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**Technological Drivers of BRIC Economies:
Public Versus Private Sector Control**

Vipin Gupta, David M. Orozco, and Linda Yueh



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¶1 MR. LEV: Thanks, Everyone, for being here today.

¶2 Just so you know, this symposium will be published. We have a court reporter, so the transcript of all the panels and the keynote speaker will be published, in addition to a number of what we think are very fascinating papers by our panelists. And that will come out this summer, so look for that.

¶3 Our first panel is exploring the issue of technology drivers of the BRIC economies. And we have first, on my left, David Orozco. David is a 2004 graduate of Northwestern Law School. He's currently a fellow at the Kellogg School of Management, and he recently -- can I say that? He recently accepted an appointment at the Business School at Michigan Technology University. His area of interest is intellectual property and kind of the big picture of how intellectual property interacts with policy.

¶4 Next to him we have Linda Yueh. Linda is with us today from London where she is on the faculty at the London School of Economics and Oxford University Department of Economics. Linda is a specialist in international trade economics, and intellectual property economics. She has written a paper for our forthcoming symposium issue, so we hope you'll all enjoy that. It is in the first -- at least the first draft of it is in the CLE materials right now.

¶5 And then next to Professor Yueh we have Vipin Gupta. Professor Gupta received his Ph.D. at the Wharton School of Business at the University of Pennsylvania. He's currently on the faculty at the School of Management of Simmons College in Boston. Professor Gupta is interested in the cultural aspects of intellectual property, particularly with respect to gender issues, disparity and inequality, and interested in how clustering of certain regions affects -- and the cultures of different regions affects the views toward intellectual property and technology.

¶6 And with that I will leave it to Professor Yueh who is going to take the lead on this panel. Thank you very much.

¶7 (Applause.)

¶8 MS. YUEH: First of all, we were told by the Dean that we have to shout in this room to be heard. So, if there is any problems in hearing us, please just discreetly waive your arm and we'll speak up.

¶9 The first thing I want to say is thank you very much to the organizers, to Dan Lev and to Jodie Rosello, for the invitation and putting together this very interesting symposium and conference. I know that I'll be looking forward to reading the

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*** Panel moderator. Dr. Yueh is an associate in globalization and fellow in economics at London School of Economics and Oxford University.

symposium issue. And also to thank the Dean very much for coming here today and welcoming us to this fantastic venue. So despite what I said about shouting it is an absolutely lovely room, and I think aesthetics meanings everybody. So I hope you enjoy the day as well.

¶10 What we're going to do in this panel is we're going to try to set a good example in terms of time management, so each of the speakers will be given 20 minutes, and I will be fiercely waiving my "Five Minutes" sign in front of their faces if they're running over this time. So this way there will be a good half hour for discussion left, because we very much would welcome participation from the audience, and any questions and discussions that you might have I think would be a valuable contribution to the symposium volume as well.

¶11 So the order of speaking. We had originally decided that David was going to go first, until we worked out that we are not very competent in terms of IT. So since my presentation is up first, I will go first. And then it will be followed by David, who will be speaking on industrial policies in BRIC countries, so looking across also a spectrum of countries in thinking about patents and who holds them. And then Vipin will close us off with looking specifically at India to try to give you a picture of intellectual property rights in a particular major BRIC economy.

¶12 So my presentation, and I'm going to make myself stick to the 20 minutes as well, is going to be essentially a look at TRIPS, which is the Trade-Related Aspects of Intellectual Property Rights. So my presentation is a story of global intellectual property rights, its relationship to economic growth, and specifically the implications for the BRIC economies, Brazil, Russia, India and China. And I'm going to focus on the largest of the BRICs, which is China, for the illustration of my presentation. So I will go ahead and start.

¶13 So the motivation, I think, for looking at TRIPS or global intellectual property rights has really come about since we've had a rule-based regime, really starting in the last ten years. So, yes, the WTO was preceded by GATT, but in terms of intellectual property the picture had changed as of about ten years ago when there was this global regime in place. So the question I wanted to think about was how does an international rules-based system affect economic growth. Because we think a lot about how domestic legal systems could impact innovation or intellectual property, but what are the implications for having a global system and what are the aspects of the global system that are most relevant. So that was the picture, that was the question I had in mind when I began this exploration.

¶14 So I focused specifically on the TRIPS provision, which of course came into effect with the WTO in the Marrakech articles, so it's an addendum to the main WTO articles, which really changed the picture of global intellectual property rights. And, indeed, I looked at a specific facet of what I think TRIPS could do, which is to affect technology transfers that are critical to the growth story for developing countries. That was the second motivation. Then I looked at what that meant for a specific major emerging market, which is China.

¶15 Now, I often discuss China as an emerging market, and one of my students the other day said, "Isn't China a major economy? Why is it that we consider it an emerging market?" Okay, okay, it is true in terms of aggregate GDP, national income, it is the fourth richest country in the world. And yes, when you adjust for purchasing power

parity, so in other words not looking at its own exchange rate but adjusting for purchasing power, it is already the world's second largest economy. But on a per capita basis China is still one of the poor developing countries in the world. That's why it is still considered an emerging market. So, anyway, that's why China should still be in the BRIC. It is not just B-R-I, or whatever the acronym might turn out to be.

¶16 So the outline of my quick presentation is going to be TRIPS and economic growth. I'm just going to outline a bit about what the relevant provisions are in the TRIPS article. I'm going to then turn to evidence of growth and inequality, so looking at the convergence theory for economic growth, and then I'm going to look at BRIC.

¶17 The way that TRIPS is often seen is that it harmonizes intellectual property law. So what TRIPS did was that it actually overturned the Paris and Berne Conventions, which were based on two major principles. The first one is independence and the second one is territoriality. What that essentially said was that intellectual property laws were specific and governed by a domestic country and other countries had to respect what IPR laws are in a particular country, so there is no harmonization. So China could have a particular intellectual property regime and the United States could have one and that would be consistent with international law.

¶18 What TRIPS did is that it changed it. It actually harmonized the system. So that means, of course, it's a uniform system of intellectual property rights. So TRIPS actually covers all intellectual property rights from patents to copyrights to trademarks, and of course, similar to all WTO agreements, it also provides for national treatment, most favored nation status, and dispute settlement by the DSU.

¶19 And, indeed, even though the TRIPS provision in particular hasn't actually been extended to developing countries, most of the LDCs are currently exempt, it already accounts for about 8 percent for all the cases brought before the DSU.

¶20 Now, WTO -- in terms of why this is an important international rules-based regime to be concerned about, the WTO covers over 95 percent of world trade, about 150 countries at the last count, and what it does in terms of thinking about the implications for LDCs is that it creates -- extending this kind of intellectual property rights protection gives the kind of artificial monopoly that we're familiar with in developed countries' IPR systems which is supposed to give an incentive to innovate to the innovator by reducing the risk of expropriation. So how that is done, of course, is that it gives an artificial monopoly extended to 15, or perhaps 20 years in Europe, to the innovator so that they undertake the risky investment needed to come about with R&D -- to invest in R&D and to produce innovation.

¶21 Now, international economic law, of course, will do two things in this respect very similar to what a domestic system is but with notable differences. The first one is that if you create an artificial monopoly on intellectual property rights, then technology transfers, which lots of developing countries receive because they are far from the technology frontier, they are still in the imitation stage of development, especially we're talking primarily industrial technologies that could make the factories more productive, it creates a monopoly price for the technology transfer, making that process of imitation more costly.

¶22 On the other hand it could have the same effect of stimulating innovation, so this could induce multinationals to provide more sophisticated technologies, it could provide an incentive for domestic firms to better innovate if there previously wasn't a very good

IPR system. And of course a dispute resolution mechanism in general provides better disputes over, say, enforcement of IPRs, which is a major issue in the BRIC economies and other emerging markets, and I think you'll cover that in a later panel.

¶23 So there are these two counter-weighting effects. On the one hand, yes, it could make technology transfers more expensive; on the other hand, it may actually induce more innovation. Very similar but with a notable difference in terms of convergence theory in the global economy.

¶24 So the second thing to think about in terms of TRIPS and economic growth is that technology transfer has actually never been free. So when you think about economic growth models, and there is always a prediction of convergency because there is always, say, a country, a developed country with more sophisticated technology, developed IPR system, they're closer to the technology frontier. And then there is the developing countries who can still imitate, farther from the frontier, they're poor, they don't spend as much on R&D, but really they're just not technologically sophisticated to have to warrant R&D spending in order to grow.

¶25 So what these models suggest and what they predict is that in a normal sort of growth framework, say a solo model or neoclassical growth model, there are what are known as diminishing returns to a factor. So the more capital stock you add you gain a less -- a falling amount of output for every unit. So that makes sense; you can't perpetually add computers without increasing the other factor, which is labor, without experiencing diminishing returns.

¶26 Now, if there are diminishing returns then the solo model predicts that capital, which is the investment that would invest in sort of computers or other types of capital stock, would actually move from high-level countries where you have diminishing returns to developing countries where there are lower level of capital and therefore less likely to encounter diminishing returns. This free movement in capital, of course embodied in technology because whatever is being invested in to be brought to a developing country is coming from a developed country, and that process of capital moving with free transfers of technology, because it's embodied in the capital, generates the prediction that global growth rates should actually converge. Because if everybody has the same technology and capital is moving freely, then you should find there shouldn't be this vast disparity among developing and developed countries in terms of growth rates because everything should equalize in perfectly working markets.

¶27 Now, this of course is empirically not true, and in a domestic, in a national system there are already models like endogenous growth theory which are trying to better explain the process of how it is that technology is accumulated, how it is that investment and foreign direct investment are actually realized.

¶28 So what this means is that if technology wasn't free in the first place we would not have expected the predictions of the solo model, along with all the other factors that would predict divergence in global growth rate. I'm going to show you evidence that there is indeed divergence in global growth rates.

¶29 But this kind of IPR system would actually accentuate the process. So before if technology wasn't free you wouldn't expect convergence, but now you've actually made technology transfers priced at monopoly rates which would make it harder and more expensive to catch up. So developing countries weren't catching up in the first place, but this system has the potential of actually increasing the cost of development even further.

¶30 So the next slide that I'm showing you is growth rate and initial per capita GDP from 1960 to 1995. On the X axis, which is the horizontal, that is per capital GDP in 1960, and on the Y axis this is the growth rate from 1960 to 1995, which is the year of the adoption of the TRIPS agreement. So this captures a good 35 years of global growth rates.

¶31 Now, if there was a relationship between, say, low levels of per capita GDP and the growth rate what you should find is the poorest countries, so those closer to the origin, should have higher growth rates because growth is driven by technology and investment and the mechanisms that we talked about. So it should be an inverse relationship, it should be a downward sloping line. However, as you can see from this graph, which I have plotted, I'm afraid, nearly 200 countries, there is no such relationship. That simply even before the TRIPS agreement there was a big divergence in terms of global growth rates.

¶32 What about the second factor that I talked about, that maybe it's simply outweighed by the fact that there is now more investment going in to, say, developing countries and embody better technology. That is very much an empirical question, but I'm just going to show you a couple of bits of data looking at four direct investment flows.

¶33 The first thing that you should notice is that from 1991 to 2004 world global -- global foreign direct investment flows are very high. Developing countries actually have a very small share of that, but it is actually quickly growing. It is quickly growing, however, for some regions of the world.

¶34 So for Asia and the red line is Latin America, most FDI flows to those regions as opposed to, say, Africa and Central and Eastern Europe. So there are changing investment flows, perhaps as a result of an increasing rules-based system. Of course, there are other factors. But it is also clear that most of the FDI goes to the successful economies.

¶35 So this just give you a picture, a more recent picture, 2004, which sees developing countries catching up.

¶36 But I should say on this picture that developing countries, a lot of this is going towards China, India, Brazil and Russia, the BRIC economies, the major emerging markets. So it is not that all developing countries are experiencing this flow of capital, which embodies, of course, technology.

¶37 Now, I'm going to move to sort of does it matter, FDI, intellectual property rights. I mean, does this actually matter in terms of innovation for emerging markets or major developing countries. I'm going to look at China in particular, but I've given you some citations and references which say, you know, we're not sure. Most of the economic literature goes, "On the one hand, on the other hand." So, yes, there are studies which show that patents, which typically are used as the best proxy for formal innovation, are linked to foreign direct investment, and of course research and development spending by the country itself. And you hear this a lot in developed countries, how much do we spend on R&D, how much do we spend on R&D. That's where it comes from. But for developing countries foreign direct investment is important because of what I described earlier, but also because, hey, if you're a poor developing country you just don't have that much money to be spending on R&D. I mean, you're in the imitation stage.

¶38 So the literature says, okay, some countries there is a positive relationship between FDI and innovation measured by patents, other countries not so much.

¶39 Now, I'm focusing on China because in terms of FDI flows China is actually the leading destination for foreign direct investment in many years, in several years rivaling the United States. And in terms of stock it has the third largest stock in the world after only the U.S. and the U.K. So in many ways if you don't find the positive relationship for China, it would be difficult to see how foreign direct investment might benefit other countries which simply don't get the kind of investment that goes to China.

¶40 So looking at China -- first of all, just very quickly, I've just simply put up, they have patent laws, even before the WTO, and that's why you can look at patent data. So you hear a lot about China has a poor IPR regime. It is true, but they have a lot of de jure provisions; it's just that de facto the enforcement is poor.

¶41 So China had a patent law since 1985, really at the start of urban reform, so it has been at least 25 years in terms of patent laws. And, of course, China did adopt the TRIPS agreement so it's a continuation of the IPR regime, which had been strengthened up until the TRIPS agreement and then extended.

¶42 And, of course, China does have a very aggressive foreign direct investment policy and industrial policy specifically aimed at getting technology in foreign direct investment, initially through mandating foreign direct investment to come in the form of joint ventures, which all the literature suggests that has more technology transfer potential. And then in the mid 1990s by creating what are known as high technology development zones, a special form of special economics zone which are geared at attracting the technology embodied in foreign direct investment and then married to R&D facilities so that they can develop technologically to stimulate economic growth.

¶43 So the first picture just shows the FDI in China, and it is sizable. Obviously the big jump came in 1992 when China really bulked up its FDI policy by extending special economic zones beyond Fujian and Guangdong, and you see it shooting up. And like I said, China is now a leading destination.

¶44 Now, in order to look at the effect of something like foreign direct development versus, say, other factors, like human capital or R&D spending, one has to account for the fact that the patent law regime is uniform across the country. So I haven't put the figure up there, but the successful patent grant rate in China is pretty much the same across China's provinces. But what these provinces differ at in terms of -- they differ is their level of development, the level of FDI, the amount of R&D spending that they incur, the level of education. So national patent law regime but variations in terms of the number of patents in these provinces associated with different factors.

¶45 So with variation one can explore what the relevant factors are rather than just looking at it without thinking about what the different regional affects might be.

¶46 So I've put up all the provinces, GDP as well as patent, and this is your patent grant rate. So it is not that the regime is different for provinces, it is simply that there are other factors which explain the different numbers of patents granted in these provinces. It's not just because some have better enforcement than others, it's pretty uniform.

¶47 And what the determinant of innovation or patents show, and this is a fixed effect, negative binomial. I'm happy to answer questions on regression theory. Looking at 1991 to 2001 when China really started its FDI intake, the significant factors affecting innovation are some of the things which you expect, R&D expenditure and FDI and other factors. However, the most significant factors are definitely R&D and foreign direct

investment. In fact, the marginal effect of spending an additional unit on R&D versus FDI is pretty similar. So it matters for innovation.

¶48 And I've simply broken this up by region, because as I said there are regional variations in terms of level of FDI, and of course level of development.

¶49 And controlling for everything else, which I've shown on the slide in terms of -- including province-specific effects, it is R&D and FDI which matters on the coast, it is only FDI that matters in the central region, and in the interior it is human capital. So there are high regional variations as well, it's not simply a picture -- it's not just the story of more FDI gives you more innovation, but it is found to be important controlling for all other preservable facts.

¶50 So to conclude. We don't -- it is too early to look at the evidence of TRIPS on income inequality because it hasn't taken effect for most developing countries. However, it is likely to increase income inequality and convergence simply because it makes imitation more costly. However, there is the counter offset of maybe it will provide more incentive for better investment flows.

¶51 Now, does it matter for innovation, after you go through all that analysis, and for China, which I've suggested is an important case study. It does matter. It is as important as domestic R&D spending for even a developing country which has grown as well as China.

¶52 So if you think about the importance of technology transfers and why it is we care about global rules-based systems, I submit that, yes, a rules-based system may be good for investment, very good for liberalizing trade, but one must think hard about the effects on technology transfers and the growing global inequality that is witnessed in the system.

¶53 So I'm going to stop there because I'm at my 20 minutes. Thank you very much, and I look forward to the discussion.

¶54 (Applause.)

¶55 MS. YUEH: We're going to try to make a smooth transition to David, so hopefully this will plug in and it will work well.

¶56 MR. OROZCO: I will stand for my presentation that way I can project my voice outward to everyone and avoid speaking loudly right into Linda's ear.

¶57 Thank you, Everyone. It is very pleasant to be here. I am from this law school, a graduate of 2004. I work at Kellogg now and I do research in intellectual property from the competitive advantage and management lens combining what is the legal doctrine with the management experience.

¶58 So we're going to talk about IP, we're going to talk about the BRICs, we're going to talk about competitive advantage.

¶59 What are the BRICs, just to lay a foundation, a framework of what the whole discussion is about. The BRICs are an acronym meaning Brazil, Russia, India and China. The origins of this term were a Goldman Sachs report a few years back. The investment banker's research arm, unit, there said if we look at the growth rates of these economies and what they're doing, in about 20 years they're going to be tremendously important in the global marketplace. Not that they aren't now, but they're going to replace what are our Germany, France, the typical G6 economies in size and importance.

¶60 That really created a stir amongst people who really study this issue, and really it is based on the high GDP growth rates of these economies. We have to look at what they've been doing in the past to understand where they're going to be going in the future.

¶61 And why does this all even matter? Well, it matters because our businesses compete, and increasingly they compete in a global marketplace. So we now have this entire discussion of how do we compete with these economies and these companies that are really driving what are the engine of wealth creation for the future and competitive advantage in the future.

¶62 And the press has picked up on this and there is this whole discussion now of the new multinationals coming out of these BRIC economies, very competitive, and how our industries and our companies and our economy is going to manage this in a competitive dynamic where capital is moving, FDI flows are moving back and forth. And really the mobility of labor is also really becoming increasingly international in scope as well, as we see in the case of India.

¶63 So there is this whole discussion. Companies really do have to pay attention to this because it is a reality. We're no longer facing issues of companies competing on cost, we're now facing very sophisticated competitors. Just recently China announced that it is going to initiate its large aircraft program. Who is going to take note of this? The Boeings of the world, the Airbuses of the world, very sophisticated companies, large companies that provide extremely sophisticated components, high value added products. This is no longer just outsourcing, this is no longer let's just get cost advantage anymore. These are big companies that are looming over the horizon threatening our companies, the value creation, jobs and economic growth of our economy.

¶64 So it is good to focus on whether we can compete or not. There is a lot of discussion about that, people are really focusing on that. But at the same time we really have to understand what is below the surface. There is a deeper layer of understanding behind this story, and what we're going to talk about more in this discussion is what are the key elements of this story. Because as we know there are individuals who can really just target what are discussions that focus more on the lowest common denominator, which is, you know, we're outsourcing our production, this isn't good for our economy. The shareholders of our companies that are outsourcing, on the other hand, are claiming it is good for them. So it's really this nuanced discussion and we really want to look at the facts as opposed to the rhetoric.

¶65 So to look at the facts, we have to outline what are the basic research questions behind this issue. And I pose it that the following research questions are really the important ones to ask. First is what is the source of competitive advantage for each one of these economies; how do they differentiate themselves in the global marketplace. Second is what challenges do they face, because everything isn't rosy in those economies. They're growing at very fast rates; however, they're facing extremely important challenges for the future growth rates of those economies. Third is what government policies are they implementing to leverage their strengths and overcome those challenges. Because what we'll see is that one of the common denominators is that governments in these economies play an active role in managing and guiding the economy, and we're going to see a bit more about what they do and how that fits into intellectual property because that's a key component of competitive advantage and economic development.

¶66 So first we'll start with brief overviews of each economy. I'll focus a bit on each. We'll start with Brazil, which is the first BRIC economy. What are the advantages, competitive advantages of Brazil? Well, Brazil has these tremendous natural resource endowments. They have factors of raw materials, they have metals, minerals, a

tremendous oil and gas industry. So these are very, very basic raw materials that they have the natural endowments to compete with. They have an excellent transportation infrastructure, and they attract a lot of foreign direct investment, actually, with transportation. They have a very large and very well-developed financial sector. In fact, Sao Paulo is probably the Latin American capital of finance. It is a huge industry. And they also are starting to develop what is the ICT industry, the communications technology industry, software and things of that nature.

¶67 However, they have really important challenges. Some of those challenges are that they have high fiscal deficits. The government of Brazil is very active in managing the economy, and to do that they borrow a lot. So they have high fiscal deficits. The diversification of the Brazilian economy is not really as good as it should be. They focus a lot on what are those natural endowments without diversifying as much as they should. They have low value-added exports. They're importing raw materials a lot, which really have the lower margins and are susceptible to global pricing, so they basically have to take what is the price of the international markets and that's not the most optimal scenario. Right now it is good because those resources are actually very well priced, but in the future that could all change. R&D, they don't focus too much on R&D relative to the other BRICs, and that could be a challenge in the future as well.

¶68 For government policies the Brazilian economy is really highly managed by the Brazilian public sector and there is an anti-IP bias of sorts in the Brazilian discussions of where to go and move in the future. Where you see Russia, China and India perhaps moving a bit more towards IP embracement, Brazil is really hostile in discussions of intellectual property and that might deter growth in the future.

¶69 Russia is a very interesting case. They're growing very rapidly, but they went through a crisis. They had this period after the communist regime of wild west capitalism where the model was let's basically privatize everything, sell it to the public, managers can take ownership interest. And the theory under classical economics is if you have property rights the economy will move towards efficient utilization of those resources. However, what we saw was the opposite happened. There was corruption, there was mismanagement of resources, there was looting, and basically the economy just went down the tubes. And there was this group known as the oligarchs who controlled the resources of production, they controlled everything, and that was not a good scenario for Russia under that case.

¶70 What are the competitive advantages right now of Russia? Well, Russia again has high R&D, they have excellent scientific capabilities. The government is actively involved in that. They have a government guidance program now where as opposed to the wild west capitalism many of the key strategic industries now have been pre-purchased by the government, are being managed now so that they can actually produce under a more efficient model, and the economy is being guided in certain key strategic sectors. They have also a high capacity for natural resources as well, gas, metals, mining, of that nature.

¶71 What are the challenges? Like Brazil, very similarly, they focus a lot on the natural resources. They have a lack of legal infrastructure, which can be a big problem because, as we'll see, the rule of law, strong property rights are a key element for moving forward in that development cycle towards resource, cost-based advantages to value added product differentiation, higher margins industries.

¶72 Russia has high involvement of the government in the economy as well. That could be a challenge.

¶73 Some of the policies are that the state is heavily investing in R&D and they have this management structure now where the key strategic industries are controlled by the government, the oligarch's power has been reduced, and now the state is taking an active role in managing the economy as opposed to pure wild capitalism.

¶74 India. This is the story, really, of two different Indias. There is one India which is the middle class and the upper class, which is developing rapidly. And then two-thirds of India, which is really still the agriculture, people in the farms, very low education and perhaps savings rates, things of that nature. So they're really overcoming this difficult gap in income right now.

¶75 Some of their advantages are they have found that by focusing on the service sectors they have been able to differentiate themselves from China and other economies as well. So if you look at really the value and the investments that are occurring right now in India, they're focusing on the service industries as opposed to manufacturing, which would be China's core competitive advantage.

¶76 English is a source of advantage for China as well. American companies can now focus on servicing in India because of that, of that trait. The engineering skills of India are magnificent. They produce so many engineers, highly qualified technicians every year. That's a source of competitive advantage for India as well, especially in the software industry. And that is good for them because it requires very little capital to start up software-based investments.

¶77 And, of course, they're also a friend and ally of the U.S. They have the same, perhaps, mentality of promoting democracy and individualism, and the U.S. sees India as a key strategic ally in that respect.

¶78 They have a lot of challenges. One of the challenges that India is undergoing right now is infrastructure. They lag behind China and other countries in terms of basic roads, land, air transportation. The logistics of getting things done in India is extremely challenging, not just because of the real infrastructure problems but there is also a bureaucracy that historically has developed in India that is very strong and provides a big barrier to what is the efficient utilization and efficient transfer of resources.

¶79 They also have less foreign direct investment than China, and the brain issue is also a problem for India as well. Well, you know, they train these highly skilled workers but then the workers go to America and other countries where they can monetize their intellectual capital.

¶80 Foreign ownership laws have changed things so things are improving in India. Big state sponsored R&D remains a huge element of the Indian economy, and that could be either a source of competitive advantage or a hindrance depending on how you look at it. At the stage of development right now that India is you can see that they have to manage their economy in some way and the state has to be involved in educating the citizenry, promoting what is basic research, and that will eventually, hopefully, get monetized some way as property.

¶81 Software markets have been deregulated as well, which is a positive element of India's competitive advantage.

¶82 Finally we have China. So we have China now, which, you know, is a major player now in the global market. They have infrastructure advantages. They have R&D.

They have an increasing -- I'm sorry, a decreased stake in state-owned enterprises. Now the state is becoming less of an actual player in the economy and more of an architect of policy, so they're actually combining what are state resources with private resources, so they're in a transition period now. Whereas before the state used to control economic production, now it is the state and private sectors combining together. And hopefully in the future, if things go well for them, the government will have a smaller interest in these ventures as well.

¶83 Manufacturing capabilities. We all know about the story of mainland China and how they've really leveraged what are the skills of the workforce, the low cost labor advantage. And, you know, companies, global companies have really taken advantage of that and basically moved manufacturing to China.

¶84 Some of the challenges are related to their transition, like the other economies. Basically what's happening now is wages are going up in China. They are losing that cost basis differentiation. They're trying to manage it so that eventually they enter this higher value added production and exploit those benefits as well, because they have a highly trained labor force and they want to use that so that these people become innovators, these people become managers, they create the new ventures that will threaten what are the existing incumbents in the global marketplace, the corporations in the developed world.

¶85 The brain drain I think in China is still there, but I don't know what the indicators are. I think there might be a reversal of that. There is some type of anecdotal evidence of that where now people who are highly skilled and left China are coming back to China. That's a good signal and I think it is a good sign for China in the future because they need the talented managers, they need the talented scientists, inventors, attorneys to come back to China and manage those local industries which will compete in the future.

¶86 One of the challenges is this idea of "Guanxi," which is the idea that relationships are a driving force in the economy. We'll see later how really to move from what is the initial stage of government-managed economy to market-based economy you really need an impartial rule of law, and this idea of relationships might be a barrier to that. Initially they're managing it so that it is a source of competitive advantage for the Chinese economy, but in the future as Chinese companies compete amongst themselves and against international players there will have to be an increase in the impartial, stable rule of law that determines disputes as opposed to relationships.

¶87 China has done an amazing job managing their economy if you look at any statistic. They have guided investments to strategic sectors. They've created these special economic zones, as Linda mentioned and these zones have worked amazingly well. They started out with few of these zones to really just study what is -- how economic growth would be managed if it worked, and it did work. So now there are many special economic zones throughout China. They're thriving, the infrastructure behind them is excellent, and the investment pours in. You see China really managing what is investment through these special economic zones and through tax policies which encourage foreigners to come in, spend the money, do whatever it is that they have to do, which typically is exporting the goods back to the originating country.

¶88 Now, the million dollar question is will the BRICs sustain growth and achieve global dominance. That was the whole goal of the initial research project at Goldman Sachs, and we have to find out.

¶89 Now, the interesting thing about the Goldman Sachs report was it had these assumptions. Like most economic models, they assume things. These assumptions are critical to understanding the question and the answer to this question in the future. Some of these assumptions are basic economic issues, social issues, education, human capital, infrastructure issues, which we see for the most part that the BRICs are doing a pretty good job of managing.

¶90 India is having some issues with infrastructure but they're spending a lot of money to improve. Human capital in these countries is really growing as well and they're trying to make it more equal. But really I think the key is going to be the rule of law, I think. That is where we can really bring a lot to the discussion because what's going to happen is these properties are going to have to be managed in some way to create value.

¶91 And if you look at patents as a proxy of that, what we'll see is that the discussion is the WIPO, which manages the PCT, the international patent application system, tells us that for 2006 there was record year filings for these economies. However, if you look at the data, none of the BRICs really have a significant amount of patents that are valuable in the global market. That tells you a lot. That tells you that really the patents are not a focus of priority and that there is a big assumption that isn't being spoken about. That assumption is that really the value added where the products are created, which are in 5, 4, and 3 levels of this pyramid, are being ignored by the BRICs at this point. They're in a transition period and most of the investment has focused on levels 1 and 2, which are labor arbitrage and process optimization, which are low patenting fields.

¶92 So to move forward to achieve that growth rate that the BRICs need to achieve so that the Goldman Sachs report fulfills itself, they'll have to move up to 3, 4 and 5, and patents will be an increasingly important role to protect themselves and to leverage value in those spaces of innovation.

¶93 Now, some of the conclusions that we would draw from this are that each country has its own unique industrial strategy. The twin goals are to sustain growth and move up the value chain, to move away from resource cost advantages to innovation differentiation marketing. And the transition is that and will require institutions. It is not like the Russian case where you just privatize and let everybody run loose. That's not going to work. What you need to do is you need to have this rule of law that supports investments, encourages investments, encourages value dissemination across the economy, knowledge transfers.

¶94 And finally we see that patents are not yet a part of that discussion. Because these economies are managing their investments, to move forward they have yet to focus on patents, because I think ultimately what is going on is these economies are more interested in learning, attracting investments, and diffusing the technology and establishing what are relationships with future competitors in the future.

¶95 Thank you very much.

¶96 (Applause.)

¶97 MR. GUPTA: Thank you for the invitation.

¶98 And, actually, after 16 years I'm in a law school. My last experience in a law school in the U.S. was at the University of Pennsylvania. When I came here for doing my Ph.D. at the Wharton School I was interested in counter-trade, technological exchange, so I decided to take a course in business law in the law school. And then midway I decided to kind of quit the course because I found the classroom culture in the law school to be

very different from the classroom culture in the business school in the sense that in the law school there was one-way interaction and I was used to more a two-way interaction where like in my MBA program in India part of the grade used to be a class participation grade, so I decided to quit that. And I was told that probably I made a mistake because that was not -- I was just told this today, that that's not typical of the law schools, and we have built in significant discussion time even today. So it is never too late to be in the law school.

¶99 Well, today my goal is to share with you an analysis of the technological drivers of Indian economy, and the analysis presents a culturally sensitive story of how public, the government, and foreign multinational controls complemented and built upon, and not substituted or dominated, the indigenous private sector for generating and leveraging regional clusters and gendered technological base in India.

¶100 My perspective is guided by my disciplinary roots in management, focused on strategy and international business; my research on culture, particularly as a principal of the GLOBE program on culture and leadership in 62 societies; and my continuing and evolving research on technological growth, family businesses, and women in leadership, based on my dissertation and affiliation with the Family-Owned Business Institute at Grand Valley State University and with the women-focused education at Simmons College.

¶101 I'm going to invoke the global innovation systems theory and its limitation as a way to situate, motivate and interpret the implications of the analysis that I'm going to present. This theory gives a primacy to the role of public controls and multinational controls as technological drivers in any emerging economy. I then discuss the story of India in four phases.

¶102 The first phase covers the period until the formation of the constitutional republic in India in 1950 when the technological base was situated primarily amongst the family businesses, particularly the craftsmen families in India. The second phase covers the first three decades thereafter when the government sought to play a commanding role in the economy. The third phase covers 1981 to 1995 when the policy environment was liberalized to engage professional private firms, particularly in the informatics sector. The final phase covers 1996 to 2005 when multinational firms played an increasingly prominent role in India. Thereafter, the role of democratic controls in the evolving story of India is considered. Finally, I will briefly look at the cultural dimensions of technological drivers in the BRIC countries more broadly.

¶103 So let's consider the standard prescription on the technological drivers of an emerging economy. The recipe for success, it seems, involves import foreign technology, reengineer and adapt it, and incrementally change and apply it. The government plays the role of an orchestra manager by funding public sector and subsidizing private sector efforts to do so, particularly through concession interest rates. A successful public control also includes manipulating multinational corporations to transfer their latest technologies and to engage in FDI to help create local capability to absorb it, again through various incentives, tax holidays, land grants and privileged access to domestic market.

¶104 Particularly in Japan and South Korea the government encouraged the keiretsu groups and chaebols to import electronics technology from various multinational corporations, that incrementally assimilate it, and develop capacity to perform complex

innovations. In both nations the governments restricted foreign investment and focused on inducing technology transfer collaborations.

¶105 However, the same policy appears not to have worked in either of the nations during the 1990s when the governments of both nations sought foreign direct investment very actively to help restructure the faltering economies and to help revive technological growth.

¶106 China, on the other hand, relied heavily on the public controls to encourage foreign direct investment since the early years of economic reforms during the 1980s and later, as Linda showed, in the 1990s in particular. The technology transferred through FDI in China, however, in various counts it seems that was generally older generation and subject to close international scrutiny under dual-use technology transfer.

¶107 We can identify at least three major hypotheses suggesting limitations of the global innovation model, the global innovation systems model. First, the socio-technical systems hypothesis predicts that technologies are linked to the social institutions and attempts to absorb technologies bred in alien social environments create social chaos and rejection.

¶108 Research has demonstrated difficulties in transferring mass production technology from the U.S. to Europe, and lean production technology from Japan to the U.S. and Europe. The process involved more than just assimilation of foreign technology. It required a complete reengineering and an entirely new solution, such as mass customization in the U.S. that built more on mass production rather than on lean production in Japan.

¶109 Secondly, absorptive capacity hypothesis predicts that without a vibrant private sector with strong and related broad technological base it may not be even feasible for the private sector to absorb and assimilate foreign technology. And if the government coerces this through subsidies, then the absorption initiatives would occur but at a very high cost, as we see in Japan also.

¶110 In South Korea where the government has taken a more iron-clad role by supporting large and diversified chaebols the per capita incomes and economic resilience has been lower than in Taiwan where the smaller firms have been the drivers of innovations.

¶111 Third, property rights hypothesis predicts that multinational corporations have constrained incentives to nurture foreign capacity building because their property rights in foreign nations, particularly those who are keen to learn from their know-how and develop local base, are incomplete. MNCs have very -- have been very concerned about intellectual property rights piracy in the emerging markets and often withhold transfer of their key technologies.

¶112 So what might be a qualitative model for the emerging markets? Let's look at the story of India and the role different technological drivers have played over the course of the history.

¶113 In Phase 1, until 1950, the technological drivers of India's economy were primarily subject to family business controls. Archeological studies suggest that around 2000 BC Indian craft families used copper and bronze casting to make fine vessels, tools and weapons. They also brought raw cotton from the villages and spun, wove and dyed that in the cities. Indian craft families focused on occupational subgroups and transferred knowledge across generations through family-based learning. The products were

exported from Mesopotamia to Bahrain until 1800 BC when adoption of copper and bronze technology in Mesopotamia substituted Indian trade.

¶114 Later in the first millennium AD Buddhist families in India diffused associated know-how, such as temple art and national governance system, to Southeast Asian nations. Then, in the second millennium AD, crafts families fused Islam associated technologies, such as architecture, designs, music and cuisine, with their own know-how of India. More recently, over 1850 to 1950, British transferred railroad, telecom and postal technologies to colonial India and used them to divert raw materials away from the family businesses and flood markets with competing goods.

¶115 So what are the implications? Phase 1 suggests that family business controls may be effective for the application, inter-generational, and international transfer of technology, as we saw with Mesopotamia. They may also be effective for the assimilation of international technology in local cultural endowments, as family businesses are strong repositories of local cultural endowments, as we saw with transferred knowledge. However, they may be vulnerable to subordination by hostile institutions because of their close identity with their local communities, as we saw with the British.

¶116 In Phase 2, between 1951 and 1980, India as a constitutional republic aimed to develop public institutions for driving technological growth. The Nehru government adopted a scientific resolution with a policy framework setting a path of cooperation with both Eastern and Western blocs through non-alignment movement. A blueprint was laid for creating universities, policy institutions and publicly funded R&D labs. The role of promoting basic science and basic industries for improving an average citizen's conditions of living was recognized.

¶117 The first five-year plan emphasized reconstruction of British era railroad, telecom and postal infrastructure and extended to the rural area with an additional emphasis on irrigation. The second plan put massive public sector funds in the basic and heavy sector. The private sector investment was put under licensing controls and were supported through concession finance. Several domains were reserved for the small sector. In the third plan efforts were made to mobilize foreign aid and technology for basic industries, agriculture and technical education.

¶118 So let's look at some of the dynamics here. Initially the West refused to transfer technology for basic industries starting with steel. The Soviet bloc chipped in in that dynamic by helping construct a steel plant in India in 1955 and licensed aircraft, tank and other military technologies to India, and then expanded assistance in oil, machinery, power generation equipment and tractor industries. The Western bloc, of course concerned, countered with its own technology and financing for capital goods to India.

¶119 However, the U.S. support for China and Pakistan in 1970 alienated India and encouraged her to focus on developing her own basic and military technology. A network of 40 R&D labs were created, along with technology and engineering colleges. These efforts yielded mixed results. The nation became 90 percent self-sufficient in capital goods by late '70s but there were substantial consumer goods supply constraints, along with economic stagnation, inflation, educated unemployment, and growing poverty, despite the garibi hatao, the poverty eradication campaign of Indira Gandhi.

¶120 Also, the cost of capital goods was very high in India. For instance, the computers that were developed in India had limited applications and were costlier than the better foreign options.

¶121 Also, at the grass roots level the activists sought swadeshi, or indigenous farm technology. India developed new varieties of crops, going beyond the U.S. technology transfer that led the initial green revolution in Punjab, using the U.S. model for extension networks for universities and heavy state support for farm R&D. India became self-sufficient in food by late 1970s and resilient to droughts, compared to mid 1960s when famines and food shortages had killed several thousands.

¶122 So what are the implications here? Phase 2 suggests that the public sector controls are often oriented toward basic infrastructure and capital goods industries. They may take an expedient approach to fulfill social goals, such as for regional or national development and may end up having disproportionate benefits for the creamy layer, like technical growth for instance, with survival public welfare for the bottom of the pyramid with increasing poverty deficit in India. They are vulnerable to geo-political issues. They also have high emotional visibility and may be able to engage grassroots activism and local cultural endowments for achieving success, as happened in green revolution extensions in India.

¶123 So let's look at Phase 3. Between 1981 and 1995 the Rajiv Gandhi and later the Narasimha Rao governments introduced liberal policies for electronics, including computers, telecom and software, focused on the involvement of professionals in the development process. Technology trade was liberalized to allow the import of key components and technology, particularly for professional body shopping and software exports. Government decided to computerize public sector railroads and banks and assigned the work to private professionals to help enhance their capabilities, resources and confidence. The government also engaged non-resident Indians, so foreign-based Indians, professionals, to help develop an acclimatized telecom switch using various component technologies licensed from overseas, and then involved the private sector to expand telecom equipment capacity in India. It took the help of UNDP to connect 750 academic and research institutions through internet networks.

¶124 A focus was put on Bangalore as the IT regional cluster. Bangalore had several large public sector electronic, telecom and aeronautic firms, several government R&D labs, and several technical colleges. The region's families had begun sending their families to the U.S. for higher studies and were encouraging the daughters to join the workforce. The government selected select MNCs,¹ especially from the U.S., to establish software development links with professionally run firms in India. A direct satellite link was established between the USA and Bangalore for Texas Instruments, which encouraged firms such as Wipro to move from Mumbai to Bangalore. A body shopping link was facilitated between General Electric and Infosys. This had a positive demonstration effect on many U.S. multinational corporations who set up software development centers in Bangalore.

¶125 At the same time the smaller firms began importing and assembling Korean and Taiwanese computer kits. The larger firm, diversifying from other sectors such as electronic calculators or looking at the emerging opportunity, could not compete with

¹ The term "MNC" refers to a "multi-national corporation."

these smaller firms at cost. So, many began competing on designs using local engineering pool. Others moved to software by hiring away from the firms who had participated in the public sector computerization process and began focusing on the MNC clients. Due to the poor telecom infrastructure, the productivity of offshore work within India was about half of the onsite work at the client site in the U.S. The firms began doing low-end work onsite in U.S., but as their alliances strengthened they shifted higher end work to India, very interesting, under close mentorship and supervision of the U.S. companies. In particular, the offshore work focused on maintenance of various legacy systems by leveraging on the skills of India in working with various foreign platforms, like UNIX and other kinds of things. As of 1995 two-thirds of India's software exports were onsite work in U.S., and the rest was offshore work within India. The onsite work was largely body shopping and low-skill programming and short-term client relations. The offsite work in India was high value added, focused on systems analysis and design skills, and based on long-term client relationships.

¶126 Phase 2 suggests that the rise of professional controls may need some nascent incubation and support in developing capabilities, resources and confidence. The public sector may be able to energize a regional diamond. The professional controls can also be very effective in making a business case to multinationals to invest in higher value-added area in the emerging markets.

¶127 Okay. So let's look at the -- actually, Phase 4. Okay, Phase 4. In between 1996 and 2005 the government liberalized trade and investment. Many MNCs sought to compete with the local family businesses and professional firms using older technology and pushed through consumer credit. Japanese firms such as Sony that sought to use older technology quickly failed in India. Many American firms such as GE that sought to hire employees at higher compensation rates found it difficult to get and retain sufficient numbers of employees to achieve their business goals and decided to divest their BPO operations to Indian firms. Korean firms who adapted Indian methods and offered their latest technology products were, on the other hand, hugely successful. Indian firms also became successful multinational corporations using their local culture endowments. For example, Mahindra & Mahindra they developed a hobby farmer market using a focus on low-end tractors with smaller farms in India.

¶128 Now many MNCs, such as Walmart, are recognizing the benefits of collaborating with Indian firms to penetrate the rural market. Moreover, MNCs have instituted diversity heads and policies in India with aggressive goals. MNC clients have induced greater women in top management in India; the percentage increase from 1 percent to 15 percent in the last three years. All of this has been supported with a government decision to reserve one-third posts in the village panchayat, the smallest democratic unit in India.

¶129 So, to prepare the nation to compete with the multinational corporations they decided to withdraw the public sector from non-core areas, supported hundreds of R&D projects, and the IT increased from 1.7 percent of GDP to 3.7 percent in 2000.

¶130 The private sector in India is showing capacity to produce quality goods and services at ridiculously low prices: \$20 air fares, two-cents-a-minute cell phone services. Hepatitis B, after its introduction in late '80s, was priced by U.S. drug companies at \$50 per day of dose. Shantha Biotechnics, an upstart by a computer scientist with no pharma background, developed the drug on its own with less than \$1 million investments and sold it for \$5 a day.

- ¶131 Phase 4 suggests that substantial heterogeneity in the incentives of multinationals for investing in what it takes to successfully transfer their technologies. It looks like the learning of local methods and techniques has been critical for the MNC successful tech transfer. The result is not one-way tech trading from MNC to India but a two-way tech exchange. For instance, India-born and educated Indra Nooyi, chair of PepsiCo and identified as the most powerful woman leader in the world right now, authored PepsiCo's 21st Century transformation by diversifying Pepsi from cola beverages to non-cola beverages, and that's consistent with the traditional cultural norm in India that rejects cola beverages as unhealthy.
- ¶132 Okay. So, what's the emerging trend? First, there is a growing priority on ensuring tech diffusion to the bottom of the pyramid in India. The urban areas that benefited most from the government's policies over the late '90s and 2000 had low voter turnout and the government had to kind of change from the Vajpayee government to the Manmohan government. So there is a focus on introducing IT to the social sectors such as health and education and public services.
- ¶133 Second, there is a growing emphasis on ensuring ethical use of traditional knowledge and eco development. India is playing, actually, a very important role, a huge role, in extending TRIPS and WTO to community knowledge. And it is supporting that through cooperatives and family based businesses and their links with professional firms and MNCs.
- ¶134 So these trends imply that public controls in India have shifted their role from being the nation's primary financier and generator of knowledge to a secondary supporter of innovations by well-managed private sector companies, and now to a tertiary governance and organization of distributed knowledge in diverse communities.
- ¶135 So let's sum up what we have seen.
- ¶136 Though public and MNC controls have been important technological drivers in India, local family and professional businesses have played a critical local. India is thus now able to compete globally not only in the low-end domains on cost and simplicity, but also in the high-end domains on design and complexity. The linear model of tech upgrading, based purely on assimilation and upgrading of foreign technology, does not account for India's design-intensive competence. There is a need to add the local cultural endowment factor to explain India's story.
- ¶137 Very quickly. So this is the research that I have done on the GLOBE project on culture in society. This is the code on society practices based on data from 17,000 middle level managers and 1,000 companies on a scale of 1 to 7. This actually received a Best Research Award from SIOP, the Society For Industrial and Organizational Psychology, in 2005, actually.
- ¶138 So let's use the GLOBE study. We look here at four of the nine cultural dimensions in GLOBE. Performance orientation is acknowledging and rewarding actual contributions and performance. Uncertainty avoidance is ensuring stability and using existing technologies as opposed to emphasizing change and developing new technologies. Humane orientation is being warm, generous and kind. Gender egalitarianism is gender role overlap between men and women, and women empowerment.
- ¶139 India stands out, as you can see, for its high humane orientation and low gender egalitarianism. India's grassroots concerns and its focus on traditional know-how are

reflective of humane orientation. Moderate uncertainty avoidance may allow India to build upon this knowledge while learning from the new foreign technology. India has benefited substantially through interactions with more gender egalitarian societies. Moderate performance orientation may allow India to drive technological growth while at the same time being culturally sensitive to issues such as family life.

¶140 Of course, the cultures of other nations support their own approaches to technology and we need to investigate that to fully understand those stories.

¶141 Thank you.

¶142 (Applause.)

¶143 MS. YUEH: Good. Thank you very much to my fellow panelists for sticking to time. I thought that was tremendous.

¶144 So we have about 25 minutes, I think, for discussion and Q&A. The floor is open.

¶145 Surely there are some plants ready to ask questions.

¶146 Yes. You're definitely a plant.

¶147 MR. GREENFIELD: I'm curious why Brazil, the government, has taken on an anti-IP stance and if you think that is affecting foreign investment. I feel like there was some worry in the U.S. back with India and China a decade ago about investing without strong IP regimes.

¶148 MR. OROZCO: That's a great question. I think the IP question is one that takes root a lot in an ethical dimension as well, and that is one that is not discussed oftentimes as India or the literature. I think Vipin is doing a great job by showing how really technology and culture are not really an easy mapping scenario where you can just say if you want to develop you have to have this approach to technology, you have to import these norms, and the result will be the formula of success.

¶149 I think really what happens is you're dealing with different strengths in each economy. I think Brazil has this very long tradition of state involvement in the economy, as most Latin American countries do in general. And I think the norm is that the state is a paternalistic type of force in the economy, and really the move from paternalism to private endowments is one that is challenging right now for all these economies.

¶150 Brazil I think is one where for cultural reasons they just have this bias against private ownership at this stage because it is viewed as an exploitation type of mechanism where the foreign companies own knowledge and they manage it for their own wealth but the local economy really doesn't benefit very much at this stage. So I think that is one of the issues.

¶151 But it is also a political issue as well. I mean, governments manage these discussions to promote their own agendas as well, and we see that everywhere, actually.

¶152 MS. RAGAVAN: Thank you.

¶153 Only ten years or so back we talked a lot of these minimum standards for growth until China and Russia disproved it, so I always wonder maybe IP is another fetish of the West. After all, all of these countries have become important not by embracing IP first but by actually being anti-IP first, and that goes for all BRIC economies. So I wonder if IP is another Western fetish that will pass with time.

¶154 And I just want to highlight something else. We talked about BRICs moving. David, you talked about BRICs moving to the next level in the pyramid, 3, 4 and 5, and I don't see BRICs doing that unless they balance income inequality, trade, you know, versus increased foreign direct investments. So in order to do that they really have to

violate TRIPS, they can't do that by conforming to TRIPS. So I wonder if on some level that will come back to IP being yet another Western fetish.

¶155 MR. OROZCO: I think you're right. I think these economies are really strategically focused on promoting industries that distribute the wealth I think as widely as possible. Manufacturing is one, service oriented. Industries that create eco systems of complementary innovations, that promote jobs. So I think that is a high priority.

¶156 I think intellectual property at this point is kind of like not at the top of the economies' agendas per se, they're trying to manage what you just said. I think that's my perspective on this issue. I think intellectual property management is going to become critical and is going to move up to that value position, which they obviously want it, it is in their interest to, but at this stage it is going to be one of management of what you just said.

¶157 And the assumptions behind the BRICs paper in Goldman Sachs, and any other paper that focuses on global economies, focuses on all these fundamental issues of rule of law, of diffusion of income, you know, equality and infrastructure.

¶158 You're right, it is right to focus on the system, because you cannot just focus on intellectual property, that's not the right view. That's oftentimes the view that's presented in the media and oftentimes the discussion is IP, IP, IP, but really what we're seeing is bigger questions.

¶159 MR. GUPTA: I think the issue is cultural perspective in the emerging markets. IP is really community based, so it is community endowment, and all the antecedent knowledge of the community. Even if you look at planning, like when you talk about cost-oriented occupation subgroups, that's again the marketing and branding is situated in the community. So there is an important challenge when the basic platform of knowledge in an emerging market is community based. How do you kind of differentiate or separate out and tease out the affects of the private property from the community property and can you give that community property ownership to particular companies.

¶160 So I think India is playing kind of a very important role in the world, especially in the Commonwealth countries, bringing that perspective and educating the WTO around those issues.

¶161 MS. YUEH: I think -- just sort of a quick comment on the TRIPS. I think a lot of the objection to TRIPS at the time and why it is being delayed is that it is felt that developing countries, especially not too much for industrial technology but pharmaceuticals, there is a real argument for allowing it to continue to do things like licensing.

¶162 So I think we often hear that developing countries, especially China, disregard IPRs, and I do think that there is potentially a conflict in the way that they view intellectual property rights. On the one hand they were very much -- and most of these foreign direct investors are geared at getting technologies which can help them grow and be more productive cheaply, but on the other hand there is this feeling you have to have a better institution or set up to gain better technologies. I think perhaps this calculus is very difficult to weigh and there will come a stage where it will be in the interest of developing countries' firms to have protection of their innovations and intellectual property, but it feels evolutionary and that is why they're under a lot of critique.

¶163 I think the big change with TRIPS highlights the distance between what some of the developing countries' objectives are and perhaps what is used as a long-term better

system of having a good rules-based system where everyone can be assured that the investment that they put in will not be misappropriated.

¶164 MR. OROZCO: Just to add on to that. I think also it is important to look at the history again and the philosophical foundations of intellectual property. It really originated in what is the Enlightenment, this Western notion of the individual's progress through technical means, it is a big, big part of that discussion. And a lot of these cultures really view knowledge in a different way, and their histories reflect that. So they're coming at a crossroads where, I think, they're facing this global competition, global challenge that they want to compete in and they are very successful in doing some things, but at the same time there is this underlying policy issue of how do we manage information within society and of that nature.

¶165 Now, another interesting thing with intellectual property is that really it's not -- intellectual property is not the end, really; it is really value created. That is kind of the research that I focus on more, is how do you use intellectual property to create value as opposed just to build a fence around something, and then hope that eventually it leads to stuff. And ultimately, I think, the countries can differentiate themselves to be very intelligent with management of intellectual property if that becomes a critical focus of the discussion. It's not how to create a barrier but how to actually disseminate the value through innovate ways. They have an opportunity to really approach intellectual property from these perspectives.

¶166 UNIDENTIFIED SPEAKER: The next natural question is which country out of all the countries you mentioned is closest to buying into this IP regime or is coming up to speed in that respect?

¶167 MR. GUPTA: I think the issue from many of these countries' perspective, again, is what's the framework, the policy framework within which intellectual properties are being managed, unless there is a recognition of what intellectual property does to the economy.

¶168 I give you a very simple example. Suppose if -- you always talk about technology needs to be adapted to a local country. If you adapt technology to local countries then there is an intellectual property competence that the multinationals are using from local countries, and we assign that learning as intellectual property of the multinational and we do not assign that learning to be intellectual property of the local countries.

¶169 So there is a fundamental disconnect because really from that angle foreign multinationals are never going to be able to make any money in emerging markets because by the very management logic you have to adapt, you have to make some adaptations. Then the issue is how do you value the value of those adaptations versus value of technology which is already invested and used in the U.S. One could say that if you already are using that technology in the U.S. then it should be valued less than the new learning that you're getting. Or you can say, no, my value is here.

¶170 So there is this whole issue regarding philosophy of value which needs to get into this. There is so much politics, which is always going to play a role, that we'll never come to a solution, and really the issue is going to be whether we recognize the mutual technological flows which allow kind of the Western economies to grow with the technology rather than to see it as diffusion of their technology to overseas countries.

¶171 MR. OROZCO: I think -- you know, honestly I think they're pretty similar stages, actually. It is really interesting to see how they're each using their own strategy but at the same time they're carefully managing the process.

¶172 I think based on numbers, based on absolute numbers just because of the size, I think China is probably at a little bit slightly more sophisticated state of IPR, just because of the long history of foreign direct investment, actually, and basically their policies and their harmonization. But at the same time the enforcement issue is critical, so right now everybody is focused on how there is this very bad enforcement in China, how you have to have special relationships, the issue of knowing someone who can get things done. But if you look at raw numbers of patent filings and things of that nature, in the patent world at least China has the largest stake in what is technical knowledge proper.

¶173 MS. YUEH: Other questions?

¶174 UNIDENTIFIED SPEAKER: You mentioned property rights. At this moment the BRICs economies are particularly vulnerable, so my question is to anyone: What policies would those developed countries be able to take not only to protect the property rights of companies but also to compete with the companies in BRICs economies where the intellectual property rights are not first priority or top rights? So in order to do so, the TRIPS system, is it enough or is there something for developed countries to compete with companies in BRICs economies?

¶175 MR. GUPTA: Essentially from the research which I have done, again, the important issue is that from a multinational perspective what do you count as your IPR, and generally it seems like most IP is associated with technical knowledge. But there is a fuller organizational knowledge also, that MNCs own the marketing expertise and product optimization techniques and all that. And what we have seen is that while the companies are trying to protect their technical knowledge, they give the rest of the knowledge free. Like subcontracting to India. All the other knowledge would be given free and they will try to protect only the technical knowledge.

¶176 So one of the important issues is to recognize the value of the other things and to start kind of trying to say, okay, what can we do with this? That's where the IPR regime doesn't kind of apply and therefore the companies don't understand it. I think by focusing on that we're getting a better mutual understanding between kind of how to govern property rights on which you cannot have assigned intellectual property rights in the current sense, because that's the problem of emerging markets, that's the problem of organizational knowledge.

¶177 MR. OROZCO: I think that is well put. There are many different types of knowledge that you have to protect the capabilities. You can't rely just essentially on IP. You have to rely on other tacit knowledge which isn't exploiting things that really other people cannot observe and that are sources of competitive advantage and really protecting those rights that probably expand your market share in those markets initially, build up brand equity if possible. Playing by the country's own rules. If you need relationships in China, establish a relationship and try to get your IP enforced in your economy.

¶178 So, yeah, relying on different forms of IP, tacit knowledge, which is invisible, and playing by the rules of the local economies. Probably a multi-pronged strategy that companies can take.

¶179 MS. YUEH: It reminds me of when I used to be a lawyer getting asked that by clients. I think my feeling is it is going to keep lawyers employed for quite a long time,

because the vehicle for foreign direct investment is extremely important. So I think some of the vehicles have changed with the kind of industrial technology being outsourced to these countries.

¶180 For instance, if you're very worried about R&D know-how, then the R&D investment component of one's investment could be a wholly foreign owned enterprise, but for other bits of the investment -- so the FDI could go in and apply for a hybrid, only for R&D, it could be joint ventures for, say, for instance, distribution or production where local knowledge and local connections and supply chains are very important and it is difficult to navigate in an imperfect legal system so you need to borrow the relationships of the local firms that you're interacting with. But you would segregate what would be considered to be, for instance, knowledge that one would be very loathe to have reverse engineered and use a hybrid form to try to manage the particular country.

¶181 But I think probably the sense from the presentations this morning and more generally is that every single market is very different, and so what might work in China will likely not work in India. So like I said, it will keep lawyers busy for quite a long time.

¶182 Other questions?

¶183 MR. LEV: My question is sort of related to that and to your answer to that. The subtopic of the panel is public versus private control, and I got the sense from Professor Orozco that the BRICs are kind of all in the same place of a hybrid system of public and private control of both the economy and the intellectual property technology development.

¶184 So looking at what actually is driving value, and it might be different in each economy, but do you see that countries that lack internal competition and put technology solely in the hands of state-controlled monopolies are at a long-term disadvantage versus the other BRICs that have taken more of an anti-monopolistic, competitive approach to technology and development?

¶185 MR. OROZCO: I mean, India is a great example to talk about because so much of the research and development in India right now is state-sponsored, state-owned. I think it is really about -- you have to look at it, I think, from a temporal aspect; you have to find out what eventually is going to come out of that. In China we saw that a lot of the human capital moved into value producing enterprises that eventually are successful and probably very evolved, so there has been quite a talk about that as well.

¶186 MR. GUPTA: Exactly. You have to take a temporal perspective in that if that remains within the state-owned enterprises then really it doesn't benefit the local economy also and it's not going to play a very important role in the international markets, especially for the WTO. Really restricting the ability of the government to fund and subsidize public-held R&D initiatives.

¶187 MS. YUEH: It does raise an interesting question because most IPR systems try to differentiate between what should be publicly funded R&D that provides general social benefits. So, for instance, subsidizing research facilities in universities. So there is a level at which public control is absolutely necessary because we don't want to have artificial monopoly pricing of what should be basic technologies. This is a very standard, narrow time model.

¶188 But what's difficult to differentiate even today is the overlap between basic technologies and what would be considered to be value creating industrial marketable

technologies, and those may raise a very difficult question as to how much of it should be, say, favorable IPR systems, which don't have to be just laws, subsidies, tax breaks, there are a lot of ways of fostering innovation, and how much of that should come from private sources.

¶189 But in general I think you're right in thinking about whether or not state-controlled monopolies do matter versus, say, having a greater degree of competition. And I think the theory is mixed on this and the evidence is mixed on this because there is the Shamptering (phonetic) versus Arrow view that monopolies are more innovative because they have money versus small firms are more innovative because they're hungry. It is an open empirical question.

¶190 Since you're the editor-in-chief of this issue, you're allowed to ask a second question.

¶191 MR. LEV: To get a sort of -- how much do you think of what you just -- the issue you just addressed of the IPR and TRIPS are differentiated between public and private issues can be broken down through adequate technology transfer regimes, what you just said, taxes, licensing regimes, but not specifically associated with the IPR, the technology focus of IPRs?

¶192 MS. YUEH: I think that on the technology transfer issue TRIPS provides a framework which is very broad and at an overview level. Simply that patents are to be respected for 20 years, for instance. Now, that doesn't preclude, say for instance, for a developed country's government, say, transferring and giving away green technology, agricultural technology. So it says the IPR is there, but it has always been the case the IPR holder can waive the right to receive royalties for its use.

¶193 Now, the difficulty again with TRIPS is that the carveouts understand that things like pharmaceuticals are not the same as industrial technologies which can be geared at profit. Those are, for instance, things like generic drugs for HIV, for basic diseases, and those ought to be transferred, ought to be carved from this kind of TRIPS regime. But it is, again, highly controversial and a subject of debate as to how much of the pharma are willing to allow generic versions of their drugs to go to emerging countries, which then, of course, have the potential of escaping back across borders. So this is not an easy issue at all, even for things like drugs.

¶194 But I think that for the most part what it -- it doesn't preclude other governments from giving away useful, basic technologies, but all the disputes do come on the much harder questions, which are what is industrial technology and how do we gain the best value for the cost of innovation we've put into it in our country which you're now going to enjoy a benefit from. So that is -- there is no easy calculus on that. But that's why it is interesting to think about and have a conference to talk about.

¶195 I think I probably have time to take one more final question. You're allowed to ask a second one.

¶196 MR. WORD: So I understand there is regulation or law in India that kind of keeps outside firms outside of India and doesn't allow particularly U.S. based firms to open up shop. Do you think that has an affect, at least a negative affect on India's ability to buy into these intellectual property regimes and file more international patents? What are your thoughts on that?

¶197 MR. GUPTA: Well, first of all, in India there have been significant liberalizations and multinationals are now allowed to make a significant investment. Of course, there is

also a strong visibility. Walmart was trying to invest in India and there was a huge backlash, and therefore they decided that they were not going to back innovations. But what has happened is attractions with the foreign clients. Indian companies have become hugely sensitive to the significance of creating IPRs. So many of them, the leading companies, they're actually kind of taking a lead in kind of even using their process know-how and converting that into product and knowledge which can be sort of used in various same processes, applied to different sectors and different clients and different products. So the differentiation between process knowledge and product knowledge is big there.

¶198 So that's an evolution in thinking in India which is evolving only recently. And so definitely multinationals have played an important role in creating very vibrant private culture around technological issues.

¶199 MS. YUEH: Any final questions?

¶200 Otherwise, I think we ought to wrap up. And that just leaves me the privilege of thanking my fellow panelists, who have been excellent. Thank you all.

¶201 (Applause.)

¶202 MR. LEV: And we have one gift for the panelists. And I thought it might be interesting to note that the gift that we chose is also incorporating the ideas of the conference. It is a specialty tea that's actually owned by -- developed by a Kellogg alum, so a Northwestern connection, but the specialty tea is grown on his family's plantation in northern India. It is a whole leaf tea, it is organic, and it is green technology. Not only that, it won the most innovative product in Illinois last year because of its very innovative method of packaging and distributing tea. So I hope you'll enjoy that.

¶203 (Applause.)

¶204 MR. LEV: Lunch will be in the Atrium. Just follow the students, they can show you the way.

¶205 (The panel discussion was concluded.)