

Rise of the Machines?

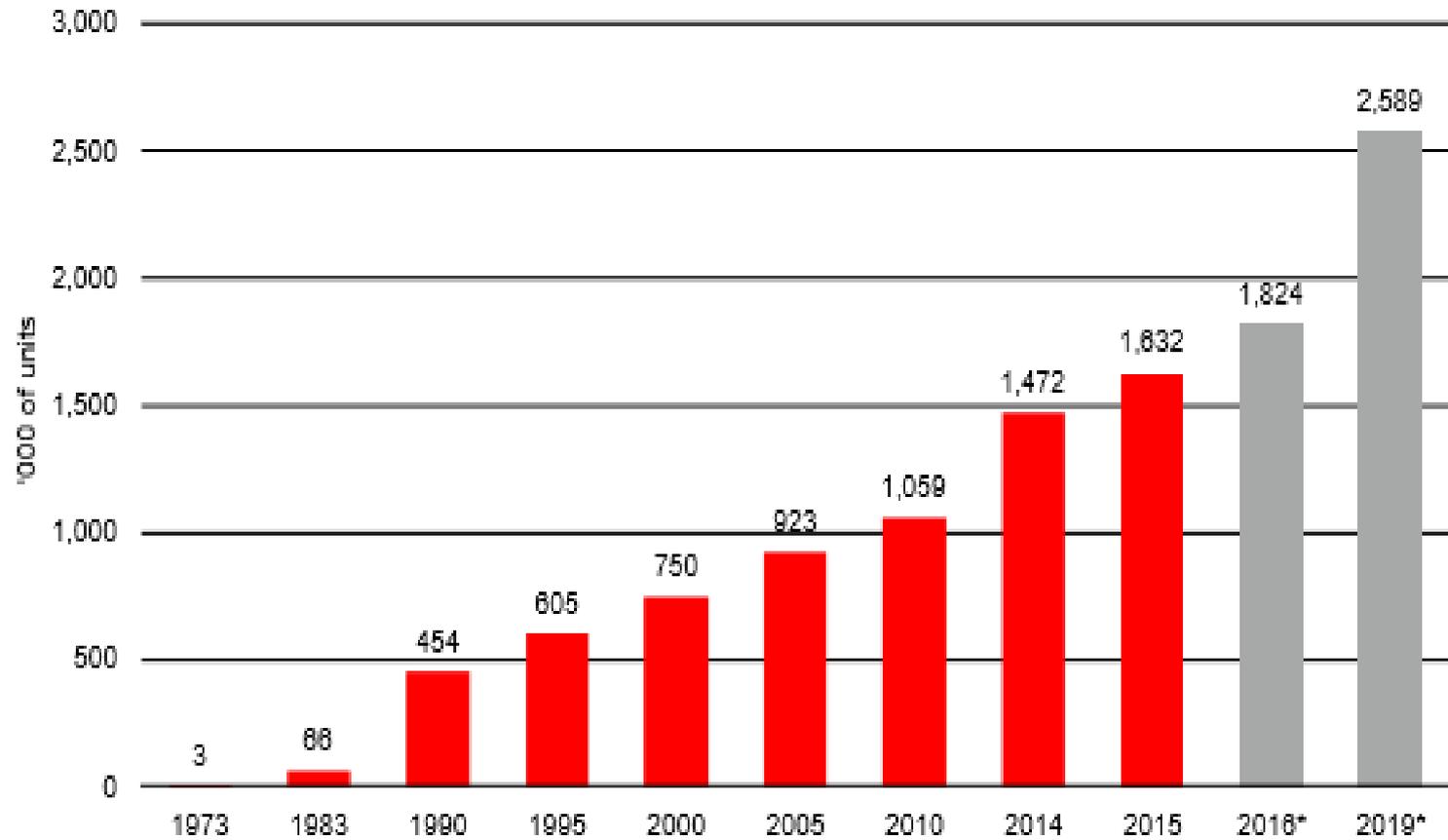
- Automation and the Future of the Humanity



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Worldwide estimated operational stock of industrial robots

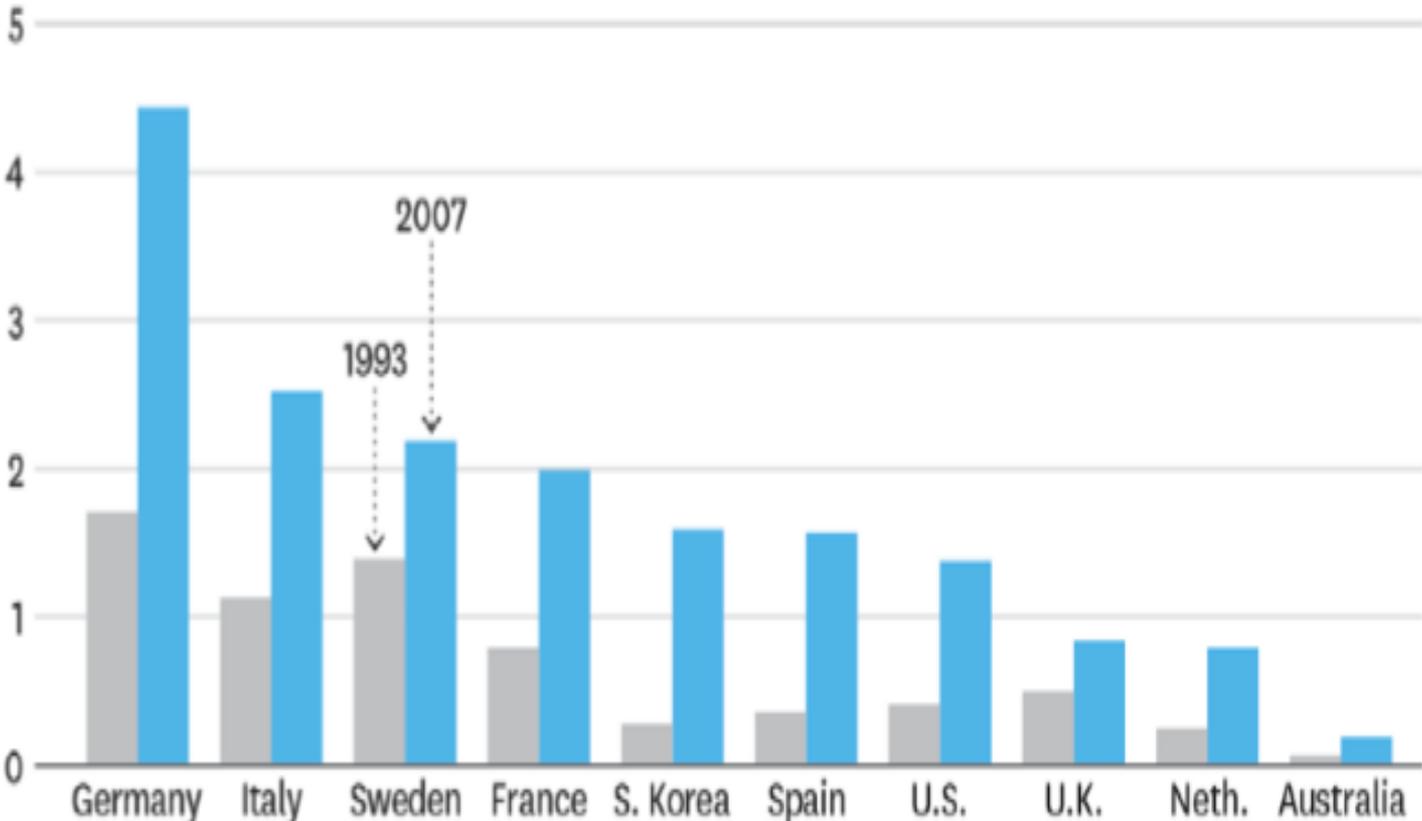


*forecast

Source: IFR World Robotics 2016

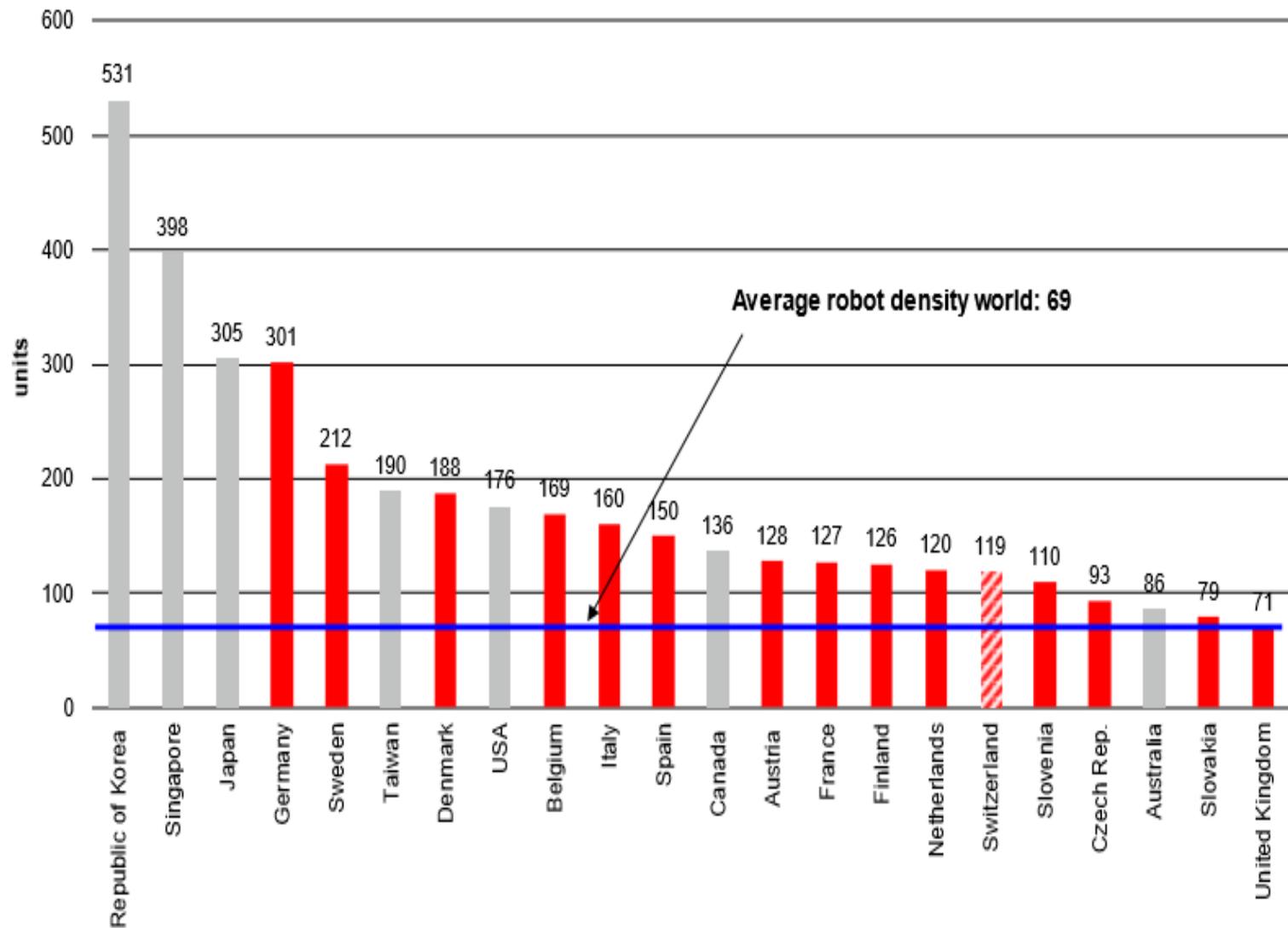
Where the Robots Are

NUMBER OF INDUSTRIAL ROBOTS PER MILLION HOURS WORKED



SOURCE GEORGE GRAETZ AND GUY MICHAELS, "ROBOTS AT WORK," 2015

Figure 2.9 Number of multipurpose industrial robots (all types) per 10,000 employees in the manufacturing industry (ISIC rev.4: C) 2015



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Kurt Vonnegut, Jr. Player Piano

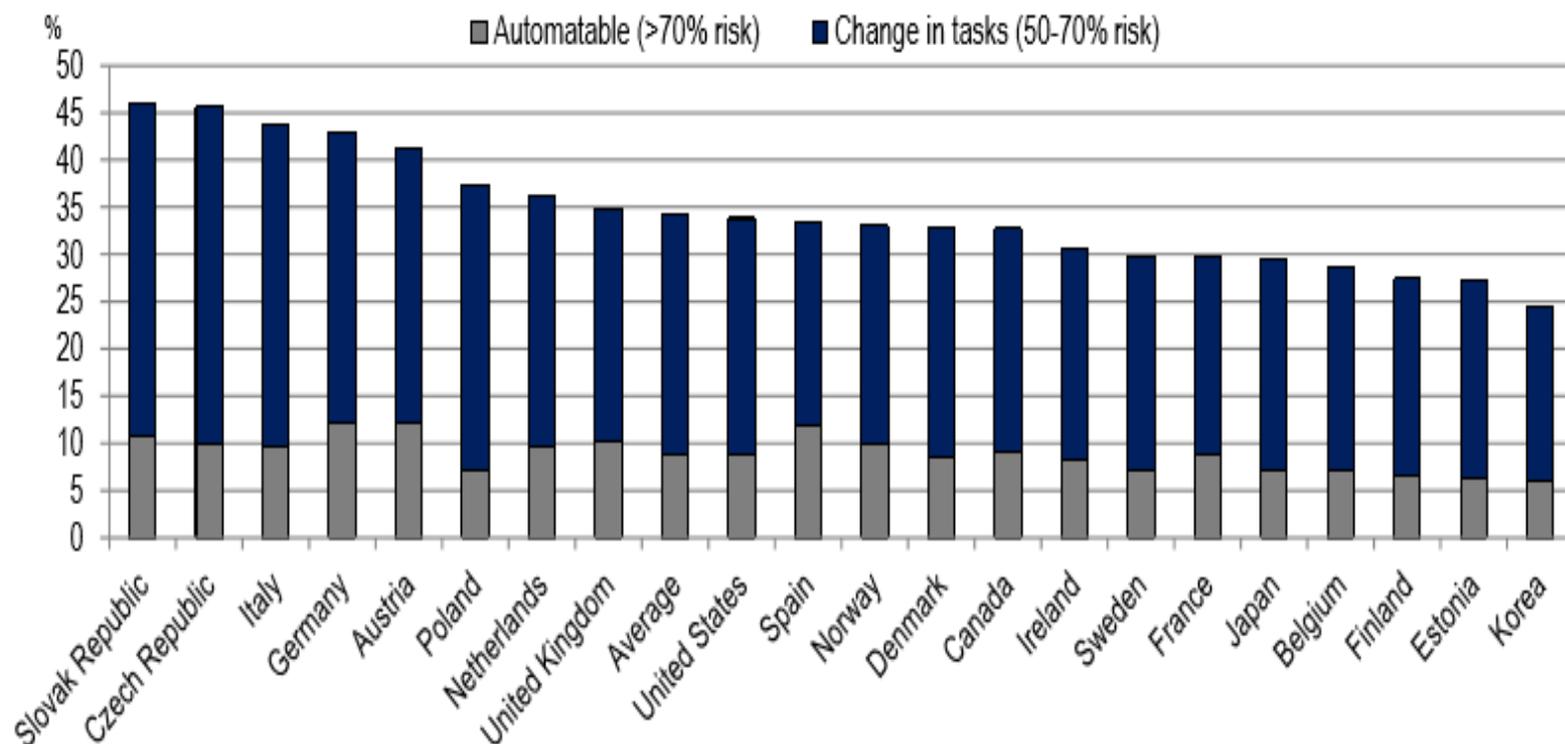


"A funny, savage appraisal of a totally automated American society of the future. It is loosely related to George Orwell's *1984*, and just as loosely to *As for the woman, Ah!*"
—William Hixson



Figure 2. The risk of job loss because of automation is less substantial than sometimes claimed but many jobs will see radical change

Percentage of workers in jobs at high and medium risk of automation



Note: Data for the United Kingdom corresponds to England and Northern Ireland. Data for Belgium corresponds to the Flemish Community.

Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012) and Arntz, M. T. Gregory and U. Zierahn (2016), "The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis", *OECD Social, Employment and Migration Working Papers*, No. 189, OECD Publishing, Paris.

Technologies – automation – job losses

- Demand conditions for automation
 - Automation technologies/robots usually involve investments in very expensive machines whose uses are limited to the purposes for which they have been originally created.
 - Given this, firms will not be willing to invest in them, if demand prospects are uncertain.
- Dynamic demand responses to automation
 - If automation makes a product cheaper and if the demand responds strongly enough to the fall in prices, automation may increase output to the extent that there is a net increase in jobs.
- Dynamic supply responses to automation
 - The introduction of new production technologies will create demands for new components and new producer services, thus creating new employment opportunities
 - Once you include such indirect (positive) effects on jobs, the headline figures for job losses may be exaggerating the true extent of job losses.

It “is very unlikely that machines will exhibit broadly-applicable intelligence comparable to or exceeding that of humans in the next 20 years”, although “it is to be expected that machines will reach and exceed human performance on more and more tasks.”

- *Artificial Intelligence, Automation and the Economy*, a report of the National Science and Technology Council of the US, 2016

Politics of automation

- “After each new strike of any importance there appeared a new machine” (Karl Marx, *The Poverty of Philosophy*)
- The society can shape the way automation and robotics technologies evolve by using government subsidies, regulations, or even outright bans.
- Depending on what we do in terms of worker training and re-training, the same technological changes may generate different amounts of ‘technological unemployment’.
- The evolution of automation technology will also be affected by the degree to which workers resist automation, which in turn is critically determined by the political arrangements for their job security and livelihood.