

THE BROOKINGS INSTITUTION  
FALK AUDITORIUM

FOSTERING GROWTH THROUGH INNOVATION

Washington, D.C.  
Friday, January 13, 2012

PARTICIPANTS:

ADVANCED INDUSTRIES AND EXPORTS:

**Moderator:**

BRUCE KATZ  
Vice President and Director, Metropolitan Policy  
Program  
The Brookings Institution

**Panelists:**

DOMINIC BARTON  
Worldwide Managing Director  
McKinsey & Company

ELLEN KULLMAN  
Chairman and Chief Executive Officer  
DuPont

\* \* \* \* \*

## PROCEEDINGS

MR. KATZ: We have wonderful panelists here. Dominic Barton is the major domo of McKinsey, the global managing director obviously based in London, but also on the Board as it's been mentioned of the Brookings Institution. And Tom Connelly is a senior executive with DuPont. And your boss was supposed to be here, but she was involved in a skiing accident. This is the problem with the winter holidays, right? But we really appreciate your taking the time.

And I, you know frankly, I think Secretary Bryson set this up very well. I think he marched us through why manufacturing matters; why it's such an innovative sector; why it has such a dramatic impact on wages and incomes critical to growing the middle class; why it's important to the trade deficit, broader fiscal balance of the United States; why it interplays with environmental sustainability, the potential for clean tech. I think he really set this up well, and I think the COMPETES Report coming out of the Department of Commerce does that in the same vein.

What I'd like to do is sort of, really from your particular areas of expertise and focus, sort of drill down further. And Dominic, I thought I'd start with you because I think one of the most interesting pieces of work coming out of McKinsey -- Daniel Pachod is here, Michael Park, other of your colleagues -- is this focus on advanced industry and the need for the United States to, as Glenn said, with a clear, laser-like focus, to engage on or to understand that there are certain sectors of the American economy -- aerospace, automotive, defense, medical devices; I mean, we could run through the list, I think we would probably have the same kind of conclusions -- that are absolutely fundamental for us to stay at the cutting edge of innovation, at the vanguard of global competition. But that requires us to rethink what we do and this sort of co-production between business, university, and the public sector.

I thought it might be helpful just as sort of a platform setter for you to describe why McKinsey is interested in advanced industry and why we need perhaps even to reframe the conversation about manufacturing in this way.

MR. BARTON: Well thanks, Bruce, and it's an honor to be here and also work with Brookings. McKinsey and Brookings are working in sort of a close collaboration on this topic because we also think it's vital.

You already mentioned, I think, just as a bit of background, I mean, the sector and the various companies or businesses that are in it, a couple of more facts maybe just on why we think it's important, and then maybe some of the things that we've done and what we see as being some of the imperatives. It's roughly -- those industries that you talked about, the automotive assembly, national defense, medical devices, and so forth -- it is about 10 percent of the U.S. GDP, that's the size of it. But it's about 45 percent of our exports, and it accounts for about 4 million of what I would argue very, very high-skilled jobs. We talk about knowledge workers and you think about the whole chain. This is at the far end. So we think wow, it's 10 percent; it punches way above its weight.

The Secretary talked about the amount of R&D that's actually being done by these players. Most of that 67 percent is actually done by the advanced industry's players in manufacturing. That's where the bulk of this -- this is where the engine is. And actually while we would argue that all of the trends are heading south -- we heard about education, we heard about the lack of long-term thinking - - the trends are heading south, and we think south quite quickly. We actually do have quite a strong base and we shouldn't forget that. And I think we invest more than the next four countries combined, and that's changing. We heard what China's doing and so forth. But we believe we're in kind of a case now of a use-it-or-lose-it type of thing where we've got to make some big shifts to drive it.

And one of the reasons why -- actually it was about 18 months ago we decided to set up a sector called advanced industries to get the R&D, to be able to get the capabilities to serve these types of institutions. If you look at the big forces at work in the world moving ahead, we've all heard about the rebalancing of the world towards Asia and Brazil and Africa and so forth. We're talking about the technology grid, the speed of information, the amount of information that's moving, this re-pricing of the planet that's going on, the demographic challenges with an aging population. We're going to move from having basically three retirees for every worker; we're going to end up moving to a situation which doubles that by 2050. So there's all sorts of productivity issues that are coming up, major shifts going on.

If you look at, for example, food which we think will be one of the biggest industries of tomorrow -- ag food. The way that we're going to get the ability to feed the 3 billion people and move it is actually through a lot of the advanced industries' technology. It is going to be vital. And if you look at what Israel is doing right now in advanced industries and food, it's phenomenal, helping cows produce

from 5,000 liters of milk to 11,000 liters of milk a year. This is, by the way, a big deal for China. They're looking at this and saying, "How can we buy these professors and get them over here?" And I could go through countless examples of what's happening just in food, which you might think is low-tech. It's high tech. And the U.S. is in a wonderful position to kind of drive that all across the value chain, and I think DuPont is doing a lot of that.

You look at energy, which is going to be a big sector -- you've talked about this, Bruce -- the Secretary talked about clean tech and so forth; that's a massive shift. Health care, I mean, health care fortunately or unfortunately is going to be one of the biggest businesses of tomorrow given the demographics. A lot of the advanced industries is what's going to be there to make it productive, and we're seeing a lot happening on that side.

And then logistics and transportation, and this is the country that invented airline travel and travel, you know, the moon shots, all of this sort of thing. That whole sector itself is moving forward. So with these forces at work that we see there, the amount of business opportunity, which is going to be created and driven through this sector in particular, is mammoth. And it's a multiplier effect, a different type of multiplier effect than we think. And we all know -- I don't want to bore you with the old stories of the Tang from the moon mission type of thing. But we're going to see orders of magnitude, multiples of that. And we can't predict what those are; we just know they're big. And we think it's very important that we own that out there.

So that's why we're very passionate about this area, and we think there are a lot of things that can actually be done. And we think it's -- while we have the sort of scale to be able to do it, all the forces are going in the wrong direction. And so we think a jolt, a pretty massive jolt, is needed to be able to shift them.

MR. KATZ: Just one follow-up question, and then I'll talk to Tom. This is a conceptual narrative really about what drives what in any economy, what's absolutely critically important. And obviously when McKinsey Quarterly comes out, the Germans read it, the French read it, the Japanese read it, the British read it, the Chinese read it. Do you get a sense that our competitors in the mature and developing economies have this clear sense about advanced industries and their strength and, therefore,

moving to policy, the platform they need to set? Are we alone in the world by basically not understanding that sort of core insight?

MR. BARTON: I think we're quite far behind in the understanding and actually the drive for doing it. And if I compare it -- I just look at recent travels; Andrew Liveris talked a bit about this with Germany and others. But China, and I know we always talk about China, it's interesting -- I actually was asked to go and talk -- they have a special initiative in their 12th five-year plan with the seven strategic industries. They're all advanced industries. And the amount of money that they are going to put into that and they're onto immigration. They're talking about -- one of the big discussion points was how come all of the -- we don't have any Nobel Prize winners -- zero in terms of the scientists except for those that go to the U.S. What's going on? How do we shift that? How do we move it? So you have China. You have I'd say a massive focus on that side with the resources and the planning and the timeframe that goes on. The Germans, the French -- the amount of effort the French are putting into foreign direct investment in advanced industries is incredible. There's a lot of push. The English with what's going on with Cambridge. So it's a -- I'd say that the focus on it and the timeframe and the resources and the desire to kind of cut through the blockage to move it I think is at a faster pace. And I think we're slow. And again, we have an advantage, but overtime that will disappear.

MR. KATZ: That's a great context for the conversation with Tom. And, Tom, just for the audience and for everyone watching this on the Websphere and Twittersphere and all the rest of it, just something about DuPont. I mean, sixth largest exporter in the United States. Over two-thirds of your manufacturing base is in this country. Over half of your workforce is in the United States, and 50 percent of them are in traditional manufacturing jobs. This is a large company in an advanced sector that has an enormous impact on people's lives and obviously on some of the broader economic indicators that we care about.

What's your perspective and the company's perspective about the dialogue you've heard so far about do we have a manufacturing moment? Is there a potential for industrial revival? Can we, not just double exports within a certain period of time, but really have this focus on global engagement become more a part of our DNA in the U.S.? What's the perspective from a large company?

MR. CONNELLY: Okay, that's a lot of questions, Bruce, so let me wade into it. Yes, we are the sixth largest exporter. We run a balance-of-trade surplus from a U.S. perspective, but we like the U.S. and our manufacturing base here, and we feel that we're able to compete with people anywhere in the world from a U.S. base.

I kind of push back, though, on the notion of traditional manufacturing jobs. Traditional manufacturing jobs are changing so quickly. There are no low-tech manufacturing industries left. There maybe some low-tech producers, but they're not going to be around for long. So if you're in the manufacturing business, either the product you produce has a distinct advantage or the process by which you produce it or your logistics have an advantage. But if you don't have a high-tech advantage to your operation, you're not going to be in the manufacturing business for very long.

I think we can do that from a U.S. base, but we need to change some things. We've talked about many of them already this morning. We see more and more consumers around the world. The U.S. is still the largest and most attractive consumer market in the world, but we've seen over the last few years, and really post-financial crisis, the emergence of China not just as a producing nation, but as a significant consuming nation. We're seeing the same thing in India. These are vast markets for U.S. products that really didn't exist a decade ago.

Now, what do we need to do to be ready for that? Certainly in the new world, the next economy if you will, trade, open trade, and fair trade agreements are critically important. If we're going to have an innovation-based economy, IP protection takes on enormous -- we innovate, we need to protect it, whether it's a product or a process, whether it's via a patent, and the U.S. Patent Office is the gold standard for intellectual property around the world. We need to protect and enhance that. It's about pendency. We can't let the pendency get too long. It's about the quality of the examinations. We're the gold standard, but we've got to maintain it.

I think it's also about removing some barriers. We heard earlier from Andrew and Klaus about that. There are some things about the regulatory approvals and how long it takes. I know Dominic and I were both in Asia. I come back here and I talk about Asia clock speed. Things move faster there. We will be at a disadvantage if we allow our processes to take so long. So a few things need to change,

but we definitely have a strong future. And there is a bit of a moment right now given exchange rates, et cetera.

MR. KATZ: Let me stay with you about the issue of workers at various levels because what you described to me the other day was a very large portion of your workforce eligible for retirement in a very short period of time. So my sense is that you need workers with certain skills much more substantial than "traditional manufacturing." Do you have the sense that our high schools, community colleges, intermediaries, labor or others are able to produce these workers?

And then secondly at the management scale. Someone came up to me during the break and said a critical question -- and actually there are about three or four of them in here -- is for topnotch management talent coming out of the best business schools here and around the world still an attraction to the financial sector; manufacturing sector not as attractive because of compensation issues and other issues. So how do you think about the workforce challenge really at these multiple scales from your corporate perspective?

MR. CONNELLY: So let's talk at our production level. And clearly -- and again, we heard a bit about this this morning. There is a need for skilled crafts workers, people who are really good at being able to build and maintain plants. They are in short supply. We've been able to meet our needs, but as you say, our needs will be increasing in the next several years. And they need to be met locally because most of our production workers are recruited in the area.

At the plant operator level, it used to be that plants were 20 years ago manually controlled. It's now all computer-based distributed control systems. The quantitative skills and the computer skills required of a plant operator in a chemical operation far exceed where we were awhile back. And I think it's at this level that the community college can play a very significant role. And it's not about a general curriculum at the community college level; it's really about a curriculum designed for the local industry to provide skilled workers that we'll need. And I will say we have had great partnerships in areas where we manufacture. The communities, the counties, the states, really do want to work with us in terms of developing those skilled workforces.

At the professional level I would say we recruit mostly, scientists and engineers, over 70 percent of our professional staff have engineering degrees. We are concerned about the numbers of U.S. students, U.S.-born students, who are interested in careers in science and technology.

At the research level we hire research scientists that are trained by U.S. research universities, the leading research universities. You look in their chemistry department or physics or biology department, you'll find that half of their graduate students were born, again, outside the U.S. So immigration policy to allow us to attract and retain talent from around the world is important.

At the management level, I'm an engineer by training, and I'm in a management role now. I am concerned that management talent may find the financial sector more attractive perhaps, but at this point we're a leading company in our field and we're able to pull in the talent that we need.

MR. KATZ: Dominic, what do you think about this workforce challenge at all levels and whether we are able to essentially deal with it, not just with our sort of institutional arrangements, but with sort of our cultural norms in many respects?

MR. BARTON: Well, yeah, I think it's a broad area and just maybe a couple of angles on it. We've talked about the immigration issue before, and I just would completely echo what Klaus and Andrew said, too. If you look at the statistics and you look at where the source of the talent is coming from, a big chunk of that is from foreign talent. And if you see what's happening right now at the MITs and so forth, people who are graduating -- and, for example, we try and hire them, and we're probably going -- they probably should be going to -- we're probably part of that -- I should be careful what I say. But we'll bring them in and they can't get a job with us. They can't work in the U.S. So we send them to Canada. We send them to Germany. And guess where we start putting some of our Centers of Competence for Advanced -- it's ridiculous, that sort of thing and I think we have to blow that cap. I don't know how much screaming -- I don't know whether we should camp out in tents -- maybe that's a business -- we should camp out in tents until something happens. It is seriously a big issue just on that dimension.

I think a second one is what I call around the polytechnics. There's kind of an image -- this is maybe when you get into the cultural -- there's a cultural image. If you go to a polytechnic, you haven't really quite made it or why do people go. I think that's just a very wrong-headed view of how



things are. And we have some very good polytechnics in the U.S., and I think we've got to put more resources behind them and the community colleges because in doing some of the work on the unemployment gap of what's going on, there are several million jobs that are not filled because there aren't the skills. It's the welders and so forth that are there. So I think we have to change the image; that this is a very good thing to do and it creates terrific jobs and opportunities for people as they move forward and so forth. And I think there is a cultural image, very different from Germany, very different from other parts, in Korea and so forth. Interestingly enough, China hasn't figured this part out. The effort is on high-end universities. They're creating not only hundreds of thousands of engineers, which is why they're creating hundreds of thousands of people that also can't get jobs. And I think they're going to finally get it, too, that it's the polytechnics that matter. So I think we have to really on the cultural side move that.

A third aspect I would just say and it's something we found from the work we did with Brookings and talking with some of our clients in this area. There are -- one other thing we worry about, I'll just give you an example, is risk culture. If you look at some of the defense companies -- this is something that we've looked at. With the way media works today, it's kind of like you're getting an x-ray exam through every stage of the development of your product, and that's not a very helpful thing to have happen because you are going to have mistakes made when you're doing product development. I go to the F35 -- these are very complex devices that are being built and there's a sense out there now that I think from young, high-powered, talent that if you want to make a career and move ahead, you probably don't want to take that risky project because chances are, there'll be a screw-up and you'll know about it. We all know about how -- you mentioned Boeing. It's kind of like we got a YouTube version of actually what's happening. And I'm not saying that we shouldn't have transparency; I'm just saying how can we make that exciting again because we've made many mistakes in the past to be able to build things? There's something about a risk culture we've just picked up with management, top talent deferring to the big, established, business units, as opposed to doing new things. So again, that's a very micro thing, but that's something on the culture side I think we have to look at.

And I think this relates to something that, again, was mentioned in the previous panel. We are way too short term in our thinking. I think we're driven by quarterly reports. I think the quarterly

report focus has seeped into our R&D and so forth in companies, and so that's another cultural point of view I think we have to shift.

MR. KATZ: It sounds like both of what you're saying, though, particularly with regard to international comparisons, because I think the cartoon version of international comparisons is "they get stuff done." Regulatory approvals expedited, public sector does what it needs to do around infrastructure, et cetera, et cetera, et cetera.

I think what you're describing also, particularly with regard to the German model, is that there's a kind of ecosystem where large firms and supply chains interact with the research institutions and the skilling institutions in almost like a seamless way. Am I right? I mean, are we reading too much into what other countries are doing, or are they really perfecting this and we tend to be more compartmentalized or segmented, business separate? I mean, you described some helpful alliances with community colleges. Is that the norm? Is it the exception?

MR. CONNELLY: From my standpoint it's something that's developing here. The need is becoming more acute because of hiring needs, also because of the increased skills associated with those new manufacturing jobs if you will.

Let me say that looking at models around the world -- we mentioned Germany, I've had experience in Switzerland, you can take a look at Japan. All of these countries have vibrant manufacturing sectors and they all have very good skilling -- I like that term -- the skilling piece of it. At the research end, it's hard to argue with the U.S. research establishment. But at that skilling, the class, the community college, the polytechnics as you referred to them, that piece of the puzzle I think is done better in certain manufacturing-oriented economies like Germany, like Switzerland, like Korea, like Japan.

MR. BARTON: Yeah, the thing I would say is on execution, I'd say many other countries beat us. I was mentioning at the break an example from Beijing where -- this was not to do with advanced industries; it was about startups of new businesses. And in meeting the Mayor of Beijing, he wanted benchmarks. And we were saying well, it takes six days in Singapore if you have an idea of a business to be able to get approval to start it. Obviously, it can vary if you're doing some complex medical product verses setting up a Kentucky Fried Chicken, but basically six days is the measure. And for Beijing the equivalent was 36 days and Shanghai was 35 days. Three months later, going to visit the

Mayor, up on the wall there was Chinese letters I couldn't understand, but there were five numbers that were up there -- 36, 35, 14, I can't remember the other one. And I said, "Is that some new slogan?" And he said, "No, that's how long it takes to start up a new business." Someone had told him -- I wished he'd remembered it was me -- but he said someone and it's there and I want people when they come into my - - you go into his office this way and then you turn that way, that's what you saw. And I'm sure it's a different thing there, but that's to me kind of this execution. What is not there, and I completely agree, is actually the culture dimension. The number of countries that have tried to develop a Silicon Valley. I mean, there is a long list -- Malaysia, the Super Corridor. Russia is doing this right now, trying to build this. And that's -- I think that's very difficult to try and replicate. That's a magic if you will that we have. And that's where I go why aren't we doing more of that. We have the Broad Institute in medical, which I think is a wonderful one. But even there we could tell all sorts of stories of the complexities of getting MIT and Harvard to collaborate, which they did apparently. If you were at the MIT campus, it's MIT-Harvard-Broad or something or if you go to Harvard, it's the other way around. But the point is they're working together with business. You've got researchers, business, and it's a very vibrant place.

And I think we have many opportunities like that here. We've talked about this before, but Cyber Security in San Antonio. Cyber Security is a very important and, fortunately or unfortunately, a huge growth business or area. And I think that's something where we could -- how do we put that together? We've talked about fracking when you're thinking about shale gas. There are ways to build those centers.

And by the way, we can get other people's money. Not only can we get talent -- this may seem strange -- China, for example, has a lot of money obviously. They need to develop this for their own development. It's not a pride or a control. They have to do energy-efficient investment to be able to grow without melting the place. It's an imperative. What we've been suggesting to them is why don't you spend some of that money in the U.S.? Spend that money in the U.S. to get the technology advantage.

So I think if we could build those sorts of areas, we could actually not only attract the talent, but also the money. But we need to get moving on it.

MR. KATZ: I want to switch the policy because I think between the two panels that we've already had and in looking at what the advanced manufacturing partnership has put out, there really is

sort of a common sweep of policy reforms that we need to undertake here. We've already mentioned on this panel trade, IP, immigration, skilling. I mean, we can easily add infrastructure, tax, energy. I mean, there seems to be the common seven-to-ten areas of policy. In the last year, what have we gotten done in this town? Well, we finally got the three free trade deals done and some advances on patenting modernization, the COMPETES Act. But relatively speaking, not the kind of sea change that we seem to need to really set a platform for both retaining what we have and building on it.

So the question I guess is if you had to prioritize, and presumes this is even a semi-rational system, but if there was a prioritization of we've got to get these two or three things done because of how you see the competitive threats, what would those be at the national scale?

And the second issue is sort of building on the last conversation with Secretary Bryson. If the national government goes on a frolicking detour for a period of time, can we imagine the states, the cities, the metros, the advanced research universities, the major corporations, doing what they can do to set the platform for advanced industry and advanced manufacturing and how would you prioritize that? That may be the world we're in politically.

So first question, national scale because we need national solutions -- how do you prioritize in the near term? And then assuming we still are in this period of partisan gridlock and ideological polarization, can we push this out in some structured way to our laboratories of democracy? Anyone want to start?

MR. CONNELLY: Okay, I'll have a crack at that. First of all at the national level and again, most of the key issues have come up today. I think the education, whether it's K through 12 or university, community colleges, that's one where the international comparisons are unfavorable and becoming worse. When I talk to my -- some of the times I've been to the plants, the question I ask is which horse do you bet on in a race, the one that's out in front or the one that's running the fastest? And, of course, the answer depends on how long the race is. But if we're in this for the long run, we can't afford to have other people out there running faster than the U.S. economy. So I'd say let's -- one of the things that's holding us back is education. Let's get after the education piece.

The next thing, I'd put together a number of things that create uncertainty. Nothing's worse for business or investment or manufacturing than uncertainty, and we have elements of uncertainty

that can't be addressed. Hiring is -- I view it as a long-term commitment. You don't want to take that on if you don't know what your future's going to be like. Manufacturing requires fixed assets. You make investments; you need to earn a return on that investment over perhaps a 10-year period. If you don't know what the future's going to look like, you'll keep your money in your pocket or invest it in another jurisdiction where you understand or where you sense less uncertainty. So uncertainty around tax rates, uncertainty around R&D policies, uncertainty around energy and climate policies, all of these uncertainties cumulatively result in a reluctance to invest. So I think what this town can do is really drain the uncertainty for the manufacturing investment.

MR. KATZ: That's great. Dominic?

MR. BARTON: I think it's similar. I would probably have three I would do. One is around the immigration issue, the cap. What I feel is we need to jolt the system, and I think it would give business a lot of confidence if a move was made that way. People would say, "We're serious now about trying to build this." And so I think I would debottleneck that and get that to happen.

The second one is actually around the R&D, getting a tax credit on R&D. There's the uncertainty issue because it's for a year and then it's -- was that really linked with how people think about R&D? I mean, you do R&D not for a year. You do it for longer. So I -- and we've got a trillion dollars. Manufacturing companies have a trillion dollars in cash outside the country that's, by the way, earning zero. We heard about that before. This is not only -- we need it for R&D. We also need it for the velocity of getting things moving. So I would try and do something on the R&D front, a tax holiday on R&D. I would want it, though -- as I think someone mentioned earlier, it's not just the white lab coats. I'd want the actual manufacturing to go with it because we could get all sorts of tax loopholes. But I think something on that.

So I'd do the immigration, the R&D side, and then similar to this uncertainty thing, I would think about setting up some body -- it's like a fast-track mechanism where people can go somewhere to deal with all the convoluted processes because part of the challenge -- we've seen this actually with some of our clients that want to invest. There was one Chinese client who basically said, "We would like to invest" within a particular area -- it was in semi-conductor area actually -- and said, "It's like chickens talking to ducks." That must be some Chinese saying because we don't know even where to go or what

to do. I remember actually Larry Summers was there and he was being very kind. He said you should talk to McKinsey. I said, "We actually don't know."

MR. KATZ: You're a giraffe.

MR. BARTON: We're a giraffe. You're probably right. So some sort of fast-track mechanism to be able to -- where the issues can pop up and people -- we can hear what DuPont's dealing with or what Toyota's dealing with and people can say, "Okay, here's how we're going to try and move it." Those would be some things we'd --

MR. KATZ: Well, in some ways you're arguing for a level of transparency about these regulatory barriers that obviously just don't make any sense whatsoever.

I'm going to open up in a second. I already have a question here. Just one last question about the states and the localities and the universities and all the rest of this. And Jim Robinson is sitting here and he was on President Reagan's Advisory Council on Federalism. I mean, we are a federal republic. Washington doesn't really act like it's responsible for galvanizing the talents and energies of the full nation. It sounds like it's just sort of inward focused on the national government. Should we be thinking about a race to the top on advanced industry? Right? I mean, should we be thinking about saying to the states, across advanced R&D, across skills, across infrastructure, across export policy, across FDIs since the states mostly do the foreign direct investment, not the national government? We want to challenge you to basically come forward to us with your own strategy. More likely the states will have a strategy, frankly, with their cities and metros than the national government will have a strategy. Is that what we should be thinking about given this moment, political, economic, fiscal, and otherwise? Any initial response to that?

MR. CONNELLY: Well, I'm not just saying this, Bruce, because you're up here, but I actually think that's vital and that's where we should be heading, to the state and actually the city level. First of all, there's a -- you'd have a better perspective on who's more open minded -- but we've just seen three or four places where there is a huge appetite to actually do this. And when we think about it, it comes back to the world in many ways and a glomeration of many cities. There's like 600 cities that account for 60 percent of the world's growth. And if I look at Singapore -- we didn't talk about them; they are too small you could say to be drawing an analogy for it -- they do this integration phenomenally well.

They think about the forces at work. They think about the jobs of the future. They tie -- they have a regular -- it's every six months -- they have the Minister of Finance, the Minister of Education, the polytechnic heads, the three polytechnic heads, and business leaders, and they literally map out water is going to be a big opportunity. And we're talking about skilled manufacturing-related or research and water. How many jobs will that create and how many, therefore, educationally spots will we have? And that's how they deal with it.

They teach history in Singapore and they teach philosophy, which is important, but the number of spaces is limited. There's more spaces to learn about water technology. So I'm not saying we should go the Singaporean model, but I'm saying there's a lot of examples like that. And I think we have a lot of places like that in the U.S. where we could actually get a lot of things going. And I think when you mention this to external players -- investors or organizations -- if they could actually see and meet people like that, these states and cities are like countries in and of themselves.

So I think it's a very big push, and if we could provide some more transparency domestically and also globally to where are the people that actually really want to make something happen? Who can we communicate with? I think we could really get something moving. And your kind of race-for-the-top idea, I think, is a good one. I think if we can get other states and cities seeing that other people can do it, I think people will start to push.

That's the last that I'll blather on for a bit here, but you look at Itasca in Minneapolis-St. Paul and you look at how business, government, and the social sector have come together to deal with big issues. There are places like that that actually really want to move. And I think we should really push on that.

MR. KATZ: That's great. Questions? Right over here, and can you identify yourself?

SPEAKER: Yes, my name is Keith Rogers, and my question is for Tom Connelly. If I understand it correctly, part of DuPont's business relates to advanced industry, part of relates to lower-tech, grassroots industry, in terms of both your customers and suppliers. So my question is, are those types of local grassroots industries actually having a tough time these days because banks have gotten bigger and internationalized, investment firms are big and internationalized. And at the local level to get financing for their peculiar local enterprises, well for a homebuilder, the bank can meet certain

standardized underwriting criteria, however sound or not, and that mortgage can be sold on a secondary market. But if you have a local enterprise that's has very localized and specific characteristics, it's probably not going to excite a big venture capital firm, may not excite a big international bank. In your perception, are some of those types of enterprises being squeezed?

MR. CONNELLY: Well, I would certainly say that the lower-tech industries in a manufacturing situation where they face competition from other parts of the world, yes, they will be squeezed. DuPont itself in our portfolio don't have many of those types of product lines, but we certainly sell to customer bases, for example, in the construction industry, to use your example, where they are local operators with a lower technology mix. But I would suggest that for the future, even in an industry such as construction, there are opportunities to bring much more technology to the building industry in terms of energy efficiency to name just one dimension. And for that producer who is feeling the pressure and is being squeezed, I think it's time to innovate. I was asked recently whether innovation costs us jobs. I said, "Failure to innovate costs us jobs." And that would be my advice to that lower-tech producer who's feeling the pressure.

MR. KATZ: Questions? There's one right back here.

MS HUSEN: Hi, my name's Marilyn Husen. My questions are first of all, as we talk about these advanced industries and the need to put as much as we can behind it, both political will and also the necessary resources, my first question is around quality control. I mean, I think we've seen lately in this rush to roll out products and services, it seems we've seen an increase in recalls of a lot of products and services. How do we marry quality control with making sure that we can get the best products out there utilizing technology?

And then the second question I have relates to a survey I saw recently about China's wealthiest class wanting to immigrate to countries like the U.S., Canada, and England, and that they raised the issues of health and education being the two reasons apart from the one-child policy. What are we missing that we're not seeing in terms of the opportunities they have at home, but the desire to leave their country?

MR. CONNELLY: Well let me start, certainly with the first part of the question, which was around a rush to get new products to the marketplace and are we missing something. And let me say



first of all that business is always in a hurry. That's part of being in business. It's about being faster and it's being more efficient. But there are certain ground rules around product stewardship, and I think that is the piece where if there have been failures, there in the area of product stewardship. For a manufacturing operation, product stewardship is about how we make the product first and foremost. How do we make the product? How do our plants perform? What emissions do we have in connection with producing those products? How energy efficient are our operations?

But product stewardship is also about how the product performs. How it performs in its intended use, how it performs when misused, how it performs at the end of the life cycle in those dimensions. And I think what you're seeing is a lack of focus on that product stewardship process, and leading manufacturing companies are becoming more and more rigorous around that. Within DuPont we have a chief sustainability officer, and that role is really all about understanding how our products perform in their intended use, how the products perform if misused, and what happens at the end of the life cycle. So that is my response. There are checks and balances, processes that need to be in place to address that.

Maybe Dominic on the second part of the question?

MR. BARTON: Sure, your question was what are we missing, why is it that people want to move here when maybe we're complaining it's not so good here -- I don't know if that's the gist of it. I think that's a whole long talk itself, but I think you have to segment it in China. I think there are a lot of people that are moving into the middle class from the rural areas to the cities and it gets 900,000 people a week. They're very happy where they are. If you look at actually, it's interesting, trust in business in China -- the Edelman Survey is just coming out -- is actually one of the highest in the world believe it or not. That's where it is. So there are actually a lot of people that don't want to leave, that are happy with where things are moving, and feel very good about the future and where their children are and the focus. And they put a lot of focus on education. I think it's more in the very high wealthy group that actually wants to have places in different parts of the world and move. I think there's an interesting question for the U.S. I literally think there are millions of people that would like to buy houses in the U.S. if they want to deal with the housing issue. I don't know whether we want to do that or not. I'm just saying. I tell you, there's a big demand for that because there is a large number of wealthy people.

So that's kind of how I would look at it. I have to say just on a comment, though, when you look at education -- and that was one of the points you were making -- and that is I think an Asian advantage. If you look at the amount of emphasis and focus on how important that is compared to how I think we see it -- I know I'm generalizing; it's very big. I'm amazed, for example, in Korea at the size of the private tutorial market for children between the ages of 4 to 8. There are billion-dollar-plus companies that are serving that market. Australia's third largest export is education primarily to Asia.

MR. KATZ: That's interesting. Questions? Right over here, just got to find a microphone.

SPEAKER: Yes, I'm Jeff Alexander. I'm with SRI, formerly the Jefferson Research Institute, and we do a lot of work in regional economic and workforce development. And there's a kind of contradictory message that I've detected, which is here a lot of people have said the technical institutes and community colleges are an important part of workforce and job growth. But we have a strong message in this nation about everybody needs to have a four-year college degree, we need more kids going to university, and local governments use the percent of population with a four-year degree as a metric for their success. Don't you see those as kind of contradictory? How would you reconcile those two messages for policymakers?

MR. BARTON: Well, I would agree with you. I think we need to put much more emphasis on it is higher education. And it doesn't mean having a university degree means that's where you are. We need to broaden the aperture of where that is, and I think maybe we're simplifying too much when we say we want university education -- we want more education. I actually think we have to be -- again, I would be emphasizing much more on the polytechnic side.

Also there's this sense, too, that it's not -- you go there if you haven't made it. I think that's just -- it's really a bad image to have there because, by the way, there are a lot of cases of people who have gone to the polytechnics. They do the work for awhile and then they -- there are a number of CEOs that have come through that group. It's a time for all sorts of reasons, different reasons, for skilling reasons and so forth. So I think we have to get more of the story out about that and broaden it to do it.

The other thing I would just say, too, is this aging population. You know, why is it that we think once someone's over the age of 55 they can't be productive anymore? Why are universities

focused on 20 to 30 year olds? Maybe we're going to have to start to think about educational institutes focused on 55 year olds for another way because if you just look at the world and where that's going. So I think our kind of mindset on education needs a reset fundamentally.

MR. KATZ: Just listening to this question, the back and forth. How many folks in the room either have read the book, *Money Ball*, or have seen the movie? Okay. Brad Pitt, right? And it just seems -- for those who have not read the book or seen the movie, the whole premise is you've got to measure right essentially. It's about baseball and the Oakland Athletics and Billy Beane who was the general manager who basically with insight from a young statistician basically decided that there was a better way to measure baseball performance than just RBIs and the traditional, sort of batting average. On-base performance was sort of the focus.

And it's almost like we should have a money ball for manufacturing or a money ball for metros, you know, where we're measuring the right thing. And it's a little bit more comprehensive. I mean, we do these cartoon measures. Everybody's got to get a four-year degree. We go off on that frolic for a couple of years. And then at this point we need to have a much more textured, nuanced view of our economy.

I would just say also in response to this question, it's not just post-secondary education. About six months ago I went out to see the Austin Polytechnic Academy which is on the west side of Chicago, which used to be the big manufacturing base of Chicago. It still has many small- and medium-size enterprises. They set up a public high school from what we used to call "voc ed" and the small- and medium-size manufacturing firms are basically in charge of the curriculum. So people are getting the normal education, but then for a portion of their education, they're being trained. And at the end, they actually get the NIMS credentials. They can literally leave high school and go on the factory floor in the west side of Chicago. And when you look at the class coming into this high school, many people are coming in with third-grade reading, fifth-grade reading and math. By the time they leave, they can move directly into the workforce. So we can push this down further into our system, probably again along the German model and some of the other models. There's a question back here.

SPEAKER: Thank you. Larry Checco, Checco Communications. We were told at the outset of this day that GDP in the country is pretty much back to what it was prior to the recession with 6

million fewer workers. That's a very disturbing statistic. And is this a trend that we're going to see? I mean, and how do we -- it's a big hill, looks like a mountain to me.

MR. KATZ: Let's go at this for a bit.

MR. CONNELLY: Right, I think that's why we're here. I think part of that answer is more manufacturing in the country because manufacturing addresses not only the domestic market, but it addresses all those emerging consumers in other parts of the world. Manufactured goods as we've heard represent a smaller fraction of the economy than they do of our exports. They can create wealth for the country by sales to consumers elsewhere. On one level, the fact that we're producing as much as we did before the recession with fewer workers says we've had an increase in productivity. That's never a bad thing. But what we need to do is to take those additional resources, put them back to work, and manufacturing is a great place to do that. And the emerging, developing, markets are a great place to sell U.S. products.

MR. KATZ: Dominic, McKinsey came out with that study. I guess it was in conjunction with the President's Job Council where you really looked over the course of the decade and were trying to sort out what are some different scenarios of growth. I think at one end of the continuum was 21 million new jobs. I think Gary did a great job today of saying, you know, what's the joblessness hole we're in now? And how do we sort of climb out of it? And how long is it going to take?

How big of a deal would manufacturing be in contributing to this kind of job creation that has to occur, whether they're the factory jobs or this broader continuum of jobs that we're describing?

MR. BARTON: Well, again, we have scenarios on it, but I think that it's very large. It comes back to just what Tom had said; that there are a lot of opportunities. Our sense is that a lot of the - we're a very consumer-driven economy, right? We heard and it was great, but how much we're going to spend depending on the value of our house and where things are. You know, innovation and technology create wonderful new, I think, opportunities for jobs and also for consumption. It's its own virtual cycle.

So taking aside just the point about the number of jobs that can be created from many of these advanced sectors, health care as we look at it, whether you look at it positively or negatively, is going to be one of the biggest industries in the world. You just have to look at the demographics that are going on. There are a huge number of jobs we think that can be created in that from the very basic level

back to the point of -- we don't have enough nurses, we don't have enough radiologists, which is one level. But there's a lot with big data. If you think about what we can do now with data and our bodies and where things are and what's happening, I think this is just going to erupt into a big area. So it's not only sort of the basics of what we're doing now, but I would say where it's going to be going. And that's why I say with food.

Someone mentioned before about standards. There are actually very big businesses to be built on standards, and I'll tell you that a Chinese consumer would buy that. If you had -- if you think about what happened with milk and what happens with drugs, and where things -- that is a very high-value-added area to develop, just standards in how we do it.

So our sense is we're sort of seeing 2 million jobs that we could see directly. That was one number that we'd used. We could break it out. On the whole big data area, we think that's going to be half a million jobs. But again, it all depends on how much we do in each of these different sectors.

MR. KATZ: That's great, very helpful. Questions, comments, criticisms? Your hand immediately went up.

SPEAKER: Thank you for very interesting discussions. My name is (inaudible) with Voice of Vietnamese Americans. So we're talking about jobs and creating jobs for Americans. Would you say that we have a global area playing field and how do we enrich that? Are you having troubles with the wages and the labor laws here for us American workers compared to China? And would that create problems for your end products? The Secretary said that we want to create it here and export it around the world. So with the idea of the FTA and the TPP non-tariffs, how are we supposed to compete with the wages and labor laws between here and over there?

MR. CONNELLY: So if I understand the question, can a U.S. base compete with a competitor who is based in a different part of the world with different labor standards, et cetera? Is that the nature of the question? And I would say it is an issue, no doubt about it. There are parts of the world with lower cost of capital and lower unit labor rates than we have. So that's a statement of the problem; it's not a reason to give up. So I think what we need to do then is to look at where we want to compete. There are some sectors where we cannot through our product technology or our manufacturing technology bring enough to that sector to make a sustainable business out of it, and we will exit those

businesses. But what we have found is there are enough places, thanks to our intellectual property, where we can create a product that has value for the consumer in those developing regions and where they're willing to pay a price of a U.S.-manufactured good.

Part of it is the security question, and Dominic's absolutely right around food products and food ingredients is a new and important business within the DuPont Company. Part of it is the quality of our products, the consistency of our products. Part of it is specification-driven. Goods that are manufactured in Southeast Asia may be for markets in the West, and the materials will be specified at a DuPont international standard.

So there are ways to compete. There are some markets where we cannot compete. And it's up to the business leader really to find out where and how his business or her business can be successful.

MR. KATZ: Follow up?

SPEAKER: So we're talking about value-added at a higher level of products. Do you have any problems with the IP protections because that's where we're being -- the minute we have some products coming out, shortly after they are imitated.

MR. CONNELLY: Absolutely, and I mentioned IP earlier. It requires constant vigilance, right? And don't think that just because you have a patent that's sufficient. You need to construct an IP and protection strategy, and I like to think of it as concentric shells. The patent is the outer shell, but you need to build layers of IP protection that go well beyond simply holding a patent in one part of the world. We study the applications. We have proprietary ingredients. We have proprietary processes that we use. We worry about cyber security and penetration of our intellectual property. And it requires constant vigilance, and I think it does require government-private cooperation to build that IP fortress around our ability to manufacture in the U.S. and succeed in global markets.

MR. KATZ: Question right here.

SPEAKER: Yes, thank you. My name's Peter Gluck. It strikes me there's been no discussion of what I see as a contradiction between the need for national investment -- infrastructure, education, and so on -- and the dominant political climate in the United States where nobody wants to

spend anything on anything in the Congress; and, in fact, they want to spend less on everything, and it may be worse after the 2012 Congressional elections.

So what is the appropriate role of the private sector in publicly advocating for these kinds of greater expenditures in areas like education and infrastructure? I recall a program here about a year or two ago where the case was made for an infrastructure board, and the argument was made there that even Republicans support that. But I don't think anything's happened.

MR. KATZ: Nothing has happened yet. It's happening in the states, but not at the national level.

MR. BARTON: I would just jump in, I think -- I don't know if it was the Secretary or someone mentioned that we've confused investment with expenditure and we treat it the same. And I think that's just wrongheaded. So I think we've got to get back to the basics about accounting and how we look at things.

Just on infrastructure because it's an area I'm very passionate about, we feel we know that if you were to invest \$250 billion to \$300 billion a year in U.S. infrastructure -- and we know sort of precisely what areas, it's in roads and grids and so forth -- you would create 2 million jobs. By the way, that \$250 billion-\$300 billion will come from outside. The China Investment Corporation -- I see John Thornton talked about it when he was here -- the Canada Pension Plan. There are people who actually want to invest in infrastructure. It's not even our money. They'd rather actually buy that than bonds to be honest. And yet we can't -- so everyone says that's great. We have people that actually want to put the money down. We have needs that are in the areas, but we've got a market that doesn't work. And I think that's a shame when we have unemployed people like that.

And that's where I feel we need some -- you mentioned it, Bruce -- I don't know if it's a transparency thing to say by not doing things or taking -- I think Klaus talked about it or Andrew -- going to take six months. You're costing people jobs that are out there, and I just wonder if there's some other mechanism that we could put up. Why is it that we look at the stock market every 25 minutes on television about where it's moving? Why aren't we watching what the progress is on an infrastructure project and, therefore, jobs and then get people? Why aren't we putting tents up around that? So I feel very passionate about it because the money is there to put it in. The people are behind it. The needs are

there, and there's a bottleneck. And maybe again, I think the good news is there are some local leaders that actually want to do something. We just have to get the transparency there so that people see it.

MR. KATZ: Antoine, and then maybe one question after this just to get everyone sorted.

SPEAKER: Dominic, I think -- Antoine (inaudible). I think you raised an absolutely fundamental question here, and that is the way the government does accounting for expenditures versus investments. It's idiotic. Now why is there not an outcry in the business community? I mean, this is something that could bring two ends of the political spectrum together because it is so totally obvious that we need the infrastructure to remain competitive. And it is so totally obvious that we have a big budget deficit. And it is also totally obvious that with some financial ingenuity, we could develop the instruments to do this. This is where I personally think the McKinseys and the DuPonts and everybody should push and where Brookings should push.

MR. KATZ: Absolutely, good point. This is actually going to take us back to the cultural conversation. So you watch the stock market; I'm on Twitter all day long. It's very interesting because if we were up here talking about biking in cities with a celebrity, let's say, there'd be thousands of tweets right now; if we were focusing on transit or urban building, maybe hundreds of tweets. The bikers, by the way, tweet more than anyone else. I'm trying to get some tweets now. But there's not a lot of Twitter traffic on this, and I'm wondering. Is that a sign that when we talk about the real commanding heights of the economy, so to speak -- advanced industry, innovation, exports, foreign direct investment -- we're talking about a certain cohort of individuals and institutions, but individuals, who are not really plugged in to social media. They're not spending most of their day engaged in this way.

And the end of this question or really comment is, you know, to use a Margaret Thatcher phrase, "We might have to sex this up a little" to really get the culture change we need around labor, around skills, around seeing this as a career path and a professional path and a life path. When you think about America, there is a past that we have of people tinkering, you know, in these makers fairs that happen around the country. I mean, they're well attended, right? We have to think at just the cultural level. There needs to be a different thought process, outreach, along with what Antoine's describing, with some of the key policy things we need to hack at to get done.

I don't know. Are you guys on Twitter?



MR. BARTON: Oh, I can barely handle e-mail. But, you know, one story I could say on that, and I'd give a prize to Antoine if we could get Twitters going on investment verses expenditure. That would be a -- but one thing I have to say is we could -- I do think, that said, we could leverage it.

Just one story I was going to give. I met the fellow who basically did *Chariots of Fire*. I can't remember his name. He's in the House of Lords now, and he changed his life to now focus on education. To cut a long story short, he basically was doing advertising awards, and they gave it to a social media house. And the company that won, it was for lifeboat savers in the U.K. And the people who are providing the money, their average age was 65 so they had to change the demographics. So what this small little advertising agency did was they found 25 bloggers whose average age was 15 years old. And these bloggers had a following on the order of 150,000 people, so a big group. And then they sent a jacket -- from the RSL they sent a little video about these people that volunteered and so forth. Cut a long story short, they ended up signing up 100,000 people with an age actually of 21. Not a single dollar spent on advertising. So again, I think that there's a lot that could be done to tap into people to identify what the problem is. I think people just don't know necessarily what the problem is and make it tangible to people.

And then I think it's a matter of -- there are so many vehicles whether it goes back to education and the schooling system. Do we talk about this? I think in media we talk about -- a lot of it is on compensation and banking -- where are the stories of these heroes that are inventing amazing things that are going on right now. And so I just wonder, too, if in the media we couldn't glorify or have some heroes or prizes or, I don't know, something. Doesn't have to be on the invention side, but that's a great thing to be able to go to.

Last thing I'd just say, I remember the Germans actually. There was a group of German business leaders that decided to focus on this whole STEM thing. The way they did it was they went to kindergartens, and they developed a little box which was to get people to sort of look at how you could do little experiments. This was in kindergarten, because their view is if we get people excited about science in kindergarten, that's what these business leaders did. And it's probably not social media.

MR. KATZ: Tom, any thoughts about this, about unleashing the hidden tinkering talent.

MR. BARTON: No, I think there is a culture change, and I would agree with Dominic. It's got to start early and K-12 is the key to getting more interest in science, more interest in innovation at higher levels. I served on the National Academy's committee once and on a Saturday morning, sitting around a room with a table full of research professors from leading research universities. We said what did we all have in common? Why did we think we were here that Saturday morning? There were two things we had in common. One was a Gilbert Chemistry Set, and we were lamenting the fact that all the good stuff was now out of it for legitimate safety reasons. But the other factor that we all had in common was a high school teacher that made science exciting. And if we can put the excitement in the classroom, we'll get the kids in STEM majors in universities.

MR. KATZ: Well, we had Mayor Daley at a dinner last night, the former mayor of Chicago. And he made the point, which he's made many times before, but it was just so crystal clear and lucid, that we're not teaching invention, manufacturing, I mean any number of -- from the early stage up we sort of lost that. We had this sort of post-industrial nirvana we were marching through. Well, post-industrial means you don't have industry, minor problem. So you don't need to teach it.

I really am struck by a lot of sort of what's been sort of added to the conversation here on both the policy front and on the contextual front. Last question, and since I have the floor, I can ask what I want. We've been working with a group -- and it really builds on this question about Vietnam and some of the Southeastern economies -- we've been working with a set of U.S. metropolitan areas on trying to both enhance advanced manufacturing and services, but also begin to engage with international markets. And our next panel is here, so this is going to be short. In the same way in *The Graduate*, when someone comes up to Dustin Hoffman and says "plastics," you know, bricks, civets. We've got a gazillion names now for all the emerging markets in developing economies. And in the United States, unlike many other countries, we have many immigrants here who relate back to these countries. So if you're thinking about the interplay of invention, commercialization, prototyping, production, and exports, your probable answer will be, "Well, I have to understand what the metro is and what their sectors are before we end up talking about which country and trading partner they should really engage with." But out of all those acronyms, are we sort of missing sort of the next group of emerging markets? Are we focused too much

on the big ones and, therefore, missing so many opportunities in the next tier? What's your view on that and then we'll close?

MR. BARTON: Well, I think there's this huge -- again, someone said before 95 percent of the consumers are outside and so forth. One plug I would like to make for is actually Africa and Nigeria. This is a place that's moving -- Nigeria will have more babies born than all of Europe combined this year. And so I would be -- Africa and food.

MR. KATZ: That's your *Graduate* moment?

MR. BARTON: Yeah, that's my *Graduate* moment.

MR. KATZ: That's good.

MR. CONNELLY: I would say for us BRIC has been more BIC than BRIC, but I was going to go exactly where Dominic went, and that was Africa. We sent a team of 30 young DuPonters to Africa last year, to go to the markets, to understand them. It's still early days. They're certainly not in the BRIC category yet, but it's time to lay the groundwork for what's going to happen there economically over the next 20 years.

MR. KATZ: Well, as the British say, we're going to have a march of the makers in the United States. And this panel and the prior-to panels I think really helped to illuminate how to do that.

And now I am going to turn it over seamlessly maybe to my colleague, Darrell West.  
Thank you very, very much.

\* \* \* \* \*

CERTIFICATE OF NOTARY PUBLIC

I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

Carleton J. Anderson, III

(Signature and Seal on File)

Notary Public in and for the Commonwealth of Virginia

Commission No. 351998

Expires: November 30, 2012