



Innovation, Technology and the 21st Century Global Economy



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As Prepared for Delivery

Good afternoon. It is a great honor to come to Stanford University. Stanford, of course, is one of the world's premier centers of higher learning, and it also has the good fortune of being linked to the world's leading hub of modern technology and innovation.

So I am delighted to be here, and I would like to especially thank my hosts—John Shoven, director of the Stanford Institute for Economic Policy Research, and Tino Cuellar, director of the Freeman Spogli Institute for International Studies.

As I am just returning from Sydney's G-20 meeting, I would like to share with you our views on the global economic situation. While unemployment is too high, public and private debt are too high, and global growth is too low relative to potential, we certainly see some economic momentum in the works—global economic growth of 3¾ percent this year, rising to 4 percent next year. This latest pickup of growth is largely due to positive developments among the advanced countries—certainly in the US, but also in Japan and the Euro Area.

Ironically, the emerging markets that kept the global economy afloat during the crisis (together with the developing economies, accounting for three-quarters of global economic growth in recent years) are weakening, with their economic cycles turning and growth

slowing. For some of them, a rising tide came with more choppy waves—strong growth opened up vulnerabilities that came into focus as growth began to slow.

At the same time, because the economic situation was improving in the US, the US Federal Reserve started the process of dialing back its unconventional monetary policy. This mix created the conditions for some capital to flow out of a number of emerging markets, thus generating market volatility and currency variations.

In these circumstances, we on our part have cautioned (i) that monetary policy should remain accommodative in many advanced economies; (ii) that countries should continue to bring their houses in order by taking appropriate policy action, adopting credible policy frameworks, and implementing structural reforms; and (iii) that communication amongst policy makers should improve.

As I just returned from a meeting of the G20 in Sydney, let me tell you where we ended up. As you know, the G20—the group of the 20 largest economies in the world—has been instrumental in fighting the global financial crisis, and it remains a key forum for discussing global economic and financial issues.

For example, the G20 members have agreed to complete core financial reforms set out in response to the crisis by the end of 2014, making the financial sector safer and less likely to cause crises.

G20 governments and central banks have also agreed to clearly and consistently communicate their policy actions, and to continue cooperating on monitoring spillovers to other countries.

The discussions also rightly focused on a country-specific as well as a collective effort to restore medium-term economic growth that, if fully implemented, could raise the level of GDP by an extra 2 percent over the next 5 years, which would create significant additional jobs.

So I left Australia with a sense that, despite many risks that could undermine the recovery, policy makers are broadly on the right track.

And yet, we also need to discuss what kind of growth this "right track" leads to. Will it be solid, sustainable, and balanced—or will it be fragile, erratic, and unbalanced?

To answer this question, we need to look at the patterns of economic activity in the years ahead, and especially the role of technology and innovation in driving us forward.

As Isaac Asimov—a master of science fiction literature—once said: [“No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be.”](#)

This is what I want to address today, in the form of three questions:

- First, what does this new technological era mean for the economy, especially for jobs?
- Second, how does it relate to one of the scourges of our age—rising inequality?

- Third, what about some solutions, including education and what I refer to as the “new multilateralism?”

Technology and the economy

Let me begin with the interlinkages between technology and the economy. Innovation is pushing ahead at warp speed. You know this. You live it. You even drive it.

We are certainly living through one of the most exciting periods in human history. We can feel the air hum with virtual activity and reality transform before our very eyes. The pace of change is so fast that even the technology of five years ago seems prehistoric.

Those of you who are students probably do not even remember a time when phones were not smart, when cameras contained film, when texts meant school books, and when wireless referred to an old-fashioned radio!

This advance is centered on the rise of a global digital network—the “hyperconnected world”—combined with the rise of genuine machine intelligence. If the previous revolutions were about using machines for brawn, this is about using machines for brains. And since technology is powering a giant leap in global interconnectivity, these are “connected” brains!

Just look at some of the trends. Today’s smart phones are more powerful than yesterday’s supercomputers. We see cars driving themselves, printers making complicated three-dimensional parts, and robots doing the most complex tasks.

“Science fiction” is rapidly becoming “science fact”. Indeed, we may just be getting started when it comes to the power and reach of machine intelligence.

What does this all mean for our lives and livelihoods, for our common economic future?

It is easy enough to conjure up a bright future of dramatically higher living standards, as routine tasks are outsourced to uncomplaining machines. Indeed, as early as 1930, John Maynard Keynes was thinking about a future of leisure and abundance centered on a fifteen-hour work week!

Yet it is also all-too-easy to imagine a future that is more grim, more in line with the dystopian picture favored by so many science fiction writers.

Certainly, we can see some worrying trends. For a start, the effects of new machine technology are not showing up in productivity statistics—at least not *yet*—and productivity is by far the most important driver of long-term economic growth.

Some say that productivity from this kind of advanced technology is devilishly hard to measure. Others say that it is merely a matter of time before it shows up in the data. But we certainly need to keep an eye on this.

One of the biggest worries, however, is how this technological innovation affects jobs. Put simply: will machines leave workers behind?

Despite his optimistic vision, Keynes worried about the transitional problem of what he called “technological unemployment”—what happens when we economize *on* labor faster than we can find new uses *for* labor.

This is always a risk during times of rapid change. In the past, it was agricultural workers and then industrial workers in jeopardy. Today, even seasoned professionals can find themselves cast adrift on an unfamiliar ocean.

In terms of job creation, this means that we might need to sprint faster in the years ahead—maybe a lot faster. But this will be even harder to do, because we have much more ground to make up—thanks to the legacy of the crisis.

Think about it: had the crisis not occurred, there might have been 62 million more jobs in the world today, according to the International Labor Organization. As it is, there are over 200 million people looking for work across the globe. If the unemployed formed a country, it would be the fifth largest in the world. To add to our worries: 75 million of these are young people, eager to take that first firm foothold in the ladder of success. We cannot allow them to become a “lost” generation.

So clearly, jobs must be a preeminent priority in the years ahead. The major test of the new technological era is simple: can it provide decent livelihoods for all people?

Technology and rising inequality

This feeds into a broader concern: Technological advance creates a small cohort of big winners, leaving everybody else behind. Which brings me to my second topic today—the problem of rising inequality.

Income inequality is on the rise across the world—starkly so. According to Oxfam, almost half the world’s wealth is owned by one percent of the population and, stunningly, the bottom half of the world’s population owns the same as the richest 85 people in the world. Since 1980, the richest 1 percent increased their share of income in 24 out of 26 countries for which we have data.

Here in the US, the share of income taken home by the top 1 percent more than doubled since the 1980s, returning to where it was on the eve of the Great Depression. Since 2009, the richest 1 percent captured 95 percent of all income gains, while the bottom 90 percent got poorer.

While this is happening, the International Labor Organization tells us that labor’s share of income has fallen over the past two decades in 26 out of 30 advanced economies—even though labor productivity has risen.

What is causing such a convulsion in the distribution of income? There is no single factor here, although it seems clear that technology is one of the major factors—it can create huge rewards for the extraordinary visionaries at the top, and huge anxieties for the ordinary workers at the bottom.

Certainly, those with the lowest skills are having the toughest time in today’s economy. Here in the US, the unemployment rate for people without a high school diploma is three times greater than for those with a bachelor’s degree or higher. Indeed, over the past two decades,

only those with college degrees have seen rising real wages. Some are simply giving up and dropping out of the labor force altogether—this is probably one reason why the participation rate is the lowest in a generation.

I know that these concerns resonate strongly at this university, which was founded—to use the words of Jane Stanford—with a “spirit of equality”. One of her goals for the university was “to resist the tendency to the stratification of society, by keeping open an avenue whereby the deserving and exceptional may rise through their own efforts from the lowest to the highest stations in life”. This noble ethos has always served Stanford well, and we will need more thinking like this in the years to come.

Why? Because if not managed carefully, rising inequality and economic exclusion can have pernicious effects. It can undermine economic, social—and perhaps even political—stability. It can tear the very fabric that holds society together.

We now have firm evidence—based partly on IMF research—that a severely skewed income distribution harms the pace and sustainability of growth over the longer term.

We also know from our work at the IMF that careful design of tax and spending policies can help reduce inequality. Think about improving access to health and education, putting in place effective, targeted social programs, and making taxation more progressive.

Policies aimed at countering inequality are hard to design. They throw up winners and losers. The potential for conflict and discord requires courage and determination. And yet, giving the huge stakes, the work must begin.

In the years ahead, it will no longer be enough to look simply at economic growth. We will need to ask if this growth is inclusive—whether the small boats rise with the big boats instead of being capsized by them.

The importance of education and the new multilateralism

This brings me to my third major point today. Taking a step back, how can we make the new economic age enhance, rather than diminish, our humanity? How can we make this amazing innovation advance the prospects of all people?

These are different times, and they call for different solutions.

As Abraham Lincoln once said, “The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise—with the occasion. As our case is new, so we must think anew, and act anew.”

What would this new thinking and new “acting” look like? First, let’s build a bridge to take us to the future we want, and from the platform on the other side, let’s discover new horizons.

The bridge I have in mind is education—education attuned to the requirements of the advanced machine age.

Putting it simply, educational systems are not keeping pace with changing technology and the ever-evolving world of work. Not enough people are thinking strategically enough in this area.

Fundamentally, we need to change *what* people learn, *how* people learn, *when* people learn, and even *why* people learn. We must get beyond the traditional model of students sitting passively in classrooms, following instructions and memorizing material. Computers can do that for us!

A 21st century educational system must focus on the areas where humans can outclass computers—such as in cognitive skills, interpersonal skills, fine motor skills, or sophisticated coding skills. Think of creative jobs, caring jobs, jobs that entail great craftsmanship. And given the rate and pace of change, we will need the ability to constantly adapt and change through lifelong learning.

This means that public and private sectors must work closely together. It means that institutes of education must think even harder about how to equip today's generation for tomorrow's world.

Top-tier schools like Stanford have an especially important role to play here. As you know so well, Stanford's model of education was innovative from the outset—co-educational, non-denominational, and always practical, focusing on the formation of “cultured and useful citizens”. Stanford was ahead of its time back then. I know that it will continue to be ahead of its time as we venture into the exciting period ahead.

Yes, machines can replace our muscles. Computers may even replace our intelligence. But they can never replace the capacities that make us truly human: our creativity and innovation, our passion.

So education must be the *bridge* between the present and future, the old and the new. But we must also build an enduring *platform*. By that I mean a new way of thinking about the global economy—the “new multilateralism”, where all stakeholders take joint responsibility for the global common good, breaking down the borders and barriers that are really relics of a bygone age.

This is really the only surefire way to bend the new age to our will, to manage the complex channels of a hyperconnected world, to get to grips with global problems that are no longer amenable to only national solutions, because they completely ignore borders.

The good news is that we already have some key institutions of multilateralism at our disposal. Think about the IMF, for example. The Fund is essentially an economic club of 188 member countries that commit to working together and to helping each other in time of need—secure in the knowledge that in helping one, they are helping all.

Going forward, the new multilateralism must build on the old—and adapt to a world that is more interconnected and networked, but also more diffuse and dispersed in terms of power and decision making.

As a first step, that means that institutions like the IMF must be brought fully up to date, and made fully representative of the changing dynamics of the global economy—including the shift toward dynamic emerging markets. We are working hard on that.

More than this, the new multilateralism must also encompass the dense web of networks and coalitions that are now deeply embedded in the fabric of the global economy. Think about the

rise of cities and multinational corporations. Think about civil society organizations that, thanks to technology, now have a global reach.

There will be many different types of actors on this new global stage. The challenge is for them to work cohesively—and together, write the next great act of our grand global destiny.

Conclusion

Let me conclude by agreeing with futurists Erik Brynjolfsson and Andrew McAfee—the authors of *The Second Machine Age*—when they say that “technology is not destiny, we shape our destiny”.

So how do we shape this destiny? To borrow a *Star Trek* reference, how can we make the future look more like the harmonious United Federation of Planets and less like the soul-destroying Borg collective?

That is the great test of our time. I know that the Stanford community is intricately linked to the developments that will shape our future.

Thank you very much.