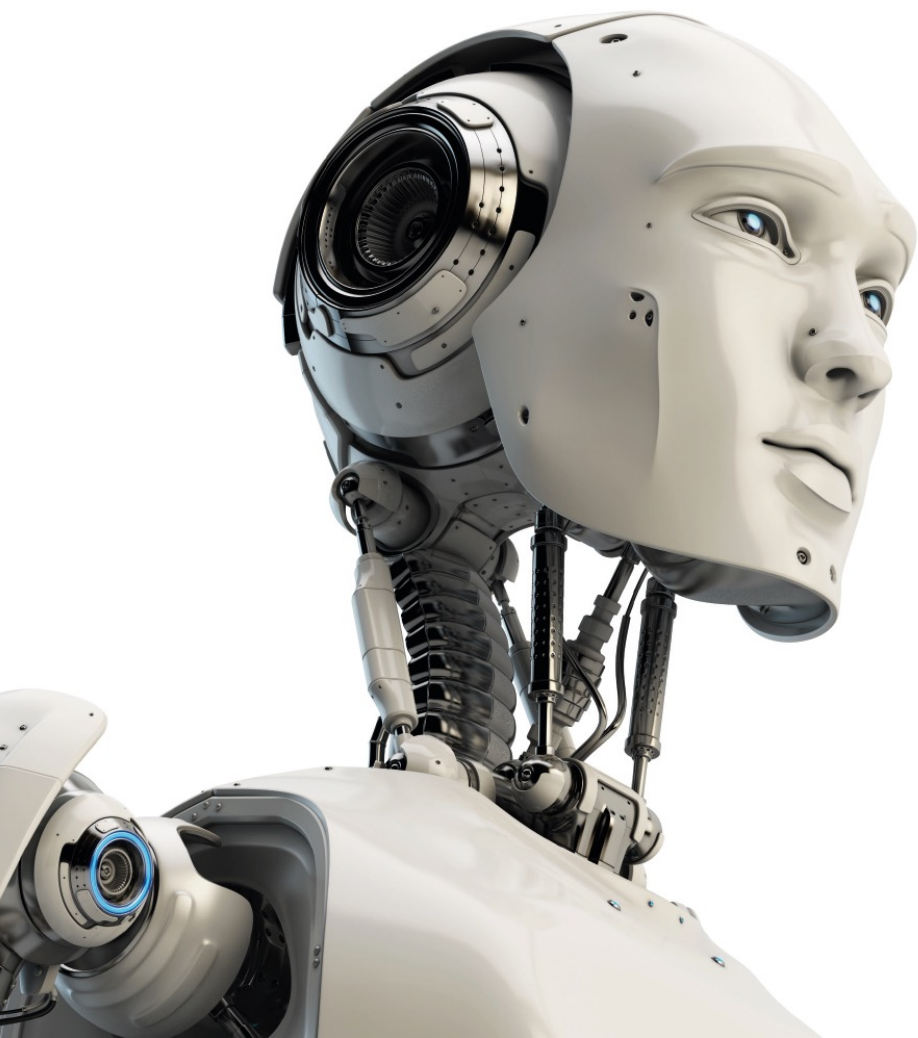
# **EDUCATION, SKILLS AND WORK IN THE FOURTH INDUSTRIAL REVOLUTION**

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**Employer Engagement: Preparing  
Young People for the Future**

**Joint (Virtual) Conference, Education and Employers &  
Edge Foundation, 1st-2nd July, 2021.**





## WHAT I'D LIKE TO DISCUSS

- **Preparing Young People for What Future of Work?**
- **What is the Fourth Industrial Revolution?**
- **Dominant View on Automation and the Future of Work – Labour Scarcity.**
- **Some Evidence...**
- **An Alternative View - Job Scarcity.**
- **Challenges For Employers and Education.**

# WHAT IS THE FOURTH INDUSTRIAL REVOLUTION?

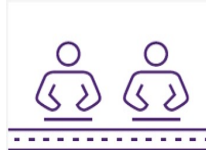
- **Driven by Advances Across Interconnecting Tech...AI, Robotics, Blockchain, Internet of Things, Additive Manufacturing (3D printing), etc.**
- **New Products and Services + Innovative Ways of Doing Existing Things (General Purpose Technologies)**
- **Digital Platforms are the Production Lines of the Twenty-First Century.**



## First Industrial Revolution

**From end of the 18th Century to late 19th Century**

Mechanisation and the development of steam power, production mainly focused on agriculture, textiles, etc.



## Second Industrial Revolution

**From Late 19th Century to mid-20th Century**

Advanced mechanisation based on factory mass production power by electricity. It also gave rise to increasing white-collar employment to support the growth of mass consumer markets and public services.



## Third Industrial Revolution

**Mid-20th Century to beginning of 21st Century**

Growth of electronics, computing and the internet, fuelled by an exponential increase in computing power. It gave rise to a new wave of economic globalisation and the integration of corporate value chains, extended from manufacturing to service industries.



## Fourth Industrial Revolution

**From the early 21st Century and remains in the early stages of development**

Digital transformation of business, public services, and the wider society, driven by rapid advances in Artificial Intelligence, Robotics, Data Analytics, Internet of Things (IoT), etc. It is challenging existing models of work organisation with major implications for the economy and the future of education, jobs and the labour market.





# WHAT IS THE FOURTH INDUSTRIAL REVOLUTION?

- Early Stages - How We Define It Is 'Real In Its Consequences'.
- Age Of Recombination (Unravelling And Recombining) Not Unique Age Of Invention.
- 'Industrial' Revolutions Are Social, Including Institutional Restructuring: Education-Work Relationship.
- Technology Is Not Destiny...

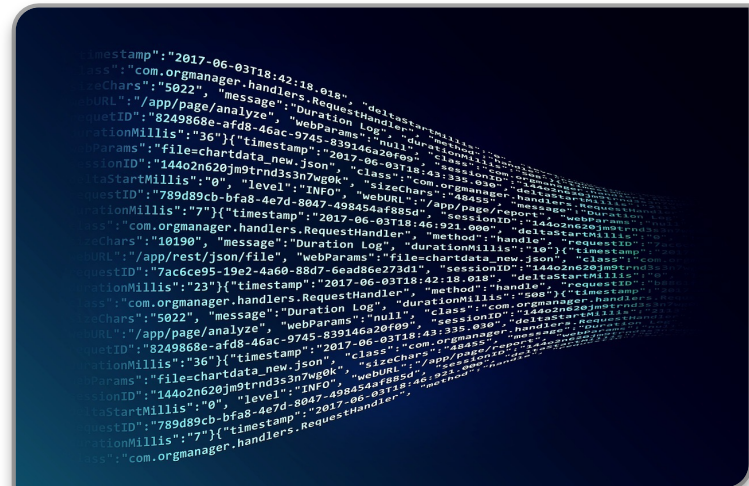
# ‘LABOUR SCARCITY’ IN THE FOURTH INDUSTRIAL REVOLUTION

- Consistent With Human Capital Theory: People Invest In/Acquire/Possess:

‘a bundle of valuable “human capital” that, due to its scarcity, generates a flow of income over the career path’ (David Autor).

- Consistent With Longstanding View →

The More Technologically Advanced An Economy, The Greater Demand for Skilled People (Skill Biased Technological Change):



# Labour Scarcity – Supply Side Solutions

- Race Between Education And Technology.
- What Constitutes 'High Skills' Is Changing – 'Dancing With Robots' (Levy and Murnane).
- Focus On What Is Believed Robots Can't Do – Non-Routine Cognitive Skills, Emotional IQ, etc.
- Using 'Big Data', etc. To Get A Better Understanding Of Changing Employer Needs → Education/Training Reform.
- More Focus on STEM and Digital Skills (Coding, etc.) → Agile Workforce.



## EXISTING EVIDENCE ON THE CHALLENGE OF AI & AUTOMATION

- **Claims of Mass Technological Unemployment Are Exaggerated...But People Will Have Fewer Working Hours, For Longer in Life.**
- **Job Context - The Distinction Between Gig Jobs and Regular Employment Is Increasingly Blurred (agile workforce?).**
- **Job Content – AI/Automation Replaces/Restructures High-Skilled and Routine Jobs:**
  - But little evidence of a rapid decline in so-called routine/less skilled jobs.
  - Graduate underemployment - third of graduates not in 'high skilled' jobs (SOC 1-3, UK) → increasing labour market congestion pre-dates the Pandemic.
- **Occupational Structure Has Not Been 'Hollowed Out' But Is Changing Its Character.**
- **Today's School Children Will Not Enter Jobs That Don't Yet Exist - 85-90% UK Replacement Jobs - Although They May Not Remain The Same.**

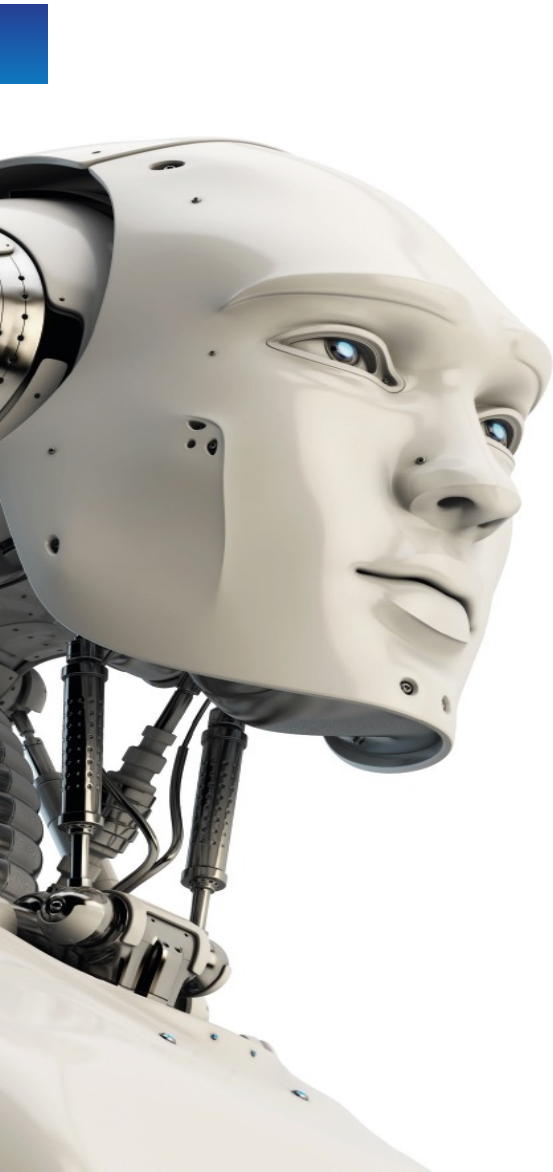


## **JOB SCARCITY – ALTERNATIVE VIEW OF AI, AUTOMATION, AND FUTURE OF WORK**

- **Capacity/Structural Problem Rather Than Alignment Problem...But 'Supply Side' Still Important.**
- **Not the 'End of Work' But There Are Not Going To Be Enough Jobs Of The Kind That People Are Qualified For/Expect.**
- **Key Challenge To Move The Economy In Ways That Are Labour Enhancing + Productive → Machine Centred v Human Centred.**







# Job Scarcity

- 'Cognitive Challenge' - Robotic Process Automation → Cognitive Process Automation?:
  - Not Direct Labour Substitution 'Robots for Teachers', etc.
  - *Knowledge Work into Working Knowledge* → Extended Through Platformisation.
  - HR Tech → Big Data and Visualisation Tools. Unbundling Occupations - Skills/Tasks (Agile Models?).
  - Core/Periphery Workforce Takes on a New Meaning No Longer Linked to High Skill/Low Skill.
  - (Re)Stratify Managerial, Professional and Technical Jobs.



# Young People And The Employer Challenge

- There Is No Automatic 'Win-Win' Resulting From Digital Innovation.
- How To Engineer A Collaborative Human-Centred Approach?
- Ensure HR Tech, etc. Is Used To Diversify The Workforce...Not 'Screen Out' The Young.
- Agile Working – How Can Young People Be Supported To Be 'Job Ready'? (More Than Having the Right Skills → Work Experience, etc.).
- Home/Remote Working – Doesn't Work For Many Young People (Work Culture, Work Induction, etc.)?
- New LMI Tools – But Employer 'Needs' Poorly Specified – 30,000 Skill Related Descriptions!
- Following The Pandemic – How To Create More Meaningful Employment, Learning, And Entrepreneurial Opportunities For Those Hardest Hit.

# Young People And The Education Challenge



- **Education For What Future of Work?**
  - **Labour Scarcity v's Job Scarcity – Both Theories Highlight The Need For Significant Educational Reform.**
  - **Pandemic Highlights The Scale Of Educational Inequalities....Social Divide/Digital Divide.**
  - **Social Mobility → If The Demand For Higher Skilled Workers Flatlines Or Is Reversed → We Will Need A Different Model Of Educational Opportunity.**
- **The Race To HE Is Being Re-Evaluated → Greater Focus On 'Applied' Education But Problem Of 'Parity Of Esteem'?**
- **Accelerated The Role Of EdTech/New Delivery Models In Post-Compulsory Education and Training: Opportunities and Challenges?**
- **Renewed Focus on Lifelong Learning → Significant Reductions In Formal Workplace Learning And Adult Education Budgets (UK) → How To Deliver Lifelong Employability + Human Flourishing.**
- **Digital Literacy Is Much More Than Teaching Coding – *What Will It Mean To Be Human?***



# Moving Forward



**Early Phase of the 4<sup>th</sup> Industrial Revolution...**

**Not the End of Work → Labour Market Can't Resolve Distributional Issues → 'Equality of Opportunity' and 'Equality of Condition.'**

**Labour Scarcity v Job Scarcity → Using the 'Correct' Lens...**

**Whose 'Needs' of Industry Should Be Served, And For What Purpose?**

**How To Create A New 'Opportunity Bargain' For Young People?**

If you want more background analysis this is our recent book from OUP.

Also see Working Paper 2 'Education, Technology and the Future of Work in the Fourth Industrial Revolution' (P. Brown)

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