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It's a Flat World, After All
By THOMAS L. FRIEDMAN

In 1492 Christopher Columbus set sail for India, going west. He had the Nina, the Pinta and the Santa Maria. He never did find India, but he called the people he met ''Indians'' and came home and reported to his king and queen: ''The world is round.'' I set off for India 512 years later. I knew just which direction I was going. I went east. I had Lufthansa business class, and I came home and reported only to my wife and only in a whisper: ''The world is flat.''

And therein lies a tale of technology and geoeconomics that is fundamentally reshaping our lives -- much, much more quickly than many people realize. It all happened while we were sleeping, or rather while we were focused on 9/11, the dot-com bust and Enron -- which even prompted some to wonder whether globalization was over. Actually, just the opposite was true, which is why it's time to wake up and prepare ourselves for this flat world, because others already are, and there is no time to waste.

I wish I could say I saw it all coming. Alas, I encountered the flattening of the world quite by accident. It was in late February of last year, and I was visiting the Indian high-tech capital, Bangalore,

working on a documentary for the Discovery Times channel about outsourcing. In short order, I interviewed Indian entrepreneurs who wanted to prepare my taxes from Bangalore, read my X-rays from Bangalore, trace my lost luggage from Bangalore and write my new software from Bangalore. The longer I was there, the more upset I became -- upset at the realization that while I had been off covering the 9/11 wars, globalization had entered a whole new phase, and I had missed it. I guess the eureka moment came on a visit to the campus of Infosys Technologies, one of the crown jewels of the Indian outsourcing and software industry. Nandan Nilekani, the Infosys C.E.O., was showing me his global video-conference room, pointing with pride to a wall-size flat-screen TV, which he said was the biggest in Asia. Infosys, he explained, could hold a virtual meeting of the key players from its entire global supply chain for any project at any time on that supersize screen. So its American designers could be on the screen speaking with their Indian software writers and their Asian manufacturers all at once. That's what globalization is all about today, Nilekani said. Above the screen there were eight clocks that pretty well summed up the Infosys workday: 24/7/365. The clocks were labeled U.S. West, U.S. East, G.M.T., India, Singapore, Hong Kong, Japan, Australia.

''Outsourcing is just one dimension of a much more fundamental thing happening today in the world,'' Nilekani explained. ''What happened over the last years is that there was a massive investment in technology, especially in the bubble era, when hundreds of millions of dollars were invested in putting broadband connectivity around the world, undersea cables, all those things.'' At the same time, he

added, computers became cheaper and dispersed all over the world, and there was an explosion of e-mail software, search engines like Google and proprietary software that can chop up any piece of work and send one part to Boston, one part to Bangalore and one part to Beijing, making it easy for anyone to do remote development. When all of these things suddenly came together around 2000, Nilekani said, they ''created a platform where intellectual work, intellectual capital, could be delivered from anywhere. It could be disaggregated, delivered, distributed, produced and put back together again -- and this gave a whole new degree of freedom to the way we do work, especially work of an intellectual nature. And what you are seeing in Bangalore today is really the culmination of all these things coming together.''

At one point, summing up the implications of all this, Nilekani uttered a phrase that rang in my ear. He said to me, ''Tom, the playing field is being leveled.'' He meant that countries like India were now able to compete equally for global knowledge work as never before -- and that America had better get ready for this. As I left the Infosys campus that evening and bounced along the potholed road back to Bangalore, I kept chewing on that phrase: ''The playing field is being leveled.''

''What Nandan is saying,'' I thought, ''is that the playing field is being flattened. Flattened? Flattened? My God, he's telling me the world is flat!''

Here I was in Bangalore -- more than 500 years after Columbus sailed over the horizon, looking for a shorter route to India using the rudimentary navigational technologies of his day, and returned safely to prove definitively that the world was round -- and one of India's smartest engineers, trained at his country's top technical institute and backed by the most modern technologies of his day, was telling me that the world was flat, as flat as that screen on which he can host a meeting of his whole global supply chain. Even more interesting, he was citing this development as a new milestone in human progress and a great opportunity for India and the world -- the fact that we had made our world flat!

This has been building for a long time. Globalization 1.0 (1492 to 1800) shrank the world from a size large to a size medium, and the dynamic force in that era was countries globalizing for resources and imperial conquest. Globalization 2.0 (1800 to 2000) shrank the world from a size medium to a size small, and it was spearheaded by companies globalizing for markets and labor. Globalization 3.0 (which started around 2000) is shrinking the world from a size small to a size tiny and flattening the playing field at the same time. And while the dynamic force in Globalization 1.0 was countries globalizing and the dynamic force in Globalization 2.0 was companies globalizing, the dynamic force in Globalization 3.0 -- the thing that gives it its unique character -- is individuals and small groups globalizing. Individuals must, and can, now ask: where do I fit into the global competition and opportunities of the day, and how can I, on my own, collaborate with others globally? But Globalization 3.0 not only

differs from the previous eras in how it is shrinking and flattening the world and in how it is empowering individuals. It is also different in that Globalization 1.0 and 2.0 were driven primarily by European and American companies and countries. But going forward, this will be less and less true. Globalization 3.0 is not only going to be driven more by individuals but also by a much more diverse -- non-Western, nonwhite -- group of individuals. In Globalization 3.0, you are going to see every color of the human rainbow take part.

''Today, the most profound thing to me is the fact that a 14-year-old in Romania or Bangalore or the Soviet Union or Vietnam has all the information, all the tools, all the software easily available to apply knowledge however they want,'' said Marc Andreessen, a co-founder of Netscape and creator of the first commercial Internet browser. ''That is why I am sure the next Napster is going to come out of left field. As bioscience becomes more computational and less about wet labs andas all the genomic data becomes easily available on the Internet, at some point you will be able to design vaccines on your laptop.''

Andreessen is touching on the most exciting part of Globalization 3.0 and the flattening of the world: the fact that we are now in the process of connecting all the knowledge pools in the world together. We've tasted some of the downsides of that in the way that Osama bin Laden has connected terrorist knowledge pools together through his Qaeda network, not to mention the work of teenage hackers spinning off more and more lethal computer viruses that affect us all. But the upside is that by connecting all these knowledge pools we are on the cusp of an incredible new era of innovation, an era that will be driven from left field and right field, from West and East and from North and South. Only 30 years ago, if you had a choice of being born a B student in Boston or a genius in Bangalore or Beijing, you probably would have chosen Boston, because a genius in Beijing or Bangalore could not really take advantage of his or her talent. They could not plug and play globally. Not anymore. Not when the world is flat, and anyone with smarts, access to Google and a cheap wireless laptop can join the innovation fray.

When the world is flat, you can innovate without having to emigrate. This is going to get interesting. We are about to see creative destruction on steroids.

How did the world get flattened, and how did it happen so fast?

It was a result of 10 events and forces that all came together during the 1990's and converged right around the year 2000. Let me go through them briefly. The first event was 11/9. That's right -- not 9/11, but 11/9. Nov. 9, 1989, is the day the Berlin Wall came down, which was critically important because it allowed us to think of the world as a single space. ''The Berlin Wall was not only a symbol of keeping people inside Germany; it was a way of preventing a kind of global view of our future,'' the Nobel Prize-winning economist Amartya Sen said. And the wall went down just as the windows went up -- the breakthrough Microsoft Windows 3.0 operating system, which helped to flatten the playing field even more by creating a global computer

interface, shipped six months after the wall fell.

The second key date was 8/9. Aug. 9, 1995, is the day Netscape went public, which did two important things. First, it brought the Internet alive by giving us the browser to display images and data stored on Web sites. Second, the Netscape stock offering triggered the dot-com boom, which triggered the dot-com bubble, which triggered the massive overinvestment of billions of dollars in fiber-optic telecommunications cable. That overinvestment, by companies like Global Crossing, resulted in the willy-nilly creation of a global undersea-underground fiber network, which in turn drove down the cost of transmitting voices, data and images to practically zero, which in turn accidentally made Boston, Bangalore and Beijing next-door neighbors overnight. In sum, what the Netscape revolution did was bring people-to-people connectivity to a whole new level. Suddenly more people could connect with more other people from more different places in more different ways than ever before.

No country accidentally benefited more from the Netscape moment than India. ''India had no resources and no infrastructure,'' said Dinakar Singh, one of the most respected hedge-fund managers on Wall Street, whose parents earned doctoral degrees in biochemistry from the University of Delhi before emigrating to America. ''It produced people with quality and by quantity. But many of them rotted on the docks of India like vegetables. Only a relative few could get on ships and get out. Not anymore, because we built this ocean crosser, called fiber-optic cable. For decades you had to leave India to be a professional. Now you can plug into the world from India. You don't have to go to Yale and go to work for Goldman Sachs.'' India could never have afforded to pay for the bandwidth to connect brainy India with high-tech America, so American shareholders paid for it. Yes, crazy overinvestment can be good. The overinvestment in railroads turned out to be a great boon for the American economy. ''But the railroad overinvestment was confined to your own country and so, too, were the benefits,'' Singh said. In the case of the digital railroads, ''it was the foreigners who benefited.'' India got a free ride.

The first time this became apparent was when thousands of Indian engineers were enlisted to fix the Y2K -- the year 2000 -- computer bugs for companies from all over the world. (Y2K should be a national holiday in India. Call it ''Indian Interdependence Day,'' says Michael Mandelbaum, a foreign-policy analyst at Johns Hopkins.) The fact that the Y2K work could be outsourced to Indians was made possible by the first two flatteners, along with a third, which I call ''workflow.'' Workflow is shorthand for all the software applications, standards and electronic transmission pipes, like middleware, that connected all those computers and fiber-optic cable. To put it another way, if the Netscape moment connected people to people like never before, what the workflow revolution did was connect applications to applications so that people all over the world could work together in manipulating and shaping words, data and images on computers like never before.

Indeed, this breakthrough in people-to-people and application-to-application connectivity produced, in short order, six

more flatteners -- six new ways in which individuals and companies could collaborate on work and share knowledge. One was ''outsourcing.'' When my software applications could connect seamlessly with all of your applications, it meant that all kinds of work -- from accounting to software-writing -- could be digitized, disaggregated and shifted to any place in the world where it could be done better and cheaper. The second was ''offshoring.'' I send my whole factory from Canton, Ohio, to Canton, China. The third was ''open-sourcing.'' I write the next operating system, Linux, using engineers collaborating together online and working for free. The fourth was ''insourcing.'' I let a company like UPS come inside my company and take over my whole logistics operation -- everything from filling my orders online to delivering my goods to repairing them for customers when they break. (People have no idea what UPS really does today. You'd be amazed!). The fifth was ''supply-chaining.'' This is Wal-Mart's specialty. I create a global supply chain down to the last atom of efficiency so that if I sell an item in Arkansas, another is immediately made in China. (If Wal-Mart were a country, it would be China's eighth-largest trading partner.) The last new form of collaboration I call ''informing'' -- this is Google, Yahoo and MSN Search, which now allow anyone to collaborate with, and mine, unlimited data all by themselves.

So the first three flatteners created the new platform for collaboration, and the next six are the new forms of collaboration that flattened the world even more. The 10th flattener I call ''the steroids,'' and these are wireless access and voice over Internet protocol (VoIP). What the steroids do is turbocharge all these new forms of collaboration, so you can now do any one of them, from anywhere, with any device.

The world got flat when all 10 of these flatteners converged around the year 2000. This created a global, Web-enabled playing field that allows for multiple forms of collaboration on research and work in real time, without regard to geography, distance or, in the near future, even language. ''It is the creation of this platform, with these unique attributes, that is the truly important sustainable breakthrough that made what you call the flattening of the world possible,'' said Craig Mundie, the chief technical officer of Microsoft.

No, not everyone has access yet to this platform, but it is open now to more people in more places on more days in more ways than anything like it in history. Wherever you look today -- whether it is the world of journalism, with bloggers bringing down Dan Rather; the world of software, with the Linux code writers working in online forums for free to challenge Microsoft; or the world of business, where Indian and Chinese innovators are competing against and working with some of the most advanced Western multinationals -- hierarchies are being flattened and value is being created less and less within vertical silos and more and more through horizontal collaboration within companies, between companies and among individuals.

Do you recall ''the IT revolution'' that the business press has been

pushing for the last 20 years? Sorry to tell you this, but that was just the prologue. The last 20 years were about forging, sharpening and distributing all the new tools to collaborate and connect. Now the real information revolution is about to begin as all the complementarities among these collaborative tools start to converge. One of those who first called this moment by its real name was Carly Fiorina, the former Hewlett-Packard C.E.O., who in 2004 began to declare in her public speeches that the dot-com boom and bust were just ''the end of the beginning.'' The last 25 years in technology, Fiorina said, have just been ''the warm-up act.'' Now we are going into the main event, she said, ''and by the main event, I mean an era in which technology will truly transform every aspect of business, of government, of society, of life.''

As if this flattening wasn't enough, another convergence coincidentally occurred during the 1990's that was equally important. Some three billion people who were out of the game walked, and often ran, onto the playing field. I am talking about the people of China, India, Russia, Eastern Europe, Latin America and Central Asia. Their economies and political systems all opened up during the course of the 1990's so that their people were increasingly free to join the free market. And when did these three billion people converge with the new playing field and the new business processes? Right when it was being flattened, right when millions of them could compete and collaborate more equally, more horizontally and with cheaper and more readily available tools. Indeed, thanks to the flattening of the world, many of these new entrants didn't even have to leave home to participate. Thanks to the 10 flatteners, the playing field came to them!

It is this convergence -- of new players, on a new playing field, developing new processes for horizontal collaboration -- that I believe is the most important force shaping global economics and politics in the early 21st century. Sure, not all three billion can collaborate and compete. In fact, for most people the world is not yet flat at all. But even if we're talking about only 10 percent, that's 300 million people -- about twice the size of the American work force. And be advised: the Indians and Chinese are not racing us to the bottom. They are racing us to the top. What China's leaders really want is that the next generation of underwear and airplane wings not just be ''made in China'' but also be ''designed in China.'' And that is where things are heading. So in 30 years we will have gone from ''sold in China'' to ''made in China'' to ''designed in China'' to ''dreamed up in China'' -- or from China as collaborator with the worldwide manufacturers on nothing to China as a low-cost, high-quality, hyperefficient collaborator with worldwide manufacturers on everything. Ditto India. Said Craig Barrett, the C.E.O. of Intel, ''You don't bring three billion people into the world economy overnight without huge consequences, especially from three societies'' -- like India, China and Russia -- ''with rich educational heritages.''

That is why there is nothing that guarantees that Americans or Western Europeans will continue leading the way. These new players are stepping onto the playing field legacy free, meaning that many of them

were so far behind that they can leap right into the new technologies without having to worry about all the sunken costs of old systems. It means that they can move very fast to adopt new, state-of-the-art technologies, which is why there are already more cellphones in use in China today than there are people in America.

If you want to appreciate the sort of challenge we are facing, let me share with you two conversations. One was with some of the Microsoft officials who were involved in setting up Microsoft's research center in Beijing, Microsoft Research Asia, which opened in 1998 -- after Microsoft sent teams to Chinese universities to administer I.Q. tests in order to recruit the best brains from China's 1.3 billion people. Out of the 2,000 top Chinese engineering and science students tested, Microsoft hired 20. They have a saying at Microsoft about their Asia center, which captures the intensity of competition it takes to win a job there and explains why it is already the most productive research team at Microsoft: ''Remember, in China, when you are one in a million, there are 1,300 other people just like you.''

The other is a conversation I had with Rajesh Rao, a young Indian entrepreneur who started an electronic-game company from Bangalore, which today owns the rights to Charlie Chaplin's image for mobile computer games. ''We can't relax,'' Rao said. ''I think in the case of the United States that is what happened a bit. Please look at me: I am from India. We have been at a very different level before in terms of technology and business. But once we saw we had an infrastructure that made the world a small place, we promptly tried to make the best use of it. We saw there were so many things we could do. We went ahead, and today what we are seeing is a result of that. There is no time to rest. That is gone. There are dozens of people who are doing the same thing you are doing, and they are trying to do it better. It is like water in a tray: you shake it, and it will find the path of least resistance. That is what is going to happen to so many jobs -- they will go to that corner of the world where there is the least resistance and the most opportunity. If there is a skilled person in Timbuktu, he will get work if he knows how to access the rest of the world, which is quite easy today. You can make a Web site and have an e-mail address and you are up and running. And if you are able to demonstrate your work, using the same infrastructure, and if people are comfortable giving work to you and if you are diligent and clean in your transactions, then you are in business.''

Instead of complaining about outsourcing, Rao said, Americans and Western Europeans would ''be better off thinking about how you can raise your bar and raise yourselves into doing something better. Americans have consistently led in innovation over the last century. Americans whining -- we have never seen that before.''

Rao is right. And it is time we got focused. As a person who grew up during the cold war, I'll always remember driving down the highway and listening to the radio, when suddenly the music would stop and a grim-voiced announcer would come on the air and say: ''This is a test. This station is conducting a test of the Emergency Broadcast System.'' And then there would be a 20-second high-pitched siren sound.

Fortunately, we never had to live through a moment in the cold war when the announcer came on and said, ''This is a not a test.''

That, however, is exactly what I want to say here: ''This is not a test.''

The long-term opportunities and challenges that the flattening of the world puts before the United States are profound. Therefore, our ability to get by doing things the way we've been doing them -- which is to say not always enriching our secret sauce -- will not suffice any more. ''For a country as wealthy we are, it is amazing how little we are doing to enhance our natural competitiveness,'' says Dinakar Singh, the Indian-American hedge-fund manager. ''We are in a world that has a system that now allows convergence among many billions of people, and we had better step back and figure out what it means. It would be a nice coincidence if all the things that were true before were still true now, but there are quite a few things you actually need to do differently. You need to have a much more thoughtful national discussion.''

If this moment has any parallel in recent American history, it is the height of the cold war, around 1957, when the Soviet Union leapt ahead of America in the space race by putting up the Sputnik satellite. The main challenge then came from those who wanted to put up walls; the main challenge to America today comes from the fact that all the walls are being taken down and many other people can now compete and collaborate with us much more directly. The main challenge in that world was from those practicing extreme Communism, namely Russia, China and North Korea. The main challenge to America today is from those practicing extreme capitalism, namely China, India and South Korea. The main objective in that era was building a strong state, and the main objective in this era is building strong individuals.

Meeting the challenges of flatism requires as comprehensive, energetic and focused a response as did meeting the challenge of Communism. It requires a president who can summon the nation to work harder, get smarter, attract more young women and men to science and engineering and build the broadband infrastructure, portable pensions and health care that will help every American become more employable in an age in which no one can guarantee you lifetime employment.

We have been slow to rise to the challenge of flatism, in contrast to Communism, maybe because flatism doesn't involve ICBM missiles aimed at our cities. Indeed, the hot line, which used to connect the Kremlin with the White House, has been replaced by the help line, which connects everyone in America to call centers in Bangalore. While the other end of the hot line might have had Leonid Brezhnev threatening nuclear war, the other end of the help line just has a soft voice eager to help you sort out your AOL bill or collaborate with you on a new piece of software. No, that voice has none of the menace of Nikita Khrushchev pounding a shoe on the table at the United Nations, and it has none of the sinister snarl of the bad guys in ''From Russia With Love.'' No, that voice on the help line just has a friendly Indian lilt that masks any sense of threat or challenge. It simply says: ''Hello, my name is Rajiv. Can I help you?''

No, Rajiv, actually you can't. When it comes to responding to the challenges of the flat world, there is no help line we can call. We have to dig into ourselves. We in America have all the basic economic and educational tools to do that. But we have not been improving those tools as much as we should. That is why we are in what Shirley Ann Jackson, the 2004 president of the American Association for the Advancement of Science and president of Rensselaer Polytechnic Institute, calls a ''quiet crisis'' -- one that is slowly eating away at America's scientific and engineering base.

''If left unchecked,'' said Jackson, the first African-American woman to earn a Ph.D. in physics from M.I.T., ''this could challenge our pre-eminence and capacity to innovate.'' And it is our ability to constantly innovate new products, services and companies that has been the source of America's horn of plenty and steadily widening middle class for the last two centuries. This quiet crisis is a product of three gaps now plaguing American society. The first is an ''ambition gap.'' Compared with the young, energetic Indians and Chinese, too many Americans have gotten too lazy. As David Rothkopf, a former official in the Clinton Commerce Department, puts it, ''The real entitlement we need to get rid of is our sense of entitlement.'' Second, we have a serious numbers gap building. We are not producing enough engineers and scientists. We used to make up for that by importing them from India and China, but in a flat world, where people can now stay home and compete with us, and in a post-9/11 world, where we are insanely keeping out many of the first-round intellectual draft choices in the world for exaggerated security reasons, we can no longer cover the gap. That's a key reason companies are looking abroad. The numbers are not here. And finally we are developing an education gap. Here is the dirty little secret that no C.E.O. wants to tell you: they are not just outsourcing to save on salary. They are doing it because they can often get better-skilled and more productive people than their American workers.

These are some of the reasons that Bill Gates, the Microsoft chairman, warned the governors' conference in a Feb. 26 speech that American high-school education is ''obsolete.'' As Gates put it: ''When I compare our high schools to what I see when I'm traveling abroad, I am terrified for our work force of tomorrow. In math and science, our fourth graders are among the top students in the world. By eighth grade, they're in the middle of the pack. By 12th grade, U.S. students are scoring near the bottom of all industrialized nations. . . . The percentage of a population with a college degree is important, but so are sheer numbers. In 2001, India graduated almost a million more students from college than the United States did. China graduates twice as many students with bachelor's degrees as the U.S., and they have six times as many graduates majoring in engineering. In the international competition to have the biggest and best supply of knowledge workers, America is falling behind.''

We need to get going immediately. It takes 15 years to train a good engineer, because, ladies and gentlemen, this really is rocket science. So parents, throw away the Game Boy, turn off the television

and get your kids to work. There is no sugar-coating this: in a flat world, every individual is going to have to run a little faster if he or she wants to advance his or her standard of living. When I was growing up, my parents used to say to me, ''Tom, finish your dinner -- people in China are starving.'' But after sailing to the edges of the flat world for a year, I am now telling my own daughters, ''Girls, finish your homework -- people in China and India are starving for your jobs.''

I repeat, this is not a test. This is the beginning of a crisis that won't remain quiet for long. And as the Stanford economist Paul Romer so rightly says, ''A crisis is a terrible thing to waste.''

Thomas L. Friedman is the author of ''The World Is Flat: A Brief History of the Twenty-First Century,'' to be published this week by Farrar, Straus & Giroux and from which this article is adapted. His column appears on the Op-Ed page of The Times, and his television documentary ''Does Europe Hate Us?'' will be shown on the Discovery Channel on April 7 at 8 p.m.