

# Short Panel Discussion



## Panelists

### **W. Edward Steinmueller**

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### **Richard Byrd Dasher**

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### **Eiichi Yamaguchi**

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and Competitiveness (ITEC), Doshisha University

### **Dirk Pilat**

Head, Science and Technology Policy Division,  
Directorate for Science and Technology and Industry,  
Organisation for Economic Co-operation and  
Development

### **Itaru Yasui**

Vice-Rector, United Nations University

### **Dale W. Jorgenson**

Samuel W. Morris University Professor, Department of  
Economics, Harvard University

## Moderator

### **Toshiaki Ikoma**

Chair, GIES2007 Organizing Committee  
Director-General, Center for Research and Development  
Strategy (CRDS), Japan Science and Technology Agency  
(JST)

## Summary

### **W. Edward Steinmueller:**

Session 1 is about fostering commons-based methods  
for the exchange of scientific and technical information  
within the broad concept of the global innovation  
ecosystem.

During GIES 2007, we have been focusing on science  
and technology but have had limited discussion of  
art and creative industries which provide much of the  
content justifying the information and communication  
technology infrastructure. In short, we often have a  
supplier-dominated view of the world, that suppliers  
are the innovators, with only local and limited feedback  
loops and (incorrectly) assume that technology does not  
influence science. This is an old, linear kind of model. We  
are also talking in terms of scarcity economics. If it is not  
naturally scarce, we will make it so. The view is challenged  
by the existence of an infrastructure that removes  
scarcity and creates a different logic. Apparently nothing  
is changing even with employment in manufacturing  
heading towards a 20% level. We have heard only one talk  
in which the services industry plays a central role. Finally,  
the idea that there is strong conflict between growth and  
environmental improvement persists in our discussion,

and I question if it there really is a conflict or if there is an opportunity to sidestep that process.

Obviously, the arts and creative industries are also related to the properties of information, which we have heard very little about. Information is extensible. Because it is extensible, it becomes an input that can be used freely in many different places. Therefore, we need to rethink the role of information in the economy because we have an excellent infrastructure for its distribution. What is the impact of that?

**Richard Byrd Dasher:**

Session 2 focused on the topic of human resource development, but I feel that I need to direct my comments now toward a larger but related system-level topic. This global innovation ecosystem includes different sectors, each of which has a different mission. Moreover, the participants in each sector have individual motivations and goals that will always override their desire to contribute to the whole. For example, each individual company is much more worried about its own profit margin than it is about its contribution to the total of national innovation. I think we have given insufficient consideration to the whole point of different participants of the system interacting with each other so that there is knowledge transfer. For a viable innovation system, there has to be a knowledge transfer between people who are engaged in substantive collaboration with each other. University and industry, however, can only be expected to cooperate when that is necessary in order for them to achieve efficiency in meeting their own respective goals. We need to focus in studying global innovation ecosystems on the mechanisms and channels of knowledge transfer in a very realistic way. We have to look at things such as best practices in the process of mentoring, where an industry person helps a student. We also have to look at the new challenges of globalization. This is a fact, not the result of a policy. Such challenges include the cost of maintaining operations in multiple countries. This is a huge challenge to small companies, who are

expected to contribute greatly to innovation in a national economy. We need to talk about micro- as well as macro-economic topics, such as global standards for accounting and transparency in governance. From the energy and information technology discussions, you see two things relevant to this point. First, the reason that solar cells are so well developed in Europe and Japan is because of the high cost of electricity. Business people thereby saw a greater opportunity to bring new technologies to market, so the research has gone ahead here. In fact, 70% of the output of American solar cell companies is going to Japan and Europe. In the information technology sector, we see a second business factor that impacts innovation, but here in a negative way. If you see a great technology from another country, you might want to delay adopting it until you have domestic companies that can compete in that technology. That amounts to trying to slow down globalization for national purposes, and this may have a negative impact on innovation nationally as well as worldwide. One of the things we are going to have to talk about is how to optimize the situation and balance the interests of all sectors, when everybody is trying to achieve their individual and company objectives. But we should not back ourselves into a corner with something that is actually bad for a country's economy.

**Eiichi Yamaguchi:**

The actual title of Session 3 is Has Global Alliance Feasible to Remove the Air Pollution of East Asia?

This session will have a very concrete discussion, rather than abstract. My first message is that we have to really figure out an innovation space. We used to use a two-dimensional innovation space to understand innovation, with technology innovation on one axis and business innovation of the other. We must think about a third innovation: aesthetic innovation (QOL).

My second message is that innovation is a human activity to reform society in order to enhance its value. For that purpose, everybody is only talking about technology, or knowledge embodiment for value creation. The private

sector is most likely to think only about this axis. That is how they evaluate employees. However, we should have another axis, which is knowledge creation related to science. I called this two-dimensional space the innovation diagram. The process of successful innovation can be described as a chain reaction in this space and we can classify the structure of innovation into three categories. The third category is paradigm-disruptive innovation. If you think about existing technology that describes the innovation process in the innovation diagram, the instinctive choice is to improve knowledge and better it, but we reach a deadlock. The answer is to dig into science, knowledge creation. This is what produces the paradigm disruption and breakthrough toward the goal. I call this "disruptive innovation." There are also fields of resonance.

In Session 3, we will talk about the strategy to create a global alliance to resolve air pollution problems, to enhance air resources.

**Dirk Pilat:**

Session 4 is about measurement. One of the things that is missing in our discussion so far is that some of the most important investments in innovation are currently not counted as investments. Research and development is treated as an expenditure, for example. If we treat it as an investment, we will see much more clearly how important it is as a factor in growth and innovation performance. Some other important investments in innovation are skills and organizational changes that we do not really measure though they have been of great importance to deliver the benefits of ICT. Another important reason why some countries do not benefit from innovation, is because they are not well integrated in the global innovation system. Japan is probably the least connected country in the OECD in terms of research and development and innovation. I think that benchmarking and measuring these things will provide us with a better understanding of what is important for innovation, which will also help us to think better about policies. We also need to look at public R&D. It is hard to measure the outcomes of government spending

on energy research or health research, for example. How does the spending we are making in these areas show up in improved health performance or environmental performance? For all these reasons, measurement is very important. All too often, we only consider what we measure.

**Dale W. Jorgenson:**

I think that the issue of measurement is fundamental. It enables us to focus on the impact of innovation. A lot of the discussion of measurement in innovation relates to the inputs, but fundamentally, we need to begin to think about the impact of the output. What is the output of the innovation process? When we do that, we find that we need a much broader concept than traditional research and development. If you look at recent work on measurement of investment in intangibles, it turns out the research and development, scientific research and development, is a small part of the investment that is taking place and that produces innovation. Research and development is roughly equivalent to the creation of intellectual property through what is called non-scientific research and development, which refers to music, films etc. It turns out that the intangible investments in those forms of intellectual property are comparable in importance and a very important in applications and information technology. This broader concept of intangible investment is something that has been a very important project in Japan. I am looking forward to that session.

**Itaru Yasui:**

In air pollution, we have delayed introducing regulations. The risk factor for air pollution from the compounds that have recently been regulated is very small. It depends on the mentality of people. When we discuss air pollution in East Asia, we need to discuss two kinds of things. East Asia is a region consisting of countries at different stages of development. The price of human life is therefore quite different. What can we do about that? This is very much related to a discussion of the value of human health and innovation.

**Toshiaki Ikoma:**

I just arrived back from Beijing last week and there was so much smog from strong sandstorms, dried-up rivers. This is a relatively serious problem in Beijing and other nearby countries.

**Floor:**

At least a part of the story of ICT is a human resource skill story. If you think about software, Japan was very much behind in providing the kind of software skills that are needed. In the US, the universe is a much more advanced. In Session 2, the session on human resources, we will ask about how you create a system where the initial innovation can be jumpstarted, but also a system that diffuses that innovation globally? How do you create that skills base?

**Dale W. Jorgenson:**

This is an extremely important point. The great change in the global innovation ecosystem related to information technology was the creation of the ability to enter Japanese characters through a keyboard. It has only been 20 years, maybe less, since people were experimenting with innovation systems in which people would write directly. An international consortium, this is very important, a global innovation ecosystem was created mainly at the instigation of IBM, which is very conscious of this because of its very high profile in Japan. This consortium created a system that is used today to enter Japanese characters through the keyboard. That turned out to be the critical step up at one of the great battles. In that innovation, it became possible for Japan to become thoroughly integrated with the development of data—consistently described yesterday around Microsoft. This created problems for Japanese firms using traditional technologies, but opportunities for Microsoft, Intel and IBM. It was not very long before the companies in information technology industries adapted their technology completely and took over large parts of the market using this global innovation that had been created by the international consortium.

**Floor:**

Last year we had a conference in Kyoto and one of the conclusions we reached was that we need a framework for competition and collaboration to promote a global innovation system. I would like to see Session 2 or Session 1 discuss a framework for competition and collaboration internationally.

**Toshiaki Ikoma:**

This is the idea behind the global innovation ecosystem, so perhaps each session should consider that scheme.

**Richard Byrd Dasher:**

When I hear the word "ecosystem," I think of animals eating other animals.

**Floor:**

We need to learn how to collaborate as well as how to compete. Data can be expanded; it can be used by many people at the same time without any additional cost. We need to have an economic, legal framework to support this.

**W. Edward Steinmueller:**

In collaboration, the questions of standards and how we form standards is central. When we do not have technologies that do not talk to one another through this infrastructure that we are building, we are diverted into building converters and translation devices everywhere within the system. In the Internet, we have a platform that can be broadly utilized for the exchange of information and building upon this system is an important part of the global innovation and ecosystem.

**Floor:**

When thinking about standards, processes and measurements, there is a world exemplified by Wikipedia in which they get people to do the work and do not have to do anything themselves.

**Richard Byrd Dasher:**

One question that we should answer is why we should try to do anything to promote the GIES concept. Globalization is happening, the importance of innovation is becoming increasingly obvious in all economies,

especially advanced economies. What are the real kinds of areas in which we can coordinate to make a difference? I think that one of the problems is you have so many conflicting motivations. Also, what people think is good for them turns out not to be good for them. Being able to share information, practices and successes is certainly part of what we should do. But I think we are still at the stage of outlining the scope and elements of the problem.

**Floor:**

It might be a good idea to just let people go. But we could specify the constraints and impediments. What blocks free trade or whatever. If they have a list of things that we should work on, it is much easier to tackle those. It will be easier for us to figure out in each country how to eliminate those things rather than try to build something from nothing.

**Floor:**

It is important and fundamental to give an explanation of what "global innovation ecosystem" is. There are two or three kinds of understandings. Basically, it is a kind of dynamic, organic process of innovation and is a globally linked form of interdependent system competition and collaboration combined around the globe. That is the major explanation, but also it could be a different explanation. I think it is extremely important to show what it is to the summit next year and to the world. I hope that there will be a kind of Asian wisdom to show, a harmonized definition.

**Floor:**

My observation is that in Japan the community and social scientists in charge of research is deeply divided. There are statisticians and researchers of science and technology versus the economists. There is a deep divide between these groups and social scientists. The question is how to organize the research community.

**Floor:**

I would like to get back to the point on Wikipedia. The point is that of course there are many things that are happening, but it is not that we are not doing things about it already. There are lots of policies that are driving things

in such a way that many of the new, emerging innovation by Wikipedia or open source software, the creative arts and music, is threatened by dogmatic expansion of intellectual property rights in order to create artificial scarcity. There are things that are happening anyway, and that is why it is important to bring the policy discussion to take into account new forms of innovation that might be taking place rather than just blindly going and blocking things.

**Toshiaki Ikoma:**

The presentation yesterday from the US clearly said the US would not compete on commodities, and IT is a commodity. I was surprised. Is IT a commodity or cannot you differentiate?

**Floor:**

What she meant is that information and knowledge as such is a commodity.

**Toshiaki Ikoma:**

Is information technology already a commodity or can you still differentiate?

**Richard Byrd Dasher:**

The knowledge that an engineer has is probably useless in 18 months. What companies want to hire are people who are very good at learning. In terms of developing these human skill sets, I am very happy that we have a session on human resources, because human resources are clearly the key I think.

**W. Edward Steinmueller:**

If you look at Dell, a company that I would be more enthusiastic about than Walmart, it has succeeded by adding a significant service component so that it does not become a commodity product. In that respect the contemporary economy is increasingly in services, in making commodities useful for people as well as delivering goods at the cheapest price.

**Toshiaki Ikoma:**

At the end of the day we want all of the session chairs to give us some ideas about how to develop a global innovation ecosystem. The session titles are questions. At

the end, we want to hear conclusions.