
WORKING, EARNING, LEARNING IN THE AGE OF INTELLIGENT TOOLS

The Berkeley WITS Project

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Session T1

Welcomes:

John Zysman

- Intelligent tools transforming society – self-evident
- No single trajectory, we have choices
- Must understand the alternative trajectories
- What are the leverage points that allow us to influence the trajectory?
- What happens to work and workers?

Paul Alivisatos

- UCB ethos: relentless questioning, to help figure out how to make society more just
- This ethos is important to this topic
- Lots is said about intelligent tools' impact – some accurate, some not
- Making good choices is critical

Shankar Sastry

- 1974, Daniel Bell wrote a book on post-industrial revolution
- Took 30 years after that to come to pass
- Social chaos that has come along with it could have been different if we had planned better – kinds of jobs that would be created, training for people to get there
- Today – every company says AI, Deep Learning – but that's not what the meeting is about
- Instead we're on cusp of a redux – a digital transformation of society
 - AI / ML
 - Cloud computing
 - IoT, wireless sensors
 - Kind of computation you can do by linking the above three

- Consequences: greater levels of automation, new sectors, new kinds of jobs, different kinds of jobs, affecting every sector
- Need to think about the distribution of these jobs, the salaries of these jobs
- Hope we can keep an optimistic outlook, but there's reason for concern
- Hope to start planning a roadmap for the way forward

Costas Spanos

- Technological development doesn't have to be agnostic
- The development of technology can be in the interest of society
- Not just about "controlling the monster"

OECD Presentations

Andy Wyckoff, OECD. "Going Digital"

- Why?
 - OECD origins are with Marshall Plan
 - Unique: small enough to have an in-depth discussion
 - Every policy issue under a small roof – 3,500 people in Paris HQ
 - Allows for multidisciplinary outlook, going across different agencies
 - Intelligent tools affecting every sector of policy; not just about the IT sector
 - Overcome gap between policymakers and technologists; interaction across policies
- So it's a "horizontal" project
 - Look for very interesting report on automated trucking
- What?
 - Three pillars
 - Impacts in one policy area have unintended consequences for other policy areas
 - "what keeps you up at night about the digital transformation?"
- Pillar 1
 - Distill technologies to their disruptive properties
 - Scenario analysis
 - OECD's foresight unit
 - New ways of doing policy that we never even thought of
 - Canada is using AI in immigration policy
 - New Zealand is using blockchain for secure delivery of foreign aid
 - Stocktaking of innovative policies
- Pillar 2
 - Automated trucking – "tip of the spear of AI"
- Pillar 3: Deep dives ("what keeps you up at night")

- Jobs, skills, nature of work--- need happy voters
- Use digital tools for policy design
- “GAFA” – Google, Amazon, FB, Apple, impact on productivity, competition, market openness
- Inclusivity / digital divide
- They are halfway through the project; need feedback

Stefano Scarpetta, OECD . “The Future of Work”

- First ever strategy created in 1994
- History
 - 1994: many OECD countries facing high persistent unemployment
 - Focused mostly on labor market, social policy, not so much education
 - Need improve flexibility of services and markets
 - 2006: reassessment; unemployment was down
 - More macro: brought education and other policy areas into the picture
 - Started considering not just number of jobs but quality of jobs; link between productivity and wages
 - Focusing on representation of under-represented groups
 - Now we’re in a new world post crash
- 3 mega-trends
 - People concerned about increase in robots – 500k added to economy per year globally by 2020
 - Ageing – ratio of 65+ over working age is growing; 1 in 2 people by 2050
 - Integration – workers more integrated with global supply chain, dependent on performance of foreign markets
- Labor markets are changing
 - Record-high level employment so far – no major automation impact
 - Don’t believe the Osborne & Frey study
 - But jobs will go through substantial transformation
 - New forms of employment will form
 - LOTS of unknowns about how much employment and how many new jobs
 - Labor markets are polarizing
 - Projecting big increases in income inequality
- New jobs strategy framework
 - Dynamic perspective
 - Need the right policies to allow labor markets to overcome a major shock
 - Lots can’t be done to improve overall **resilience and flexibility of labor markets**
- New jobs strategy dashboard
 - White/blue chart

- If you perform well on employment, you're likely to perform well in other categories – inclusivity, quality
 - But there are stagnant problems
 - Closing the gender gap
- Job quantity
 - US is close to OECD average in job quantity, poor on inclusiveness
 - Number of people with low income job is close to the lowest in OECD
- Key messages
 - **Labor market has to be part of broad government strategy**
 - **Flexibility is not the entire solution; must work on job quality and inclusivity**
- Three policy principles
 - Promote an environment of robust and widespread growth (high quality jobs)
 - Prevent exclusion
 - Prepare for future risks
- Think about what might happen in the future and adapt in advance, rather than waiting for changes to happen before intervening

Mariagrazia Squicciarini, OECD. “Overview of the Jobs and Skills”

- Individual transformation of jobs is key part of this project
 - 2 objectives
 - *1: how does IT change labor market, jobs and skills*
 - *2: how can policy address challenges of digital transformation?*
 - A tale of many tales
 - Measurement is hard
 - What does the “digital transformation” really mean?
 - It depends on the industry; skills also differ by industry.
 - Some metrics include, software investment, robot use, online sales revenue – reflect big changes in the market
 - Metrics are all over the map in terms of current distribution
 - They move at different paces; all are growing, but at different rates and accelerations
 - All sectors are now focused on developing IT technologies
 - Workers in digital industries have higher levels of cognitive and task-based skills
 - Returns to skills are higher in digital industries
 - Has become more important to have bundles of skills; two workers having complementary skills is out, multifaceted workers are in
 - Automation puts some workers at risk
 - *Routine workers are more at risk*
 - If you think automation and routine work are correlated, you worry about the lower part of the distribution
 - Tasks might be totally different in the same job. Job destruction and creation. 1.1% extra non-routine, and .4% routine workers?

- If you're worried about polarization need to worry about the middle part
- Technology can destroy jobs and create jobs
 - +100 technology leads to 1 more non-routine workers and 0.4 routine workers
- Need to help people transition from one occupation to another
 - Need to also reduce cost of policy, and make more effective
- How to design and target training policies in terms of the distance between skills workers have and skills they need
- Map these distances and identify needed skills-related improvements
- Identify and define VET
- Training opportunities depends on your gender, and your cognitive skills
 - Routine workers are getting the least training
 - Perhaps we need to rethink policies, how they are targeted

Stephanie Jamet, OECD. "Overview of Skills and Digitalization"

- There are positive impacts of digitalization – how can skills make the most of it?
 - We know a lot about society at this stage, but there are new opportunities for learning
 - Risks: too much time on social media, etc
 - Idea that if you have certain kinds of skills, you have more opportunity to benefit
- Policy: how can countries shape their policies
 - Not just gaining of skills, but use of skills
- Project structure
 - Because digitalization goes beyond economy and society...skills have relevance beyond work
 - Digital transformation makes learning easier, but who benefits from these opportunities?
- Indicators
 - Skills and skills policies
- Understand labor markets and how they will change
 - What are skills people need on the job?
 - Comparison on how equipped countries are
- Preliminary finding
 - Workers are working more with IT
 - Both technical tasks, but also management and other more social / emotional tasks
 - Share of non-routine tasks increases as share of routine tasks decreases
- Skills in a digital society
 - Understanding various aspects of digital society, what skills do people need?
 - Addressing digital divide – relevance of cognitive skills
 - How do skills shape the relationship? Work life balance, social isolation

- How are countries preparing?
 - Used survey of adult skills – literacy, numeracy, problem solving in digitally-rich environments
 - People lacking these skills: 15% lack these skills in rich countries
 - At best, 30% of population in each country fully has these skills
- Learning
 - Growth in content of knowledge, sources of knowledge
 - Questions about reliability
 - Negative relationship between number of computers in schools and school performance; need to figure out how to use technology to help achievement
 - On the job – technology doesn't necessarily help productivity
- Teachers need these skills – they need to know how to solve problems in technology-rich environments
 - In some countries teachers have these skills, in some countries they don't
 - US is below average
- Low-performing teachers in this category can set students back; training teachers is very important for the future
- Lifelong learning – finding balance between initial education and adult training
 - How does that balance need to change?
 - Change **certification** – sources of knowledge are broadening, work is becoming more skills-demanding. Who should be in charge of certification
 - Share of workers in on the job training is too low

Bay Area Views

Stephane Kasriel, Upwork

- Website helps people find freelancers all around the world
- Many clients are Fortune 500, many workers are knowledge workers
- Some of these technologies have an impact on the labor market
- 4th Industrial Revolution (WEF)- tech is accelerating
- AI / robotics could improve productivity, or destroy the labor market
 - Don't believe we're running out of jobs
 - Two futures: robot pets, or robot cattle
- Silicon Valley needs to lead innovation that is inclusive rather than destructive
 - Startups that say "disrupt" get a lot more VC funding than people that talk about "creating, building"
- No fate but what we make – we get to decide what technology does and how it's used; but need to be more thoughtful
- We operate jobs like in the first industrial revolution
 - 1:1 employment; onsite employment, onsite 9-5
 - Made sense for the assembly line; doesn't make sense for what people do today

- We can change, but how?
- People in OECD countries are being left behind. Why?
 - Inadequate training
 - Geography; knowledge work is done in big cities, but people don't move around as much as they used to
 - 50% of US GDP is happening in 23 cities; globally it's 200 cities
 - If you move to NY or SF, cost of living is untenably high; young students spend 70% of income on rent
- We need to change how companies operate, how jobs are tied to work; but these problems are solvable
 - 1) Need to for real invest in lifelong learning
 - US spends 6x less than Euro countries
 - 2) Need to move jobs elsewhere; workers moving to where jobs are is broken. Need to move jobs where workers are.
- Survey data
 - *Freelance workforce* is bigger than OECD metrics indicate; McKinsey asks, "do you do *some* freelance work;" don't measure by tax forms
 - 162m people do at least some amount of freelancing every years, 33% of EU+US
 - 29% are full-time
 - Growing really quickly; 3x the rate of overall US population
 - In 10 years, 50% of US population will do some amount freelancing
 - 50% of these are doing this as close to their primary source of income
 - Impacting more and more higher educated people
 - 27% increase in revenue from 2016 to 2017
 - These people have huge issues that aren't being dealt with by any government
 - The "gig economy" is not as scary as people think
 - 67% say they do this by choice
 - They don't live in the 23 cities or work 9-5
 - Freelancers prefer "freelancers"
 - Tragic story: architect gets fired for having a baby; now she's a freelancer; she prioritizes kids, doesn't work when they're at home; now she makes more money than she used to make
 - Gen X is huge part of freelancing population
 - You like mobility – finding a new full time job every time your spouse's job relocates is too hard
 - Freelancing is about freedom
 - Technology helps freelancing
 - Local network referrals dominate
 - But if you live outside of those 23 cities, your social network isn't in cities where jobs are
 - "How do you feel about this whole 4th industrial revolution?"
 - 55% of freelancers update their skills; 33% of W2 employees do
 - By 2025 freelancers would add \$2.7 trillion to global GDP

- We're not running out of jobs, we're running out of people to perform them (aging workforce)
- Talk of AI x-risk is self-fulfilling prophecy; we can do things about potential problems
- Tech is helping match people to the right jobs
- What Amazon is doing right now, siting their HQ in one of the 23 cities, is a tragedy. Huge missed opportunity for the American economy. They should have chosen a different city to become a 24th city.

Hal Varian, Google

- Reduction in both demand and supply of labor
 - Last 50 years, loose labor market; if you need workers you can find them
 - Next 50 years, going to be hard to find workers
- Bots
 - People talking about job stealing robots dates back to 1812
- Women entering labor force has flattened; baby boomers are retiring
- Spreadsheet revolution: reduced demand for clerks but increased demand for accountants
- Distinctions between jobs and tasks
 - 1950: 270 detailed occupations, only elevator operators have been eliminated due to automation
 - Look at most jobs: they are a lot more complicated than intellectuals will recognize, eg groundskeeper
 - Huge number of tasks – goes over multiple pages
 - There are 60 tasks – so the idea that they'll be totally automated away is kind of ridiculous
 - 10 largest occupations in the US
 - All those jobs are in services
 - Account for 21% of total employment
 - Future of work: “nerds and nurses”
 - Workweek – people love 3 day weekends
 - Higher productivity, excess workers
 - Netherlands has only 29.1 hours per week. They do that so that they can handle part-time work
 - People ant more jobs and less work
 - Technology can deliver that
 - There are 500m how to videos on Youtube
 - Both manual and cognitive guides
 - Amazing that we have an incredible delivery mechanism for skills development
 - Material is there, content is there, access is there, how to effectively deliver it?

- Productivity
 - Close to full employment
 - Declining participation
 - Anemic productivity
 - Only improvements in productivity can turn that around
- Labor shortages are worst in Trump country
- Without immigration in the US, labor force would be declining in absolute terms
- Participation declines; will see a tight labor market for a while, but boomers plan on continuing to consume once they retire
- We're in great shape compared to most countries: they all have demographic problems in terms of their replacement ratio
- Robots per 1k workers – highest in countries where people have declining labor forces in absolute terms
- In 2050, 2x as much alzheimers
- We shouldn't be worry about lack of jobs, we should be worried about lack of productivity growth; and productivity growth only comes from technological improvements

Laura Tyson

- Worried about polarization
- What are the incomes of people in new jobs and job types?
- Who pays for people's transitions? Government bears that costs politically and socially
- What is the political economy, not just narrowly the politics or narrowly the economics?
- What about the role of the institutions that represent the worker?
- Who are the winners/losers? How do you settle?