
WORKING, EARNING, LEARNING IN THE AGE OF INTELLIGENT TOOLS

The Berkeley WITS Project

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Session F1

Venture Capital Views on the Future of Skills and Work

Mark Kvamme

- We are about to begin on the FOUR KEY WAVES OF TECHNOLOGICAL INNOVATION:
 - First was main frame (birth of transistor and ability to compute)
 - Second was the microcomputer or the PC
 - Born out of Bohr's law
 - Had to be next to technologists to make this happen
 - People migrated to the west coast
 - Most of innovation coming out of Silicon Valley
 - Connected computer
 - Cisco, ability to link things together
 - Wouldn't invest unless was a bike ride away
 - People want access to the core technologists
 - Thinking Machine
 - Cloud computing – with a credit card, and internet connection, can get access to best system on the platform
 - High speed networks
 - Now more important to be close to the customer than to the Valley
 - Innovation happens outside of Silicon Valley because technologists only talk to technologists
 - Get diversity in presence outside of Silicon Valley
 - There is an attitude to only invest in a company that is a “bike ride away”
 - As we have this change to the thinking machine
 - Necessary to be close to drivers of economic growth (customers rather than technologists)
- Capabilities will shift to become part of fabric of different companies
 - Sebastian Trude
 - Founder of autonomous vehicles
 - Believes that AI will impact over 75% of the workforce
 - In 1990, took 25 people to create \$1 of manufactured goods
 - Today 5 people can do it

- AI will affect 75% of the white-collar workforce
 - We will have to unleash creativity and allow machines to do what they do
 - Machines are manufacturing tools
 - People need to understand their job but bring their creativity
 - AI will impact 10M workers
- We are truly entering a new age
 - Figuring out how we as workers will work with machines that are beginning to control much of our lives (i.e. doctor, lawyer)
 - Amount of change over the next 5 years will dwarf what we have seen the past 25 years
- “Nanodegrees” will drive future learning.
 - Every 3 years, workers will have to completely retrain themselves.
 - We must create an environment where it is possible for the workforce to do that.
 - The most important question of the day is how to we access knowledge and retrain ourselves.

Michael Borrus

- Similar thread
 - Fair amount of innovation coming out of Silicon Valley
- Near term horizon is easier to know than long term horizon
- Difference between training needs and getting used to new tech
- What’s really coming down the pipe
 - Not very predictable
- Lilt Inc.
 - John DeNero from Berkeley founded the company
 - Written translation online
- need for continuous skilling and continuous familiarity with new tools
 - It’s about removing the fear
- augmenting human capabilities and opening new markets
 - specific way in which the information that augments the human capability is external to the human that is being augmented
 - algorithms that choose action oriented outputs for the human
 - product of human thinking; decision making is the outcome
- 5 skills related propositions/observations:
 - output of machine intelligence is inherently probabilistic
 - more people will have to understand probability or related math
 - will not understanding the accuracy of the information that they’re supposed to act on
 - more machine intelligence provides us with probabilistic decisions
 - ability to decide after considering a vast amount of data coming from these machines
 - making decision after weighing inconsistent data
 - the more this intelligence sends out, increase the need for people who can explain what it says to the people that are impacted by the decision
 - requires social interaction
 - the more we get this data

- more humans needed to check for bias in the algorithms
- the more we rely upon machine intelligence, the more likely we are to institutionalize bias
- the more pervasive the rollout of machine intelligence
 - the more humans we will need to skill and reskill
 - technologies are transformation in ways we haven't seen before
 - 100% of all jobs will ultimately be affected
 - humans can't cope unless they can adapt
 - ability to adapt will become evolutionary required human capability

Patrick Scaglia

- the best way to predict the future is to invent it
- what does he do?
 - engages founders from research labs and helps them build companies that are ready for the market and venture investors
 - founded CITRIS
- 3 observations
 - start-up work is good projection what next 5 years will look like
 - takes 10 years for the start-up to disrupt/impact economy
 - THREE OBSERVATIONS based on CITRIS Accelerator Program:
 - 1: AI and ML are reshaping every field
 - 40% of start-ups use AI and machine learning
 - what will it be in the next four
 - therapeutics, medical devices
 - drug development
 - management of cities
 - what happens when tools become intelligent, they reshape your job; don't necessarily displace
 - 2: Diverse, highly-educated groups are reshaping the world
 - role of entrepreneurs
 - very strong group of students that are global citizens with strong awareness of social impact
 - very diverse (79% graduate students and 39% women)
 - Most of the time, talk about undergrads but some of the most impactful work comes from graduate students
 - Question should be being we being responsible
 - A lot of entrepreneurs care about societal impact of what they're doing
 - 3: crossing boundaries
 - ability of founders to navigate and communicate across fields has enabled innovations that are truly disruptive
 - breadth matters again
 - coming back because all innovation shared between different fields
 - AI/ML must be understood by non-computer scientists whether you are a chemist, biologist, social scientist
 - Biology, chemistry need to learn how to communicate across fields

- We need a 21st century version of a liberal education

Tim O'Reilly

- O'Reilly Media is a learning company
- Jobs question
 - The market is efficient at signalling people on what skills they need
 - We see ways that new economies emerge
 - Starts slowly, then then exposition of all the technologies
 - People have swarmed into the skills that they need
 - First: write some html, then databases, then new languages (php), web frameworks, statistical tools, etc etc
 - When there's a part of gold at the end of the rainbow, people know where to go
- Question on what happens when technology starts to defuse into society
 - Companies have slacked off on the need to retrain workers
 - They view the job force as a super market
 - Companies should create their own workers
- Why are we so as a society that we assume people already have skills?
 - WTF is an expression of amazement
 - What do the great technology platforms teach us about the broad economy
 - Very difficult to get from the top further up unless you move to the bottom
 - Acquire companies or pivot
 - Pattern going from inclusive capability to extractive dominance is reflective of economy
 - Things to think about when it comes to universal basic income
 - We are in a cycle where extractive players are taking too much of the value
 - Problem is that that value isn't going around- lack of distribution
 - Lack of conservation of attractive profits
- We have an opportunity to do things that are unimaginable in the same way as before
 - We are not being bold enough
 - If the machines are incredible, we can do incredible things
- What is the 21st century equivalent to the elementary school, high school, post-secondary?
- We need universal continuous education
 - Need companies to support workers
 - How do we get companies to invest in their employees as assets?
 - We don't have to think about people as costs to be eliminated
- Uber is the company of the future
 - Augments human capabilities
 - Embeds intelligence into the device
 - Interface is the tech that embodies knowledge