RELAZIONE INTRODUTTIVA DELLA PROFESSORESSA WESTNEY

"Thank you very much. I have to apologize to all of you for not being able to speak any Italian at all and inflicting therefore my English on you, although there is translation available for those of you who would like to use it.

(Let me move to the portable mike)

As you probably know, Business School professors cannot talk without overheads and I think it is partly because we have trained our students to disconnect their brains from their ears. Now they only understand what they can see, not what they hear. But to start, we have now emerging two potentially competing models of the multinational firm. One has been proposed by Michael Porter in particular, which is the *home-based model*. It suggests that a firm can have only one true home-base for each business or segment, for two reasons. One is political, the ability of offshore subsidiaries to influence the strategy of the parent, and the other is technological: the ability to leverage technology development abroad throughout the corporation. Technology also plays a key role in the alternative model, the *integrated network model*. This is from an article by Perrino & Tipping, but based on a study by Bain, the consultants. But it would be echoed by many C.E.O.s, in technology-intensive firms today. They propose that the global network model is the wave of the future and what this model consists of is "technology-core"

groups, in each major market - the U.S., Japan and Europe - managed - and here is the key - in a coordinated fashion, for maximum impact.

Now, I would like to take a few minutes just to review very quickly the factors behind the technological globalization that is pushing the network model of the firm. And we can see some ... what I've classified as market factors, which I think for many firms are the keys. This involves, first and perhaps most important, the growing geographic dispersion of lead users, or key customers. As you know Eric Von Hippel at M.I.T. has been a leader in pushing the idea that a close technical link with your lead users is critical in the development of new technologies. Increasingly, we are finding that lead users are not in the firm's own home country, they are abroad. And in order to interact intensely with them, you need people who are technologically in the state of the art but who can communicate with those lead users in their own language and with an understanding of their own R&D systems.

A second market factor, which is the classic market factor, is the need to localize products for local tastes. It is often difficult to get your home country engineers, particularly if you are an American company, to pay attention to the needs of offshore lead users.

And finally, access to local markets. Increasingly, having a technological development capability is an essential

condition of being able to sell in a market, and this is particularly important in Japan, where the users of technology are used to dense and ongoing interaction with their suppliers and they don't want those interactions to have to be extended across the Pacific or across the continent.

Another group of factors are the science and technology factors. One is what the dean of the Sloan School, Lester Thorough, calls *growing technology parity*. That means the growing equivalents of technological capabilities, in the highly industrialized societies. And the second point, which looks at first to be contradictory to the first, is the *complementarity of national strength*, in technology. But what that means is that even on ... if two countries are levelled on the gross measures of technological capacity - patents, researchers, expenditures on R&D - the areas, the particular areas in which they excell may be different and complementary. A current example is that in many areas of electronics Japan is at the cutting edge of R&D, in chemicals Japanese firms lag behind European and American firms. So that in the growing area of electronic chemicals you need to be able to put together the expertise of Japan and Europe, or Japan and the United States.

These shortages of science and technology personnel has perhaps been most important for small countries

multinationals and, as a Canadian, I've seen this in my home-base, Orjan Solvell has seen it in Sweden. To develop a global technology capacity you need more engineers than you can hire in your own country, you have to go abroad, and I suspect that many Italian firms are facing this as well.

I'm sorry to be running through all this, you probably already know it, but it just sets a background for the models.

The third factor is a set of competitive factors. Parallel to the dispersion of lead users in the market factors is the dispersion of key competitors, and, as many firms have found, in order to keep abreast of what your competitors are doing in technology you often need to have technological capability in their backyard. An interesting example of course is Eastman Kodak, which discovered that it could not keep abreast of the technologies of its key competitors either in its core business of photographic materials, where its competitor is Fuji, or in the newly emerging areas of electronic imaging, where the competitors are Canon, Ricoh, Toshiba, without having a technology presence in Japan, and so in 1989 it established its R&D lab in Tokyo - offshore.

A second factor which is most important for the Japanese firms is image building. To have a technology presence in a country in order to generate the image of being a good citizen and of being completely committed to that market in

order to establish a competitive presence there.

And finally, access to state-of-the-art components - a key competitive factor. If your global competitors are able to work closely with components suppliers, technologically, and you are not, they will have a technological edge. And this is one of the factors in the large number of American firms now setting up R&D centers in Japan.

And finally, just very quickly, to list some of the factors that involve governments. Clearly one factor is participation in standard setting. The use of technical standards as a non-tariff barrier is one that is difficult to fight. And there are two ways to fight it. One is direct political confrontations. If you are an American firm, you go to Congress. This can have some problems for your image and so an alternative is to create a technological presence that enables you to participate in the standard-setting process. And let me again use the example of Eastman Kodak. As a result of its R&D in Tokyo, Kodak now participates in 8 Japanes government standard-setting committees, that it sees as crucial. Access to government-provided research funding, is another variable, and access to public sector customers, both of which often demand a technology development presence. The result is that we are seeing still an ideal-type, but a new model of the multinational, that has the following characteristics:

Dispersion - geographic dispersion. By definition a characteristic of the multinational, but the dispersion is shaped by the need to have a presence - and a significant presence - in each major market, each major technology system and the home base of each major competitor. And because, as the Perrino & Tipping quote said, you need to coordinate across this dispersion, if you are going to benefit from it, you need growing interdependence, and that means increasingly dense linkages or, in sociological jargon, tight coupling, among those sub-units. It means developing systems for cross-unit learning, to be able to learn not only from your own experience but from the experience of others in your own system, and the ultimate, in jargon, structural flexibility we all know it is important, we still don't know quite what it is, but it's on every list, so I put it on mine.

What this means is that firms are challenged to develop two key technological capabilities, and I thought - when I rethought some of this last night - that I probably mis-labelled this first category, but you need to be able to leverage your own country capabilities throughout the system. Technology transfer. Taking technology developed in one point and using it elsewhere, and that's the classic model of international technology flows - technology transfer. Gaining access to technology abroad often means co-development, joint development of new technologies, and this is the new model.

So, the older model, which is still important, is technology transfer, the new model is joint development. Both involve interaction and learning, and we are increasingly aware of how much interaction is necessary even on technology transfer, as you adapt technologies developed in one organizational setting to a different organizational setting, and to do that requires the cooperation of the people who are going to be using the technology on the ground.

Now, in order to illustrate this I thought that I would take a few minutes to run very quickly through two cases, that my students at M.I.T. have been following. One is the classic model of technology transfer, the other is a case of joint technology development.

The first involves the steel industry, and I'd be interested to have the comments from ILVA on this, although several people in ILVA have already seen a thesis on which this is based.

NKK formed what it calls a strategic alliance, but it involved equity participation, with National Steel, in the U.S. National Steel after well over a decade of very difficult financial times in the steel industry, knew that it had underinvested in technology and it needed new technology that it did not have itself. The Japanese - again looking back to those factors and technology dispersion - the Japanese steel companies were eager to have an American base

in order to interact with the growing number of Japanese firms, particularly in the auto industry, that were setting up plants in the United States. So, it seemed a marriage made in heaven: NKK had the technology and the strategic need, the National Steel company had the need for the technology. My student who did this research is a Japanese who works for NKK, so in this phase of the research he was only able to gain access to the NKK side of the story, and this fall I will be going back to National Steel to try and get the National Steel side of the story. So, I am telling you one half of the fall story, here. But, from the Japanese point of view, the linkage with the National Steel has not been a success, yet, and these are the factors that the engineers involved in the technology transfer on the Japanese side identified as some of the key barriers in the transfer.

One involved the evaluation and promotion criteria for the engineers from the Japanese side. In Japan, engineers are evaluated over very long time horizons: five to ten years - and they are evaluated on their accumulation of skills and abilities that will be important and necessary to the firm in the future. These engineers felt that working in National Steel they were not getting the experience that they would have got in a Japanese plant, where the technology was continuously being pushed and advanced, that they were expected to be working, in effect, with a second-class

facility, and learning how to transfer patents, but not learning how to improve technology. And they were not sure that what they were doing in the United States was going to be of help to them when they got back to Japan, in advancing on their career ladders. In fact, they were afraid that it would be a disadvantage, and that made them very ambivalent about their roles. Combine that with the problem of ambiguous roles. The Japanese in National Steel, for obvious political reasons, were staff, not line managers. Their official position was as consultants or advisers to line management. But in addition to that role they were also constantly being asked to provide information to NKK and even to National Steel headquarters, on the technology, on the capabilities of the factory, information that the line managers in National Steel could easily see as espionage - "These guys are agents for the bosses". That ambiguous role made it extremely difficult for them to win the trust and cooperation of American managers that they had to have if they were going to fill their role, in order to persuade the managers to adopt new technologies.

Again - I have labelled this under "Project Management" - it is probably stretching it to use that category, but one of the most difficult problems for the Japanese engineers was defining the problem, defining their mandate, defining their project. In keeping with Japanese industrial practice, these

engineers were sent out from NKK with very vague mandates. One engineer said that his boss had said: "We want you to do your best to make National Steel a more competitive company" - and it is up to the engineer to figure out how to do that. Now, in the Japanese company, as recent studies by Nonaka and Ito Tsobashi (???) have found, the middle-level managers, like those engineers, cooperates very closely with his boss to define, in an iterative way, how the grand strategy is going to be implemented in his own personal role. And you work very closely with your boss to define it, and check with him: "Is this what I am supposed to be doing? Is this going to do it? Is this what you want?" - But these Japanese were working for American managers, and American managers are used to a system in which roles and responsibilities are clearly defined and delineated: "I, as your boss, should not have to tell you, as an engineer, what your job is" and therefore even reaching a definition of the problem became difficult for them.

On the internal networks of the company, a problem on the division of labour. In the Japanese company, people who ... the engineers in production and the engineers in the technology division work very closely together and it is very difficult to draw a line between the production floor and the technology development department, which is usually attached to the factory. In the American company, the people in the

technology department are the ones who decide on the technology. They identify the best technology, they bring it into the company and it's the job of the people in the production department to make that technology work smoothly - routine operations - not to change the technology. Therefore the Japanese were not used to this American division of labour and this ties back to what Mr. Tesaka, who wrote the thesis, identifies as the core problem. He sees it at a strategic level, that shapes and influences all these others: the definition of technology.

Is technology hardware, systems, that you can purchase and install and routinize, or is it a dynamic system that is constantly being changed and upgraded and improved by the people who were using the technology? In the American system, the people using the technology routinize it. In the Japanese system, they improve it. And given that definition of what technology is as an asset, it was impossibile really to start adjusting these systems, or to have these systems start influencing the strategic direction.

A second case: a high-technology joint-venture - we are still trying to get clearance on the name of the company, so I can not give you all the lovely detail, and you will have to trust me when I tell that for the two companies involved - again, a Japanese joint-venture company and its American parent - again, on paper, the match looked perfect. Each had

segments of the technology that would have to be used to produce the new product, and the new product - it was agreed by both companies - was very important, because competitors were moving into the market with this product and this company was behind. So, they agreed that they needed it as soon as possibile, and they put together a joint-development program, that involved bringing engineers from Japan to work in the R&D labs of the American parent, and some Americans went to Japan, in the technologies and they identified which company was ahead in which technologies and then which needed to be closely linked and put them in the same location. This program lasted for slightly over two years and ended without a product, and in agreement that each company would go its own way on developing this new product. And several of the reasons - again, identified by one of my Japanese students who did the interviews and so, although he interviewed the Americans, he might have got less honest reporting from them than he got from the Japanese, a reversal of our usual research mode, where is usually Americans interviewing Japanese. But he found these problems, again on the Human Resource Management side. Problems of evaluation criteria and modes of evaluation. The American engineer is used to fairly formal feed-back, in an evaluation process. The Japanese manager is not used to face-to-face evaluation procedures. So, when Japanese managers had to evaluate the Americans

working with their team, they had a terrible time and they were not even sure of the criteria they should be using. If they used Japanese criteria, which have to do with being a good team player, being someone who improves the performance of the whole team, their Americans were not very good. But if they tried using those criteria on the American engineers, the Americans got very angry. And in fact, as the Japanese tried to give them gentle indications of the kind of behavior they expected, the American engineers did not like it very much. Similarly, the Japanese engineers were not very highly evaluated by the American managers, because they tended not to talk in meetings, they tended not to be aggressive, they tended to want to talk to each other when you asked them a question, was very frustrating.

An even more problematic issue was reporting structure. In the Japanese system the main mode of reporting tended to be meetings and the fact that - as you probably know - in a Japanese laboratory all the engineers sit with their desks in the same place with the project manager or the section head sitting right in the same place. It is very easy for the boss to know exactly what every one is doing. The Japanese managers, when they came to America and every engineer had his own room, felt lost about how to keep track of what was going on. And one of the Japanese project managers had his team move their desks into one big area, Japanese fashion.

The American engineers on that team did not like that at all, they were used to their own offices. But even more important, on reporting structure, the Japanese emphasis - on meetings - and the American emphasis - on written reports - meant that the compromise that was worked out was they would do both. So, they had meetings and written reports, which doubled the amount of time necessary for reporting and took time away from research.

Finally, just a quick comment on linkage - internal networks - the linkage between the development people and the production people. Japanese engineers, as they develop a product, are used to being able to go onto the shop floor and make parts for prototypes, in the lunch hours, when the machines are not being used, or to ask the production people: "Would you make one of these for me, I want to see how it works". In the United States a person from the R&D group cannot use the machines on the shop floor without violating Union contracts. So they could not do it themeselves and they could not persuade the production people that it was important to do this: it was not in their job description: "Why should these Japanese be able to tell me that I should make this stupid part form and that is not what I am supposed to be doing. So, that linkage did not work very well.

All of this fed into the problem of timing, and there was a strategic problem in a mismatch of timing. Both the Japanese

and the American partner agreed at the outset that they needed this product as soon as possible. But "as soon as possible" turned out to mean two different things. The Japanese needed it yesterday, because they were facing direct, immediate competition in their home market from these kinds of products. The Americans needed it within two years, because in their home market they were not facing that competition yet, which meant that for the Japanese this was crucial and in their behavior in America they fulfilled all the worst stereotypes of the work-holic Japanese. They would work eighteen hours a day to get this through and the got furious at the Americans who were not crunching through this. The Americans did not feel the same strategic time pressure. As a result of all these things, the joint-development project ended in failure. Now, when I say failure, one of the things we want to go back and look at is what each of the companies have learned from this experience, because the failure of a project does not necessarily mean a failure of the program, if you learn from that how to do it better next time. It is a failure if you do the same things repeating the same mistakes. But this highlights what I will conclude with, which is the paradox of international learning. And that is that the advantage of the multinational corporation or, more broadly, the multinational network of alliances should be that you can tap diversity and difference, you can put

together different capabilities to learn how to do something better. But, as we have seen in these cases ans as we know from our experience, learning is easier across similar organizations. So, the paradox is that in order to use the diversity you are often tempted to standardize systems and eliminate the diversity you are trying to tap. Also, if try to standardize systems, you can spend too much time on your systems and lose what you are after. So this paradox of managing difference and managing and building similarity and on what dimensions is one of the key challenges when it comes to learning in the multinational.

(Let me stop there and just ... we are a little behind, may be we'd better ... should we take time for questions or just go straight to the next?)"