

## ORAL CONCOURS 2015

### ANGLAIS - LVI

#### Where Will All the Workers Go?

NEW YORK – Technology innovators and CEOs seem positively giddy nowadays about what the future will bring. New manufacturing technologies have generated feverish excitement about what some see as a Third Industrial Revolution. In the years ahead, technological improvements in robotics and automation will boost productivity and efficiency, implying significant economic gains for companies. But, [...] it remains uncertain whether demand for labor will continue to grow as technology marches forward.

Recent technological advances have three biases: They tend to be capital-intensive (thus favoring those who already have financial resources); skill-intensive (thus favoring those who already have a high level of technical proficiency); and labor-saving (thus reducing the total number of unskilled and semi-skilled jobs in the economy). The risk is that robotics and automation will displace workers in blue-collar manufacturing jobs before the dust of the Third Industrial Revolution settles.

The rapid development of smart software over the last few decades has been perhaps the most important force shaping the coming manufacturing revolution. Software innovation, together with 3D printing technologies, will open the door to those workers who are educated enough to participate; for everyone else, however, it may feel as though the revolution is happening elsewhere. Indeed, the factory of the future may be 1,000 robots and one worker manning them. [...]

For the developed countries, this may seem like old news. After all, for the last 30 years, the manufacturing base in Asia's emerging economies has been displacing that of the old industrial powers of Western Europe and North America. But there is no guarantee that gains in service-sector employment will continue to offset the resulting job losses in industry.

For starters, technology is making even many service jobs tradable, enabling them to be offshored to Asia and other emerging markets. And, eventually, technology will replace manufacturing and service jobs in emerging markets as well.

Today, for example, a patient in New York may have his MRI sent digitally to, say, Bangalore, where a highly skilled radiologist reads it for one-quarter of what a New York-based radiologist would cost. But how long will it be before a computer software can read those images faster, better, and cheaper than the radiologist in Bangalore can? [...]

Job-reducing technological innovations will affect education, health care, government, and even transportation. For example, will we still need so many teachers in the decades to come if the cream of the profession can produce increasingly sophisticated online courses that millions of students can take? [...]

And, of course technological innovation that is capital-intensive and labor-saving is one of the factors – together with the related winner-take-all effects – driving the rise in income and wealth inequality. Rising inequality then becomes a drag on demand and growth (as well as a source of social and political instability), because it distributes income from those who spend more (lower- and middle-income households) to those who save more (high-net-worth individuals and corporate firms).

Obviously, this is not the first time the world has faced such problems, and the past can help to serve as a model for resolving them. Late nineteenth- and early twentieth-century leaders sought to minimize the worst features of industrialization. Child labor was abolished throughout the developed world, working hours and conditions became more humane, and a social safety net was put in place to protect vulnerable workers and stabilize the (often fragile) macroeconomy.

As we begin to seek enlightened solutions to the challenges that the Third Industrial Revolution presents, one overall theme looms large: The gains from technology must be channeled to a broader base of the population than has benefited so far. [...] In order to create broad-based prosperity, workers need the skills to participate in the brave new world implied by a digital economy.

Even that may not be sufficient, in which case it will become necessary to provide permanent income support to those whose jobs are displaced by software and machines. Here, too, we should attend carefully to the lessons of the past.