



# Is the World Still Flat? An Update

Stephen Ruth and Anne Pizzato • George Mason University

Writer Thomas L. Friedman sees “flatness” as a metaphor for innumerable global partnerships and greater leveraging of IT’s immense potential. But his “dirty little secrets” suggest that the US needs to anticipate some serious internal challenges that could reduce long-term competitiveness.

It seems appropriate in this Public Policy space to devote a column to the information and communications technology (ICT) implications of three-time Pulitzer Prize-winning writer Thomas L. Friedman’s *The World Is Flat*. This highly acclaimed book has already sold more than 3 million copies and has changed the way many organizations and governments view the world. The latest revision (called “release 3.0”) is now available, but for those who might not be familiar with Friedman’s perspective, we’ll review some of the main points here.

Friedman believes that we’ve experienced three eras of “flattening.” The first (1492 through 1800) was characterized by competition among the great nations of the world to leverage brawn or muscle by harnessing the power of animals, wind, and steam. The forces behind global integration at the time were religion or imperialism, often operating together. The second era (1800 through 2000) witnessed an industrial and transport revolution, in which the key force for integration was the multinational company. According to Friedman, the second half of this era featured “falling telecommunication costs – thanks to the diffusion of the telegraph, telephones, the PC, satellites, fiber-optic cable, and the early version of the World Wide Web.” The bulk of the book focuses on the third era, Globalization 3.0. Friedman says the earlier eras were about groups and organizations, but the 3.0 world is about empowering individuals to compete as never before. He attributes this

enabling power to a flat-world platform that consists of the convergence of PC, fiber optics, and workflow software.

*The World Is Flat* also describes 10 significant forces responsible for the 3.0 era. These “flatteners” include the collapse of the Berlin Wall, Netscape and the rise of Web connectivity, workflow software (machines talking to other machines without human involvement), open sourcing (or uploading), outsourcing, offshoring (like outsourcing, except that the company actually sets up a new factory in the foreign country to get the labor price benefits), supply chaining (companies streamlining all facets of production), insourcing (companies taking on various tasks for other companies), in-forming (the rise of search engines), and “the steroids” (personal digital equipment).

Let’s examine more closely what Friedman calls “dirty little secrets,” six alarming ICT policy problems that could eventually cripple the US’s ability to be a major player in the flat world of the future.

## The Numbers Gap

The first of these dirty little secrets is what Friedman calls the “numbers gap,” referring to the overall decline in US scientists and engineers. NASA’s technical staff, for example, is aging rapidly as more of its experts retire. Without significant increases of qualified US citizens into the science and technology workforce, this situation is difficult to improve because the number of jobs that require such skills is growing exponentially (more

than 5 percent per year; [www.bls.gov/oco/cg/cgs033.htm](http://www.bls.gov/oco/cg/cgs033.htm)), and the capacity to import engineers from other nations has shrunk dramatically due to post-9/11 security restrictions.

Friedman says that the Organization for Economic Cooperation and Development (OECD) countries' science and technology-related jobs are growing at twice the US rate. Recent studies indicate that although higher-end tech jobs are increasing in the US, lower-level IT skills are being outsourced by the millions. The numbers gap is therefore twofold: the loss of low-end IT jobs and the lack of qualified people to fill the higher-end ones.

### The Education Gap at the Top

Friedman's second dirty secret concerns the cause of the numbers gap – fewer college students want to study science, math, and engineering (instead, they favor law and business schools). But college grads aren't just behind on science and technology: their literacy skills in general are suspect. In *The World Is Flat*, Grover J. Whitehurst at the US Department of Energy is quoted as saying that the National Assessment of Adult Literacy showed that fewer than a third of current college grads received passing proficiency scores. The reason, says Whitehurst, is too much time spent on TV and Internet surfing, which also results in a decline in reading for pleasure.

One area bucks this trend – the increasing number of international students in the mix of science and technology graduates: “The number of international students enrolling in US graduate schools, particularly in STEM [science, technology, engineering, and math] fields, continues to increase ... by 2005, they represented 41.2 percent of all doctorates awarded in these fields” ([www.cgsnet.org/portals/0/pdf/GR\\_GradEdAmComp\\_0407.pdf](http://www.cgsnet.org/portals/0/pdf/GR_GradEdAmComp_0407.pdf)).

But this might also be changing: “While the US is still the most popular

destination for foreign students, in a four-year period, when the number of international students worldwide has increased by 41 percent, the US share of the international tertiary student market has fallen from 25 percent to 22 percent” ([www.oecd.org/dataoecd/51/20/37392850.pdf](http://www.oecd.org/dataoecd/51/20/37392850.pdf)).

### The Ambition Gap

One not-so-secret dirty secret is the US's increasing deployment of IT jobs overseas. Friedman says that many chief executive officers have told him privately about a double benefit to outsourcing knowledge work: lowered unit costs and significantly increased productivity. The first benefit is no sur-

ing to Israel stresses the importance of finding the right balance. MYPrepForce, a company based in Westport, Connecticut, outsources Web-based bookkeeping and payroll services for its clients (large US accounting firms) to [Outsource2Israel.com](http://Outsource2Israel.com) in Jerusalem, and work ethic is an import reason why: “Israelis have better English language fluency – especially since so many are US expats or have American parents – than in other countries; their customs and values are similar to those of US citizens; the infrastructure and security in Israel is much better than in other foreign countries; and Israelis have a high work ethic,” says Greg Fern, MyPrepForce's execu-

## Recent studies indicate that although higher-end tech jobs are increasing in the US, lower-level IT skills are being outsourced by the millions.

prise – many people recognize the salary differential. But this cost differential could continue indefinitely, especially for lower-paying jobs. Since 1999, the number of low-wage technology workers in the US has decreased from 2,241,650 to 1,440,460, but the number of mid-level IT workers has increased from 462,840 to 514,460 and high-wage technology workers from 2,200,600 to 2,628,160 ([www.iie.com/publications/papers/paper.cfm?ResearchID=767](http://www.iie.com/publications/papers/paper.cfm?ResearchID=767)).

Friedman's second point about the ambition gap is far more telling. He says that the same CEOs who admit to significant unit cost savings from outsourcing also find that productivity increases, sometimes by 100 percent, indicating a better work ethic in some outsourcing situations. Is this all too good to be true? Maybe and maybe not; a recent case of outsour-

ing to Israel stresses the importance of finding the right balance.<sup>1</sup>

Although Israel's unit costs are considerably higher than India's, they're still half the US cost – for example, a fully loaded call center seat is \$19 in Israel, \$12 in India, and \$40 in the US.<sup>1</sup>

### The Education Gap at the Bottom

The fourth secret has to do with kindergarten through 12th grade education in a flat world. Friedman quotes Mark Tucker, president of the National Center for Education, on why a national school system that's supposed to be an agent of social mobility is unable to produce the kinds of graduates needed in a flat-world economy: “We were actually doing something very efficient. We were educating a group of mass production workers at the level they needed, and we poured money

**Table 1. Top broadband nations (sorted by aggregate rankings).**

Rank	Country	Penetration	Speed, Mbps	Price for 1 Mbps	Score
1	Korea	0.90	45.6	0.45	15.73
2	Japan	0.52	61.0	0.27	14.99
3	Iceland	0.83	6.0	4.99	12.14
4	Finland	0.57	21.7	2.77	12.11
5	Netherlands	0.73	8.8	4.31	11.87
6	Sweden	0.49	18.2	0.63	11.54
7	France	0.49	17.6	1.64	11.41
8	Denmark	0.70	4.6	4.92	11.37
9	Norway	0.64	7.4	4.04	11.29
10	Canada	0.62	7.6	6.50	11.11
11	Belgium	0.54	6.2	6.69	10.60
12	United States	0.51	4.8	3.33	10.47
13	Switzerland	0.68	2.3	21.71	10.40
14	Australia	0.50	1.7	2.39	10.23
15	Austria	0.42	7.3	5.99	10.08

into the elite who could innovate.” In fact, high-school graduates with minimal knowledge are qualified for increasingly fewer jobs. An applicant for a production associate’s job at a modern automobile plant, for example, must have the math skills equivalent to the most basic achievement level on the National Assessment of Educational Progress (NAEP) math test to meet company proficiency requirements, a threshold that almost half of US 17-year-olds today don’t meet. ([www.ed.gov/about/inits/ed/competitiveness/challenge.html](http://www.ed.gov/about/inits/ed/competitiveness/challenge.html)). With low-end tech jobs fleeing the US, this is a harbinger of serious long-term challenges for young Americans with inadequate technology skills.

Educators are also concerned with how US 4th and 8th graders compare with other nations. The latest Trends in International Mathematics and Science Study (TIMSS) figures won’t be out until later this year, but the most recent numbers for the math scores of 4th and 8th graders showed the US ranking behind several countries: South Korea, Hong Kong, Taipei, England, Lithuania, Japan, Belgium, the Netherlands, Hungary, Malaysia, Russia, Slovak Republic, Latvia, and Australia (<http://nces.ed.gov/pubs2005/>

[timss03/tables/table\\_03.asp?popup=1](http://timss03/tables/table_03.asp?popup=1)).

### The Funding Gap

Friedman’s fifth secret is that the US budget for solving the shortages described in the previous four sections isn’t nearly sufficient to fix them. As the average age of scientists is increasing, the number of science and technology jobs is growing, and more than 6 million new jobs will need to be filled from an ever-diminishing pool of qualified graduates; we can also add the sad fact that US scientists are producing fewer papers in technical journals and gaining a smaller share of patents. Friedman concludes, “For America to be prepared for the twenty-first century, it must increase federal investment in such research by 10 percent a year over the next seven years.” He further calls for “new research grants, each of \$500,000 a year for five years, to be given to two hundred of the most outstanding early-career researchers.”

But is this happening, nearly two years after *The World Is Flat’s* initial publication? Is anyone heeding the warnings about the funding gap? In last year’s State of the Union address, President George W. Bush called for a doubling of the US National Science Foundation (NSF) budget over the next

10 years. On 2 May 2007, the US House of Representatives passed HR 1867, the National Science Foundation Authorization Act of 2007, which authorizes US \$21 billion for the NSF for the next three years. Between 2004 and 2007, Congress increased NSF funding slightly (from \$5,652 million to \$5,917.1 million). The president’s request for 2008 is \$6,429.0 million, an 8.7 percent increase over the 2007 estimate.<sup>2</sup>

Recognizing the decline in the number of students graduating with science and engineering degrees, the House also passed HR 2272, the 21st Century Competitiveness Act of 2007, on 21 May 2007 by a voice vote. This legislation authorizes roughly US\$23 billion over five years and creates at least 20 new federal programs and grants. These new grants will be awarded through the NSF and the Department of Energy for scientists and engineers “at the early stage of their careers at institutions of higher education” and other nonprofit entities to conduct research in fields relevant to the NSF mission (<http://thomas.loc.gov/cgi-bin/query/F?c110:1:./temp/~c110VmAIdn:e57931:>). The Senate has passed its version of the competitiveness package, S 761, by voice vote.<sup>3</sup> The House passed the final conference report 367-52 on 2 August 2007, and the SEN-

ate followed suit. But even if Congress fully funds HR 2272 and HR 1867 in the 2008 and 2009 budgets, this large step in the right direction for science and technology research will still fall short of Friedman's funding recommendations.

## The Infrastructure Gap

The final dirty little secret is the infrastructure gap, which refers to the US's relatively low standing in per capita broadband deployment. In *The World Is Flat*, Friedman laments how the US has dropped from 4th to 13th place in per capita broadband use; as of June 2007, the US has fallen even further, to 24th place in per capita rankings (<http://technology.guardian.co.uk/news/story/0,,2102652,00.html>).

The US currently leads the world in the total number of broadband subscribers (60 million), but China will take the lead sometime this year, even though its gross domestic product is half of the US's. Considerable debate surrounds international broadband statistics, but Table 1, which is part of a report developed by the Internet Technology and Innovation Foundation ([www.itif.org/files/CaseForNationalBroadbandPolicy.pdf](http://www.itif.org/files/CaseForNationalBroadbandPolicy.pdf)), gives a helpful description in terms of OECD penetration percentages, average deployment speed in Mbps, price per Mbps, and overall score. Unfortunately, China isn't shown in these numbers, which are sorted by overall score, but the US rankings in speed (Mbps) and price per Mbps are interesting because they're relatively poor compared to other OECD nations, even though the overall ranking is 12th in this particular computation scheme. Because international broadband indices and measurements are so significant in the technology policy debate. The next installment of this column will discuss this in more detail.

The US broadband situation is becoming more visible now that the US Federal Communications Commission

(FCC) is moving forward with its plans to auction the spectrum of formerly analog TV space ([www.washingtonpost.com/wp-dyn/content/article/2006/09/18/AR2006091801328.html](http://www.washingtonpost.com/wp-dyn/content/article/2006/09/18/AR2006091801328.html)). A group of investors led by former FCC chairman Reed Hundt claims that opening up the rules of the auction would increase broadband competition and drastically improve the connectivity of emergency first responders, such as police and firefighters.<sup>4</sup> Of course, there's more to infrastructure than broadband, but Friedman views it as a crucial part of leveraging the flat-world platform. As he says, "The more you connect an educated population to the flat-world platform in an easy and affordable way, the more things they can automate, and therefore the more time and energy they have to innovate. The more they innovate, the more they produce things that improve the platform. It is a virtuous cycle, one that you always want to encourage the greatest degree possible."

Friedman's flat-Earth perspective is completely global; the US's IT "secrets" aren't the book's main theme. Rather, his interests are broad and strategic enough to include a possible public policy scenario in which good technology and business policy combine to save the world. No two countries that are both part of a global supply chain will ever start a war with each other. Why? Because they want to gain the higher living standards that are part of just-in-time deliveries of goods and services. □

## Further Information

- Education statistics: <http://nces.ed.gov/> and <http://nces.ed.gov/fastfacts/>
- *Foreign Policy* magazine's globalization index for 2006: [www.atkearney.com/shared\\_res/pdf/Globalization-Index\\_FP\\_Nov-Dec-06\\_S.pdf](http://www.atkearney.com/shared_res/pdf/Globalization-Index_FP_Nov-Dec-06_S.pdf)
- Information about H.R. 2272, the 21st Century Competitiveness Act of 2007: <http://thomas.loc.gov/cgi-bin/bdquery/z?d110:h.r.02272>:
- More on the broadband debate: [www.websiteoptimization.com/bw/](http://www.websiteoptimization.com/bw/) (monthly summary of bandwidth statistics and related material)

## References

1. M. Kalman, "US Firms Turn to Israel as Outsourcing Alternative," *Boston Globe*, 24 Nov. 2006, [www.boston.com/business/globe/articles/2006/11/24/us\\_firms\\_turn\\_to\\_israel\\_as\\_outsourcing\\_alternative/](http://www.boston.com/business/globe/articles/2006/11/24/us_firms_turn_to_israel_as_outsourcing_alternative/).
2. C. Matthews, "US National Science Foundation: An Overview," tech. report 95-307, 3 May 2007.
3. K.A. Wolfe, "Conferences Sought on Bills to Bolster Competitiveness," *CQ Today*, 20 July 2007, p. 27.
4. K.Hart, "Carving Up the Wireless Spectrum: Ex-FCC Chief Says Nation Needs a Faster Network," *The Washington Post*, 9 July 2007; [www.washingtonpost.com/wp-dyn/content/article/2007/07/08/AR2007070800830.html](http://www.washingtonpost.com/wp-dyn/content/article/2007/07/08/AR2007070800830.html).

**Stephen Ruth** is Professor of Public Policy and Technology Management at George Mason University. His research interests include technology diffusion in developing nations, financial aspects of distance learning, and challenges of knowledge management deployment. Ruth has a PhD in business and applied economics from Wharton School at the University of Pennsylvania. Contact him at [ruth@gmu.edu](mailto:ruth@gmu.edu).

**Anne Pizzato** is a legislative director on Capitol Hill and a graduate student in public policy at George Mason University. Her research interests include deployment of fiber optics to the home, broadband and Internet regulation and access, and the Digital Television Transition. Pizzato has a BS in telecommunications operations from the University of Florida. Contact her at [apizzato@gmu.edu](mailto:apizzato@gmu.edu).