



## IN THIS ISSUE: DAZZLING TECHNOLOGIES, BUT WHAT ABOUT JOBS?

Technology is dazzling (item 1), but eliminates jobs (item 2). What does this mean for the future? An author maps out a way forward (item 3).

**1 – ECONOMIC PROGRESS IS BOTH DISMAL AND DAZZLING**

**2 – TECH BOOM'S DOWNSIDE: NOT ENOUGH JOBS**

**3 – THE FUTURE BELONGS TO WORK THAT IS MEANINGFUL**

## 1 – ECONOMIC PROGRESS IS BOTH DISMAL AND DAZZLING

Advanced economies in the 21st century are caught between two giant, competing truths: economic growth is slowing down, and yet, at the same time, science is flourishing. What are the implications of this dichotomy?

Authors Ian Goldin and Chris Kutarna, writing at [voxeu.org](http://voxeu.org), take up the argument made by Robert Gordon – that innovation has reached the point of diminishing returns – and reject it.

Gordon's argument is that the great productivity-enhancing innovations of modern life are behind us: electricity, sanitation, transportation, etc. Whatever's left – driverless cars, or even quantum teleportation – might prove incremental in comparison.

Goldin and Kutarna say this is backwards. In fact, they argue, the present experience in research laboratories, across the sciences, is that the pace of discovery is generally rising, not falling. For reliable evidence, consider the pharmaceuticals industry (a good litmus test). Write the authors:

The year 2013 set a new record for total drugs launched worldwide (48) – a record that was promptly beaten in 2014 (61). With another 46 drugs launched in 2015, the last three years have been the industry's three most productive in its history. Recent major discoveries include new weapons against heart failure, which in an aging world is now the leading cause of death; immunotherapies, which help to defeat cancers by boosting the body's own immune response; and a viable pathway to effective Alzheimer's

medications within a decade. In part thanks to the accelerating pace of pharmaceutical achievements like these, average life expectancy across advanced economies is now rising an unprecedented four to five hours per day.

Such advances will undoubtedly disrupt and reconfigure advanced societies over the next 30 to 50 years. And medical science is not merely discovering new drugs. The advent of synthetic biology – the capacity to design and modify organisms at the genetic level – promises to eventually shift the societal role of medicine from the treatment paradigm that has prevailed for 5,000 years to one of transforming organisms to give them overwhelming natural advantages against disease and aging. Within this new paradigm lifespan, intelligence, and other basic human characteristics may quickly evolve beyond ranges that we consider normal today.

Another source of societal disruption, continue the authors, will be artificial intelligence, which is rapidly shifting the role of computers from being tools for calculation to tools for cognition. This shift has near-term implications for the structure of the labor market (according to the Oxford Martin School, almost half of all current jobs in the US have a high likelihood of being automated away by 2050), but the more profound disruption will be to prevailing conceptions of free will:

Many of the choices we take for granted in our daily lives today – which routes we drive, what products we purchase, what media we

## *Trend Analysis That Builds Business Decisions*

consume – will rapidly become subject to AI scrutiny that will unveil a range of individual and social consequences to which we are presently ignorant. As this new cognitive layer over collective private action increases in strength and reliability, how will that domain of private action be affected? Will we be permitted to continue socially harmful activities in defiance of such evidence? Will elaborate incentives arise that cause our individual behaviors to conform to optimization algorithms? And who will hold the authority to set and adjust such algorithms?

Similarly, profound transformations to society as we know it now are suggested by present pathways of inquiry into quantum mechanics, nanotechnology,

and neuroscience. All science today stands near the base of a steep learning curve.

Neither history nor the present-day pace of scientific discovery supports the notion of diminishing returns to technological innovation, conclude the authors. The challenge for growth economists, they write, is that analytic models are poorly suited to capture, and set society's expectations for, these impending disruptions. Some consequences will be too pervasive and long-term to show up clearly in the immediate data. Some will change our behaviors, and by doing so invalidate prevailing economic assumptions. And some will transcend the economic sphere entirely to touch higher human values.

## 2 – TECH BOOM'S DOWNSIDE: NOT ENOUGH JOBS

The technology revolution has delivered Google searches, Facebook friends, iPhone apps, Twitter rants and shopping for almost anything on Amazon, all in the past decade and a half. What it hasn't delivered are many jobs. So write Jon Hilsenrath and Bob Davis at [wsj.com](http://wsj.com).

After rising in the 1990s, employment at computer and electronic firms has fallen by more than 40%. While other tech jobs have been created in sectors such as software publishing, that job growth is smaller than the losses in tech manufacturing. Write the authors:

Since 2002, the number of technology startups has slowed, hurting job creation. The causes include global competition and increased domestic regulation. Another problem is that [fewer tech companies have gone public](#), which can enrich early employees and spawn more jobs as companies grow.

The latest generation of hot tech startups has attracted a mountain of venture-capital funding and gigantic valuations, led by Uber Technologies Inc., which was [worth \\$68 billion](#) as of June. The influx of wealth has created more prosperity in Silicon Valley but [exemplifies the economic polar-](#)

[ization](#) rippling through America.

WhatsApp had more than 450 million users worldwide when Facebook bought the messaging service for [\\$19 billion in 2014](#), turning founder Jan Koum into a billionaire several times over. At the time of the acquisition, WhatsApp had 55 employees.

Economists call the phenomenon “skill-biased technical change.” The spoils of growth go to those few people with skills and luck and who are best positioned to take advantage of new technology.

The five largest U.S.-based technology companies by stock-market value – Apple, Alphabet, Microsoft, Facebook and [Oracle](#) Corp. – are worth a combined \$1.8 trillion today. That is 80% more than the five largest tech companies in 2000.

Today's five giants have 22% fewer workers than their predecessors, or a total of 434,505 as of last year, compared with 556,523 at [Cisco Systems](#) Inc., Intel, IBM, Oracle and Microsoft in 2000.

In coming decades, machines are likely to replace new forms of routine work done by humans. From 1991 to 2001, the [number of secretaries](#) declined about 35%, according to the Bureau of Labor

- Market and industry analysis
- Strategic business direction
- Growth dynamics

- Trend identification and analysis
- Keynotes and presentations
- Proprietary research and reports

*Trend Analysis That Builds Business Decisions*

Statistics. The [number of textile and apparel workers](#) fell 37%.

For a long time, those with bachelor's degrees in science seemed to be safe from automation-related layoffs because their cognitive knowledge was tough for computers to duplicate. Less-educated workers who dispense personal service, such as home health aides or masseuses, also seemed safe.

### 3 – THE FUTURE BELONGS TO WORK THAT IS MEANINGFUL

Automation software, robotics and artificial intelligence are rapidly replacing human labor everywhere and not just low-skilled work. Is there a way forward? Author Charles Hugh Smith lays out a road map in [A Radically Beneficial World: Automation, Technology and Creating Jobs for All: The Future Belongs to Work That Is Meaningful](#).

Here's a small excerpt from the introduction:

The current system is based on five principles we assume are like socio-economic gravity, i.e. they're self-evidently true:

- Money created by banks trickles down to create work and wealth for all
- Technology always creates more jobs than automation destroys
- Centralization is the solution to large-scale economic problems
- Expanding debt and consumption (i.e., growth) is the path to prosperity
- Maximizing private gain organizes the economy to the benefit of all

If we look at these statements with fresh eyes, we realize they're all just wishful thinking. All five have proven to be untrue. Rather than being the foundation of a coherent system, each one adds more incoherence. Instead of serving as a solution, each one is a toxic problem that further erodes the system from within. What does this system failure mean for us as individuals and households? For starters, anyone who wants a better future for them-

Harvard University economist David Deming estimates that the hollowing-out of work spread to programmers, librarians and engineers between 2000 and 2012. As much as \$2 trillion worth of human economic activity [could be automated away](#) using existing technologies, such as Amazon's robots, in coming years, consulting firm McKinsey & Co. estimates.

selves and their family needs to start taking charge of their destiny like never before. But working within the failing system to better our individual destinies is no longer enough.

We need an entirely new system if we want to change the output from inequality, insecurity and poverty to opportunity, secure work and prosperity. This new system doesn't require overthrowing the existing order, or fixing the current system. This new system unifies existing technologies and social innovations that we can all understand. This new system is not utopian; it's extremely practical. We see examples of similar systems every day. ...

The conventional narrative claims the current system will automatically create more jobs without us having to do anything different. And if this turns out to be false, then the system will give everyone a guaranteed income for life, without changing anything but the tax rate on the companies that own the robots and software that ate all the jobs. Both solutions are completely impractical, with no basis in reality. Both are wishful thinking.

But that's not all that's wrong with the conventional system.

### **POVERTY IS MORE THAN MATERIAL**

The conventional narrative does not recognize that the loss of jobs includes a loss of purpose and social cohesion. In the fantasy version of guaranteed income, people receiving a guaranteed income are free to explore literature, compose music, create artwork, play

# Growth STRATEGIES

## Consulting in:

- Market and industry analysis
- Strategic business direction
- Growth dynamics

## Providing:

- Trend identification and analysis
- Keynotes and presentations
- Proprietary research and reports

### *Trend Analysis That Builds Business Decisions*

games and live a life of productive leisure. Freed from the burden of work, people will consume the goods and services created by automation. This fantasy overlooks the reality that communities that are given free housing, food and healthcare are breeding grounds for self-destructive pathologies, depression, ill-health and unhappiness. The public intellectuals who espouse the fantasy of creative leisure base their vision of Utopia on their own peer group, the most educated, most motivated, most accomplished and most ambitious 1% of the workforce. Most people are not able to sustain purpose and meaning outside a work environment that provides meaningful social roles. Work is the foundation of purpose and positive social roles; leisure and consumption are not. Researcher John B. Calhoun found that once the number of individuals capable of filling social roles exceeds the number of roles available, social cohesion breaks down, and the resulting pathology of shared hopelessness creates what Calhoun called a behavioral sink. Hope and the human spirit are both destroyed by this bottomless black hole. Though we think of poverty in material terms, the deeper loss when jobs disappear is the loss of positive social roles, purpose and meaning – not just a reason to get up in the morning, but a reason to contribute. Simply giving people money does not automatically create positive social roles. Rather, it reinforces a self-destructive state I call permanent adolescence in which a focus on leisure and consumption trivializes human life. This stripping away of social roles in favor of consumerism leads to self-absorption and a loss of purpose, pride and meaning. That economists are blind to the terrible impoverishment of human life when meaningful work disappears is astounding, and reminds us that *work isn't just a financial arrangement*; it is a social arrangement and a source of individual pride and purpose. The loss of jobs is not just a loss of income but a poverty of opportunity to acquire ownership of the engines of wealth creation. ...

Let's summarize the knowledge economy:

- Value flows to what's scarce.
- Capital and labor are abundant and therefore have little scarcity value.

- As goods and services are commoditized, they lose scarcity value.
- Information and knowledge are also abundant.
- What's scarce is knowledge that results in new processes, products, services and models.
- Many new ideas don't lead to new products, models, etc.
- The process of finding value in new ideas is inherently risky.
- New ideas that automate/commoditize what has yet to be automated/commoditized generate the largest cost reductions and gains.
- Automation/commoditization reduces costs, profits and jobs.

The conclusion of all this is sobering.

Technology isn't going to create more jobs than it destroys. In an increasingly competitive world of declining profits and rising costs, it is financial suicide to ignore automation in favor of maintaining business as usual. The companies generating profits in a rapidly commoditized world will not be able to support guaranteed incomes for tens of millions of displaced workers, and borrowing trillions of dollars to fund a super welfare state is not sustainable or desirable, as rapidly rising debt bankrupts the borrower. Wishful thinking about technology and guaranteed incomes guarantees failure. Displaced workers need meaningful, secure work. Giving them enough income to scrape by is not enough, as the poverty of lost purpose, pride and positive social roles robs them of the essentials of human life.

The conventional narrative doesn't state this directly, but the unspoken conclusion is: technology is the source of our problems. But this seems exactly backwards to me. What if technology isn't the source of the problem?

What if technology is simply revealing the systemic flaws in the status quo? Rather than being the source of the problem, what if technology is the solution?

These are the questions we'll explore in the rest of the book.