GSDM Global Leader Program for Social Design and Management

第2回GSDM国際シンポジウム

東日本大震災から4年：イノベーション、レジリエンス、安全保障の潮流と将来展望

The 2nd GSDM International Symposium:
Four Years after the Great East Japan Earthquake: Recent Trends in Innovation, Resilience, and Security and their Implications for the Future

2015 年 3 月 11 日 (水)9:30 ～ 17:50
11th Mar. 2015 9:30-17:50

東京大学本号キャンパス 伊藤国際学術研究センター 伊藤謝恩ホール
Ito Hall, Hongo Campus of the University of Tokyo

Surin Pitsuwan
(Former Secretary General of ASEAN)

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(Chairperson, Indian Council for Research on International Economic Relations(ICRIER))

Timothy Dalton
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実施報告書 Implementation Report

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開会の挨拶 Opening Remark

松本 洋一郎（ 東京大学理事・副学長）

Yoichiro Matsumoto（GSDM Program Director, Executive Vice President, the University of Tokyo)

Coordinator, Roberto Orsi: Ladies and gentlemen, distinguished guests, and professors and GSDM students, good morning and welcome to the 2nd International GSDM International Symposium. My name is Roberto Orsi. I am a project assistant professor and lecturer here at the University of Tokyo at the Graduate School of Public Policy, and obviously I work also for GSDM, and I am also a member of the Security Studies Unit of the Policy Alternatives Research Institute.

Today is March 11. Of course this day cannot pass in Japan without commemoration of the Great East Japan Earthquake and the innumerable people who perished in that great tragedy, and I'm confident that I'm not overstepping the boundaries of my mandate here if I also say that this event is dedicated to their memory, especially because today we are going to discuss numerous topics which are related to the protection of human life in many ways, such as the question of innovation of resilience of social and political and economic systems, and a more broad question of security, particularly related to human suffering.

So I therefore declare the event now officially opened, and I would like to invite Prof. Matsumoto, who is executive vice president of the University of Tokyo and program director to speak. Prof. Matsumoto, the floor is yours. Thank you.

Yoichiro Matsumoto: Good morning, everybody. I'm Yoichiro Matsumoto, serving as vice president for research. I discussed with Prof. Shiroyama and maybe this symposium is bilingual and he allows me to say something in Japanese. I'm sorry, maybe I will change to Japanese.

日本語でご挨拶させて頂きます。ここにございます社会構想マネージメントを先導するグローバルリーダー養成プログラムの国際シンポジウムを今日開催させて頂くわけでございますけれども、多くの皆様にお集まり頂きまして、また海外からも国際諮問委員の先生方、基調講演やパネルディスカッションのためにお集まり頂きましてありがとうございます。熱く御礼申し上げます。

この社会構想マネージメントを先導するグローバルリーダー養成プログラムというのは、言うには長いプログラムでございまして、我々は GSDM プログラムと呼んでおります。このプログラムというのは、産業界ですとか行政・研究等の様々な分野で言わばドライバーズシートを担えるような人材

を博士レベルから育てて行きたい、そういう志のもとに平成 25 年の秋にスタート致しました。背景として我々がいつも言っていたわけですけれども、例えばグローバルな環境の中でと、海外に行って誰かとネゴシエイトしようと思って政治家が官僚を連れていくと、向こうの官僚は皆 PHD なんです。そうすると、そこでやはり理屈負けすると言いうと変ですが、1 つのロジックをきちっと作ってネゴシエイトする、そういうトレーニングを受けた人材というのは、やはり博士を持っている人材、長い間自分の研究に注力して自分の論理を構築してきた人材だということになると思います。

今の役所のあり方というのは、どちらかというとオン・ザ・ジョブ・トレーニングで、目の前の仕事を 2 年間片付けて 2 年間でまた別の場所に行ってしまう、そういう人材の育てられ方がしているわけです。それに対して東京大学は、ある意味、新しい、そういう役所の人材と言いますか、官僚を育てたいというのが最初に私自身が思ったことで、その時、城山先生とこういう新しい構想を作ろうということでスタートさせて頂いたわけでございます。ただその時に、東京大学というのはやはりコンプリヘンシブな大学ですから、単に文系だけとか理系だけとかいうのではなくて、ここにありますように社会構想をマネージ出来る、そういう構想を作っていける人材、そういうものを作りたいと考えたわけです。

例えば、その中で国際経済学ですとか産業分析の能力を持って、国際的な貿易交渉の場で相手国のカウンターパートと、今、私、日本語で喋ってますけども、出来れば英語で丁々発止の議論を行う即戦力となるような、そういう能力を有する人材を、国際社会に送り出して行きたい。もちろん国内にも送り出すわけですけれども、国際機関にも送り出して行きたいと、そういうつもりでこのプログラムを立ち上げました。

国際舞台で活躍できる人材というのは、十分そういう場が日本にあるかというと、必ずしもそうではない。ある種、アドホックに育成していた、またはその人の育てられたというよりは勝手に育っていったという、そういう環境を得た人が活躍していたという気が致します。この GSDM プログラムでは、それをいかにシステマティックに、体系的に行っていこうかということを構想しているものです。そういったことをやろうとすると、実は学生に意識改革を求めるというよりは、教員そのものの意識改革が必要でして、大学という組織そのものの構造改革が必要だということに気が付いたわけで、そういう意味では東京大学にとっては大きなチャレンジを今やっているということだろうと思います。

こういった理念の下に、東京大学の 9 研究科、東大には沢山研究科があって、確か 30 近くあるのではないかと思うのですが、更にその下にもっと沢山の 100 以上の専攻というのがあって、今いろんなところで議論されていますが、学長のリーダーシップを発揮するにしても、それぞれの部局は部局で独立しているし、研究科は研究科で独立している。なかなかディーンもデパートメントをコントロール出来ないという状況の中で運営されているわけですけれども、彼らが集まって、やはりこういう構想の下に新しい人材を作っていきたいということで参加して頂いているというわけでございます。

個々の専門分野にとどまらない新しい知識というか、インターディシプリナリーな知識を習得させ、更に学生のうちから国際的な人的なネットワークを自ら広げていく。更に社会の問題意識に答える専門的な研究を行うと共に、それをどう繋いでいくかという観点からも研究を行っていく。そういうことで、我々は着実な成果を挙げていると自負しております。

さて、今日は東日本大震災から 4 年ということになることでございますけども、実は 4 年前の 3.11 の時に、このリーディング大学院プログラムをどうしようかという会議を文部科学省でやっておりま

して、私、そこに参加しておりました。文部科学省のビルというのは結構高い高層のビルなのですが、その一室で、丁度会議をやっている時に 3.11 の地震が起きました。実は文部科学省のビルというのは免震構造に成っていて、ビルその物はそんなに揺れなかったのですが、外の東京タワーが非常に大きく揺れているのを私自身見ておりましたし、隣に金融庁のビルがあって、その揺れの周期がちょっと違っていて、ほとんどぶつかるんじゃないかっていう、そのあと大変な思いをして東京大学に戻って来たわけでございますけども、そういう大きな震災を受けて、今も日本は社会に多くの爪痕を残しているというふうに思っております。

また、私自身、科学技術と言いますか研究担当でもございましたので、こういう震災の後、やはり科学技術がどれだけ社会の為に役立ったのか、震災を防止する為に役立ったのか、それを復興させる為に役立ったのかというところで、ある種大きな国民から不信を投げかけられたというようなことも感じておりました。そういう大きな爪痕の中で、社会と科学技術や政策との関わりを考えていくという上でも、この震災というのは大きな問題提起になったと思っております。本シンポジウムでは、この 4 年の内外の環境変化を見据えまして、我が国がこの震災をどう乗り越え、我が国らしい発展をいかに遂げていくかと、そういうことを議論して頂けるものと思っております。

安全保障、イノベーション、経済・都市計画等、国際的な専門家の方々、オピニオンリーダーである国際諮問委員の方々による基調講演を中心にして構成させて頂きました。多くの犠牲の上に得られた貴重な教訓を生かし、より良い社会を実現していくために、高度な専門性と政策立案能力をどう役立てていけるのか、議論を深められればと思っております。

引き続き、産業界や政府の方々には、本プログラムに今後ともより一層のご支援、ご協力を賜れますようお願い申し上げまして､私からの挨拶とさせていただきます。どうもありがとうございました。

Coordinator Orsi: Thank you very much, Prof. Matsumoto. Well, today's program is of course divided into at least two parts. In the morning we will have the first session dedicated to security in Asia and risk to human well-being, and then we will have two sessions in the afternoon.

GSDM 学生GSDM students

Coordinator Orsi: Now I would like to call upon the students of GSDM for their brief report about yesterday's session. Yesterday we had a meeting with our international strategic advisors and the students will report on this. The floor is yours. Thank you.

Takashi Nicholas Maeda: Good morning everyone, and thank you for coming to this event. My name is Takashi Nicholas Maeda and I'm a master's course student of the Graduate School of Engineering. On behalf of the students in the GSDM program we would like to make a brief presentation on the student session we had yesterday.

This picture was taken after the session, and you can see how much we enjoyed this session from our full smiles.

The student session was held at this Hongo Campus. The session was divided into three individual sections, and we students had a chance to have a fruitful discussion for 40 minutes with all three members of the advisory board, Dr. Dalton, Dr. Ahluwalia, and Dr. Pitsuwan. We listened to a short message speech from the members and after that we had open Q&As to have a more interactive discussion.

First, as for the discussion with Dr. Dalton, since he has deep knowledge and experience in nanotechnology and also he has managed many worldwide projects in various fields, we students asked many questions about both technology and careers. Today we want to share what we learned from the Q&As about how to build our career and how to be a global leader.

These are some of the questions we asked yesterday. How did you build your career? How can we find and get jobs to work as a global leader? What are the difficulties working in a global team? And, how can we acquire the skills to solve problems of growth fields?

Through the session we were told these important keys to understand how to be a global leader. First, we should set a goal so that we can decide which job or company to work at.

Next, networking. There are many jobs that are not open to the public and they are offered

through the human network and we cannot know in advance which person will help our career or offer jobs to us. In the GSDM program we are provided many opportunities to participate in international academic conferences and participate in the work of international organizations and international projects, so I think when we participate in that work, we have to keep in mind the importance of networking.

Next, establishing credibility through making outcomes for each project is of course indispensable to be a global leader.

And next, don't wait to be asked. Make it known you want to go global. Many Japanese are sometimes too polite or too shy or passive, but if we want to get a global job after getting in firms, we should not hesitate to be greedy. We have to ask our future boss or boss's boss to work globally. If we sit back, chances won't come to us.

And next, the T-shaped professional and career path. To be a global leader we should not only deepen our special knowledge or experience, but also widen our ability to apply knowledge across situations because to solve a social problem we need to collaborate with various kinds of experts and combine many kinds of disciplinary skills, so we should not stick to specific disciplinary knowledge.

Yesterday we had these important keys for becoming global leaders from Dr. Dalton. Thank you very much.

Nanami Kawashima: Good morning. So next I would like to say what we learned from the discussion with Dr. Surin Pitsuwan. In the two hours of discussion we were able to receive many insights, much too many to share in a couple of minutes, but questions raised by students, ranged from current issues, advice on career and leadership, and sharing personal experiences as a non-politician.

Regarding current issues, we discussed many topics, such as politics in East and Southeast Asia, challenges of institution-building in the Asian region and further economic development, and many more.

For advice on career and leadership advice, we inquired about the skills needed to become a global leader, what his motivation was to become a politician, and key attributes needed to

mediate conflict and find viable solutions.

During the discussion Dr. Surin also shared with us many of his experiences, such as serving as minister of foreign affairs during the Asian financial crisis or managing the conflict in East Timor as the chair of ASEAN Regional Forum, and mediating the conflict between Thailand and New Zealand for candidacy of the WTO director general. We were able to receive much valuable advice and insight from discussion.

And among all the things that we learned I think three messages really resonated with us as students. The first is that in order to be successful as a global leader and in the global arena, we must know the importance of interdisciplinary collaboration in tackling social problems. The students of GSDM, like myself, come from diverse backgrounds, such as public policy, information science, engineering, and economics, and we were reminded once again that our disciplines can only address one part and one aspect of the problem.

Dr. Surin emphasized that so long as we deal with issues that regard us, humans, it is a multifaceted issue that needs to be addressed with an open mind for collaboration.

The second message was that in order to successfully collaborate with people from different disciplines, we must have humility. Dr. Surin advised us that having the humility to ask for help from others and knowing that you cannot do everything from your own discipline is the beginning of a solution. Thinking that you can solve a problem only from your perspective or thinking that your methods are superior will not create any change.

And third, and lastly, Dr. Surin told us the importance of embracing multiple identities from various backgrounds. Touching upon his own rich identity as a native of Thailand from a rural area, a Muslim, a political scientist, politician, and a part of global society, Dr. Surin illustrated that having multiple identities gives you the ability to look at the broader picture to find a common interest. It is only by a shared sense of community, he told us, that we can collaborate and find solutions to issues that involve national, regional, and global interests.

So I and the students of GSDM were very inspired by the discussion with Dr. Surin, and we thank him again for sharing with us his insights and advice on how to contribute to a society in our own unique ways.

Xi Zhao: And after that we had third session with Dr. Isher and we discussed many issues on urbanization and economic development in India. For example, we discussed the challenges and the approaches India are taking. So many students are keen to know the megacity issue. Are these challenges or opportunities, and how differently India, Japan, and China are handling these problems or opportunities.

And secondly, we discussed India has the youngest populations, one of the countries with the youngest populations. On the other hand, many other cities in the world are experiencing aging societies, how it is differently affecting the development of the society, and how India encourages the entrepreneurship of its young people. Many people want to know about the urban-rural gap, is there any public participation in planning, as well as how to preserve culture in the rapid urbanization period. Some students are also asked about food security and safety, as well as security in urban areas.

We also discussed how to become a global leader and how the life of a PhD and research will bring real impact on the ground. In this student session, we had a great opportunity to learn from her personal experience. So I will share the three key messages we got.

First one is how to have a global vision and local roots. Firstly, we need to be global-comfortable, which means we have a wider vision instead of a narrow vision, and it's easy to do that, she told us. That is we need to be aware that we are sharing one planet, so we are not only the citizen of a certain city, but we are the citizen of a global society. And we need to respect diversity. Then many things will come naturally to be global-comfortable. On the other hand she emphasized that we also need to have local roots. Local roots means to be comfortable and proud of our own identity and culture. Local roots means we need to understand our local knowledge, we need to understand our local problems and challenges, and then it becomes easy to understand other challenges and problems in the world.

And secondly, we also want to know how a PhD is valued and also how to make a real impact on the ground. She emphasize that we are trained in school to get an analytical mind, and it will help us to solve future issues and problems. And secondly, humility is very important that is we need to be aware that there's no one solution to one problem. Regarding how policy oriented research can make real impact on the ground rather than just a paper on the shelf. She mentioned it's very important to talk to people, the practitioners who are working to solve the problem at the front line, this process will bring many valuable things back contributing to the policy-oriented research. And she advised that you need to disseminate the research results to the audience through extensive advocacy and capacity-building activities. Sometimes she also write article in media.

Lastly, as many students are facing a lot of choices at this moment and worrying about their career path and future choice. We would like to know how she pursued the policy-oriented research career. Dr. Isher said probably she was lucky, and so we further asked, is it really luck? She said that young students probably are facing a menu of choices at this stage as we have so much information and opportunities. And many people maybe think in a way that we want to reduce the uncertainty of our future. But actually each choice has uncertainty. So instead of minimizing uncertainty, we should focus on what we are doing now and what we

have at hand, and then new doors will open for us in the future.
Thank you so much for sharing these inspiring experiences.

Coordinator Orsi: Thank you very much to our students for their very detailed reports about yesterday's activity which was in effect an excellent exchange between our advisors and GSDM students.

「アジアの安全保障と人間の幸福」
Security in Asia and Risks to Human Well-Being

基調講演 Keynote Speach

スリン・ピッスワン（前　ASEAN 事務局長）
Surin Pitsuwan (Former Secretary General of ASEAN)

Coordinator Orsi: Thank you very much to our students for their very detailed reports about yesterday's activity which was in effect an excellent exchange between our advisors and GSDM students.

And now I would like to invite Dr. Surin. Dr. Surin of course, as probably most of the people in the room know, former secretary general of the Association of East Asian Nations and former foreign minister of Thailand. The floor is yours.

Surin Pitsuwan: First of all, let me say thank you very, very much to the University of Tokyo, particularly GSDM, for inviting me to be a member of the Strategic Advisory Board of the Global Leader Program for Social Design and Management.

Mr. Vice President for Research, distinguished professors, my fellow members of the advisory board, students, ladies and gentlemen, it is indeed a privilege to be with you this morning to share with you some of the experiences and ideas and concepts about security, security that would have implications on the well-being of people.

In the past, the word security only means and usually means, the security of the state. So we have national security, we have security of our borders, we have security of our airspace, we have security of our territorial waters, we have security of our national interests. But as we move on into the 21st century, the term, the word, and the concept of security has been also transformed and has been extended – or even reduced – to focus on the human persons, to focus on the security of human beings, which sometimes is contradictory to the concept of state security.

This issue, this debate, came to the fore in the early 1990s with the issue of ethnic cleansing in Rwanda and former Yugoslavia because the concept of sovereignty, state sovereignty,

connotes state security and assumes that that sovereignty gives the control of the state, of the government of that country, full responsibility over everything internal, domestic affairs.

This is a concept of sovereignty since the Congress of Westphalia, the foundation of state relations, the foundation of international relations, the foundation of international law. But when the states or the governments fail to protect their own people, citizens, what would be the solution that we can offer?

In Rwanda, two ethnic groups killing each other, 3 million. In the former Yugoslavia, wars erupted in every corner involving every ethnic community of the former Yugoslavia. It was during that time that the UN Security Council, particularly former Secretary General Kofi Annan, asked the question, what do you want us to do? What do you want the Security Council to do of the UN? What do you want the international community to do in the face of ethnic cleansing, in the face of war crimes, in the face of crimes against humanity, in the face of atrocities at a massive scale?

So there was a response from the government of Canada setting up this commission called State Sovereignty and Intervention. When states claim that they have sovereignty, when they fail to protect their own people, the international community must have certain responsibility to protect those victims of a state. Sometimes the state is the party to the violence. Sometimes the state fails to stop the violence erupting among their people. The report that came out of that commission is called Responsibility to Protect. It's no longer the issue of the right to intervene on humanitarian grounds, but it is the responsibility to protect. You see, the responsibility shifts from the state or from the government to the international community.

This idea was perceived to be rather controversial, aggressive, intrusive, and affecting the basis of international law, the basis of international community, and that is the concept of state sovereignty. But then here are the problems that we are facing. Here are the problems that the international community has to respond to, what to do in the face of such atrocities.

I can give you another example similar to the Sendai Tohoku earthquake and tsunami. On the second and third of May 2008, there was a major cyclone that descended down on the country called Myanmar. It happened to be a member of ASEAN. One hundred and forty thousand people perish in the early hours of May 3, 2008. Four million more were facing either death or starvation or diseases. And Myanmar was reluctant to open up its borders. Remember, Myanmar was under sanction. It was reluctant to open up borders for international assistance, and the French foreign minister at that time, Bernard Kouchner said, this is a clear case of responsibility to protect. We have to move in. We will move in whether you allow us or not.

So that concept of sovereignty was being now interpreted as no longer absolute. You can't claim sovereignty when you can't protect your own people. ASEAN had to step in. We had a meeting in Singapore. The foreign minister of Singapore, who was the chair then, decided to offer Myanmar three choices: one, ASEAN would help you; second, ASEAN and the UN would come in and help you, meaning the world, and; third, you face the world yourself, on your own, meaning responsibility to protect, because the world is not going to allow 4 million people to perish after 140,000 already perished.

So that catastrophe worked on the conscience of the global community, and we were all moved, we were all at a loss of what to do. When you claim sovereignty we can't go in. In the end, with persuasion, Myanmar said, yes, ASEAN and the UN can come in together. That's how a humanitarian intervention could take place, by opening up that door for humanitarian engagement.

This morning I looked at the headlines in the Japan Times; 250,000 are still evacuees in northeast Japan from the Sendai earthquake. That is also an issue of human security, an issue of helping people to get out of a dire situation so that they can live normal lives, so that they can carry on their livelihood productively without having to be dependent on others, on the community or on the state.

So the Western concept of human security or humanitarian intervention had implications on the concept of sovereignty of the state. In 2001, Japan, the Government of Japan, tried to embellish that concept, that it's not going to talk about the diminishing state sovereignty but complementing state sovereignty from a new perspective on human security. So the Commission on Human Security was formed. Madame Ogata was co-chair and she came from ten years of experience at the United Nations High Commission on Refugees, protecting people on the move, whether they move voluntarily or they move because of violence or they move because they were forced to move out from one place to another, internal and external.

You realize that there are 120 million people now moving around the world. It's called migration. Fifty million of them are refugees and a lot of them are refugees from violent conflicts. So from the perspective of Madame Ogata, co-chair of that commission sponsored by Japan, endorsed by the United Nations, human security means protecting people from threats of violence.

There was another co-chair by the name of Amartya Sen from India, master of Trinity College, Nobel laureate in economics, but he came from the background of development economics, the background of development as fulfillment of human potentiality.

So this commission that was sponsored by Japan defines human security as protection and human development, reflecting the perspectives of the two co-chairs. And they issued a report; I happened to be on that commission. They issued a report entitled "Human Security Now," human security now. So we have two concepts of human security now: human security that would talk about protection and fulfillment of human potentiality. The assumption is the best guarantor for any individual security is he or himself or herself, developed, prepared, educated, competitive, so that wherever he or she finds herself in this global uncertainty, he or she will not be dependent on or a burden on the community, the society, the country that he or she finds herself in. The fulfillment of human potentiality.

I want to present these two concepts, these two ideas of human security, this concept of human security, because the graduates of this program, the graduates of this GSDM program, will be facing a world that has to be informed by this new concept of security because when you move out to the world you will have to work with the states, you will have to work with governments, but you also will have to be understanding that there is another concept emerging in the international arena, in international diplomacy, and that is the security of the human person, the security of a human being, the concept of human security.

This will go on in the debate with controversy, but more and more the global community is beginning to realize that it is essentially a new way of looking at the global situation as we face it now. The traditional concept of coming into civil society was so that the society, the government, the state that we set up, can protect people from insecurity. There was a Hobbesian idea, Thomas Hobbes, about the state of nature of being the war of everybody against everybody. Life is short, brutish, and nasty in the state of nature. That's why we moved to civil society. That's why we moved to state. That's why we moved to government. So the primary responsibility of the state is to protect people from insecurity.

But as we move on into the 20th, 21st century, the state itself has become the cause of insecurity. And there are many cases, close to Japan, many cases in the Middle East now, many cases in Africa now, and yet this is a human family that needs to address that problem, what to do. If you aspire to go out as global leaders, if this program, GSDM, aspires to train future leaders on the global stage, this is one of the issues that you must take into consideration, moving on the landscape of the global community, knowing that there is this controversy, there is this debate, and the debate is not yet at the end of it and it will continue, but it is reflecting the reality of the world today.

That's why it is extremely important to understand your own training, the students of this program, as multidisciplinary because there is no one way of looking at the issues, there is no one perspective. The issue of human security is certainly development. The issue of human security is certainly international law. The issue of human security is certainly

economic in nature. The issue of human security is education. The issue of human security is health. The issue of human security is the health of the environment or protecting the environment from degradation because human security will be affected by environment that is not healthy, that is not clean, that is not sustainable.

So again, go out to the world with a sense of humility, knowing that what you know, what you have been told, what you have been taught, is just one perspective of looking at the issue of your own discipline, of your own expertise. And when you move out of Japan, when you move out of Asia there are other things out there, such as this very issue.

Another issue of human security is gender equality. Why? Because half of humanity is woman. And the violence that the world community and many ethnic community have done to ladies and women has been very, very violent, very, very degrading to the sense of humanity that we have.

So the security of that human person, who happens to be woman, has to take into account her own, their own fulfillment of their own potentiality too. Any society that has any obstacles to the fulfillment of woman's potentiality is not yet developed, is not yet achieving the goal or the vision of a good society.

This is becoming more and more an issue that UN agencies are focusing on. There are various international institutions and agencies and civil society focusing on it, and that is the broad-based human development, rather than just specific sectoral groups and corners of the human society that we know of it.

So I hope that you keep this perspective, this perspective of human security, in mind, that if you want to achieve the goal of your engagement in the international community, you know that you have to work and find a balance between what governments claim, what states claim, and what human beings in those states expect, and that is their personal security, their personal fulfillment.

In Europe, this issue is very, very alive. It's being debated but being translated into various projects and programs in the European Union activities. In Latin America this issue is very much alive because of various groups and ethnic groups and tribes. In Africa, certainly the issue is very, very pertinent. In Eastern Europe and many parts of Europe and Central Asia, this issue is very much alive.

I am glad that we in Asia could complement that idea of diminishing state sovereignty with some complementary concepts of education, of health, of helping people fulfilling their own potentiality, of protecting the environment so that it won't be degraded and affecting the

lives and livelihood and the health of the people. These are I hope some of the concepts and ideas that would inform your works as you aspire to take up a leadership role in the international arena.

Let me end by making an observation on this GSDM program. I think it serves many purposes. The very first one is that it prepares a young generation of leaders, particularly Japanese, to move out to the global landscape prepared, informed, and equipped with various ideas and concepts that are relevant to the governance of the global community. It is time that Japan would make this conscientiously, this effort to move out to the world. So far Japan has been identified with economic development, with investment, with industrialization, with creating production network around the world. With this program, with this complementary program, Japan is going to send out their younger generation to help the world pursuing various missions based on the disciplines that they have been trained in and the missions that they have chosen to engage themselves in, whether they are going to be in the private sectors, lead international organizations, civil society, the younger generation of Japanese leaders will help the world pursuing a better human community. One, Japan itself.

The second is the students themselves, if they are better equipped, better prepared, better informed of the state of the world, of the problems of the global community, better than older generations who were specifically trained, steeped in various disciplines. The T shape that Prof. Dalton was talking about, broad knowledge, deep in the discipline of your choice, now we are combining the two; that is, you may be engineers, a lot of you are engineers, a lot of students are engineers, you may be in economics, economists, you may be lawyers, you may be whatever, but then you have a better understanding, a broader understanding of the world. It certainly helps to prepare you to live and make contributions to the global community better.

And may I dare to say the third? And that is, this is supposed to be the beginning of the century of Asia and the Pacific. We are now accumulating wealth. We are now producing technology and innovation. We are now economic and a locomotive of global recovery, of global growth, but the measurement of our contribution to the world is not how much we trade, how we export, how much we have foreign reserves, and how much we accumulate in terms of wealth and material wealth. Asia is being called upon to make a better contribution to the global community.

If this is going to be the century of Asia and the Pacific, this program is preparing us, whether they come from, yesterday one from India, one from Vietnam, many from many different countries, one from Spain, but it is incumbent, it is important that we take a bigger step onto the global stage with our own contribution for better governance of the global community, for

more effective management of various issues, including the global environment, including this issues of global warming, the issue of diseases, pandemics, whether it's avian flu or Ebola, East Asia is being called upon and expected to make positive contributions to the global community. We are not going to be able to do that if we are not trained, equipped, encouraged, to take on that mission, along with others.

The measurement of our success is not the accumulation of wealth; it will be the contributions that we give to the world, solving global problems, managing global challenges. And I think this program is going to prepare us, prepare Japanese, prepare the rest of us, for that mission, for that challenge. Thank you very, very much.

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【モデレーター　Moderator】

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Moderator Orsi: Thank you very much, Dr. Surin. I would now ask all Session 1 participants to take their places. Session 1 is dedicated of course to the broad topic of "Security in Asia and Risks to Human Well-Being." I think we had an excellent introduction provided by Dr. Surin with his keynote speech in which he analyzed many of the issues which are challenges for the future of the world and definitely interesting for our students as well, so the question of human suffering, but also related to many more of our broader problems such as the environment, or restructuring social traditions, especially culture, as well as economic systems. So I invite everybody to take position.

Each speaker will have about ten minutes for each presentation. I would like first of all Prof. Fujiwara to speak. Prof. Fujiwara of course is a professor of international relations here at the University of Tokyo, a world-famous expert of International Relations, probably one of the most prominent in this country and in Asia, and also director of the Securities Study Unit, Policy Alternatives Research Institute. The floor is yours. Thank you very much.

Kiichi Fujiwara: Thank you, Roberto, for your very kind words. And thank you, Ajarn Surin, for your deeply moving presentation. I have the unfortunately role of providing more difficult questions that you have to ask, which is directed more to the younger members of the audience. Ajarn Surin's presentation was so wonderful, which sounded like a commencement, but remember that you have to keep on studying. This is not the end of our program.

Ajarn Surin's question about the shifting focus of security from the terrain of individual governments and states to one that focuses on the security of human beings, the well-being of people, is an important one and also it is an opening of a paradox in many ways.

When the state fails to offer security to the people, Ajarn Surin asked, what can we do and what should we do? The question is a difficult one to answer. As the aim and the tools we may have may contradict each other. On the one hand, it is quite clear to see what should be done. If the government cannot provide security to the people, then actors that are not that government have to provide security to the people.

If the government fails to provide security and, worse, if the government keeps on killing people in their land, then the agenda is quite clear: that we should stop the slaughter and provide a different kind of governance from the outside. Now remember that this is an extremely tall order given the lack of resources that what we call the international community may have. Now of course by the words international community or international society we are talking about relatively well-to-do members of the globe, such as nations in Europe or the United States or for that matter Japan, or even South Korea or China. These are richer governments provided with large military capabilities, so you might think that the international community has the resources to tackle these imminent questions. Well, that may not be the case, for all governments, if I may say so, would be more interested in protecting their own people than the insecurity of the people outside their territory.

In Yugoslavia, especially in Bosnia-Herzegovina, there was a tremendous scale of killing taking place. But then it was also clear, wasn't it, that whatever happens in Yugoslavia will not easily spill over to Italy or for that matter any regions in Western Europe. So, well, the poor people in Yugoslavia might starve or be killed, but that will or may not affect the living of people living outside Yugoslavia, so it's very easy to dismiss the cause from Yugoslavia in terms of quote "our own security," unquote.

A more dismal case would be Rwanda, which again Ajarn Surin referred to. The scale of killing in Rwanda was far greater than the one we saw in Yugoslavia. This was a humanitarian disaster. But at the same time it was also very clear that there was a lack of initiative among the leading members of the international community to tackle this question. You might recall that the UN troops in the face of the calamity simply pulled out of Rwanda instead of fighting against injustice for the simple reason that they were ill-equipped and they did not have the resources to fight against such calamity. And there was of course, after these two dismal experiences, Yugoslavia and Rwanda, that the argument for responsibility to protect had emerged.

It was clear that if we cannot do anything in the face of an imminent killing, such as the one that took place in Srebrenica for example in Yugoslavia, what good are we? If we have to live with the simple fact that people living in Rwanda keep on killing each other, then that is not just ordered to speak of, is it? But there's the rub because once the principle of responsibility to protect was widely accepted in the international community, and especially among the

members of the United Nations, the paradox of power became quite clear.

Take Libya in the year 2011. This was more or less during the same period that the earthquake took place in Japan. After the Arab Spring which led to, I shouldn't use the word downfall, but the crumbling down of many authoritarian regimes in the Arabic world, Colonel Gaddafi started a massive campaign to destroy anti-government activities in Libya. The killing was quite severe, to use a very diplomatic word, and the advance of Gaddafi's troops kept on moving to the borders of the city of Benghazi. If nothing was done, if nothing was done, then it was clear that a huge number of people in Benghazi would be slaughtered.

In the United Nations I believe this was the first time that the words responsibility to protect were openly used in defense of a Security Council resolution. The United Nations gave not orders but recognized a possible military campaign against Libya.

I dare say that I think this was necessary. You don't do anything here and a huge number of people would have been killed in Benghazi. But at the same time this took place, this took place after the disastrous consequences of the intervention in Afghanistan and Iraq. It was clear the NATO forces were not interested in stationing their troops for a long period of time, so therefore, the campaign in Libya was very short, and most NATO troops pulled out almost immediately after Colonel Gaddafi was killed.

What happened later is not very happy. After the pull-out of NATO forces, Libya, instead of having a stable democracy, ended up in what can only be called a failed state. Right now, a military junta under the control of, if I may say so, the Egyptian military, the more secular force is active in Libya while there are extremely militant Islamic groups fighting their own kind of war in Libya. Libya is a failed state, a cruel word to use, but Libya is a failed state.

Moreover, some of the troops that allied with Gaddafi moved southward to Mali and led to a civil war in Mali. I am happy to say that the convention in Mali has become somehow more stabilized than before, but nonetheless there is still a civil war going on in that region.

Another case would be Syria where an even greater humanitarian disaster took place, even compared to Libya, but this case was more difficult because the Russians had military bases in Syria and there was an extremely low probability that Russia would agree to a Security Council resolution concerning a concerted action toward Syria.

The other problem was that the Syrian government under Assad was more or less against the Sunni population, which did indicate a possibility of linkage between Iran and Hezbollah in the south of Lebanon, so touching this issue could have escalated the conflict, a very easy way to keep away from military intervention. As a matter of fact, major powers did not

engage in military intervention in Syria.

Now one power that was alarmed by this development was Turkey. Turkey has been neutral ever since the disastrous defeat in World War I. Turkey kept away from involvement even in World War II. At the same time, the deteriorating security condition in Syria endangered Turkey's stability, so therefore Turkey started to fund and arm Sunni militants active in Syria.

I will not say that Turkey was behind the expansion of IS, I don't think that is the case, but having said that, I dare say that many of the arms procurement for IS did in effect originate in Turkey.

Turkey of course was counting on the possibility that IS, or what became IS, would be a deterrent against the Assad regime. The trouble was that IS is now turning against Turkey as well, a very clumsy situation to say the least. And this is the world that we face.

Now what can be done? There is a clear lack of human security in Iraq or Syria or for that matter Libya. I should add to this long list of troubled regions Yemen, Somalia, Congo, which has become more or less stabilized but still we're not out of the woods yet there, and it's also easy to dismiss any kind of military intervention as war-mongering. It was easy to dismiss President Bush's advances to Iraq. In fact I was among the ones who opposed it. But at the same time, we have a very troublesome question to answer: what can we do and what should we do?

Two things. I'm talking too much here, but two things. I'm just opening too many questions without giving answers so I think I have a responsibility to say at least two things. One is to make sure that any kind of intervention from abroad will have a direct relationship to the well-being of the people living there. Intervention can come in various disguises. It can be disguised in terms of humanitarian, human security, but actually it's meant for security of energy procurement for example. There is always the possibility that any humanitarian norms are simply disguised for naked pursuit of national power. It is extremely difficult to make distinctions between the two.

But having said that, some actions and some military actions may be necessary to provide security for the people who are actually living there. I have proposed that securing the security of refugees in Jordon and people fleeing away from Syria should be the top priority of military intervention and I should repeat it here.

Every bombardment sounds like an easy way out. I doubt the efficacy of this. This is good for domestic consumption because you are doing something against those people who are willing to chop people's heads off, but you have to be sure that each military operation has a

direct relationship to improving the security of people living there; otherwise, the whole thing ends up in a total fiasco. That's point number one.

Point number two could be even more troublesome. It is about dealing with your enemy. In the year 1994 the United States was about to start a war against North Korea. It was well known that North Korea was developing nuclear weapons. This was still in the time of Kim Il Sung. North Korea was not only developing missile technology; there was good solid information that North Korea was going nuclear. The United States under President Clinton planned a war against North Korea alarmed by these developments.

Former President Carter with his wife visited North Korea and put a lid on the nuclear programs. Before President Carter went to North Korea, a huge group of specialists gave information to President Carter on what you should do, what you should not do about the North Korean situation; all sorts of experts filled in the information to the president. After meeting Kim Il Sung, President Carter met his aides and told them, everything you told me was meaningless in dealing with the North Korean leader. "Do you know what he wants? Do you know what Kim Il Sung wants? I'll you what he wants," said President Carter. Kim Il Sung wants dignity. Kim Il Sung wants to be recognized as a political leader. And Kim Il Sung of course was afraid that his dignity would be destroyed easily by American aggression.

What President Carter did was to assure Kim Il Sung's dignity in exchange for a change in foreign policy of the Kim Il Sung regime. Now this is a very debatable position. Some people might argue that Kim Il Sung, who failed to provide security to his people, to say the least, should be killed. He is responsible for the massive suffering of the North Korean people. So some people might argue, idealists I should say, not warmongers, some idealists might argue that there is a case when we should massively destroy the North Korean regime by force. I doubt if this was or would have been a good solution because before Kim Il Sung dies, more people will die in North Korea.

Carter's position was one that mixed the need for human security and clever diplomacy. He was one person who could do that. And I dare say that we do still need to seek opportunities to deal with your enemy even if that enemy is an extreme killer of people if there is a possibility – and this is a big if – if there is a possibility that we can achieve results by dealing with that leader. I doubt that there is the possibility of doing that with IS for example. There are cases where there are belligerent powers that cannot be dealt with, but if there is a possibility that diplomacy might still have some limited role, then we should not dismiss it.

These are some of the observations that should be connected to the wonderful presentation by Ajarn Surin. Sorry to be speaking too much. Thank you for your attention. Thank you.

Moderator Orsi: Thank you very much, Prof. Fujiwara. I would like now Dr. Ahluwalia to speak. The floor is yours. Dr. Ahluwalia, she is the chairperson of the Indian Council for Research on International Economic Relations and of course a well-known economist. Please.

Isher Judge Ahluwalia: Thank you. Let me also begin by thanking the University of Tokyo for giving me this opportunity to associate with the GSDM program, and we've had very fruitful discussions with the faculty and students, and I would now like to just present some brief comments on what Dr. Surin has talked to you about.

It is a good thing that we have now moved from talking of security of borders to security of human beings. There is wide consensus now that it is human security which must be the focus of what the governments are about and what the international institutions of governance should be about.

Let me just say a few things about what is expected from the governments when we talk of human security because we have heard in quite some detail, but coming from a low-income developing country I would just like to put some of these things in a slightly different perspective where basic education, basic health security, public health conditions, but added to that, bringing the income levels also beyond a threshold where people are not so vulnerable that even education and health become secondary considerations.

First, it is making your two ends meet, and that's why in India, from the government we expect faster growth, faster economic growth, inclusive economic growth, which takes account of those who are very poor, who need social protection, which takes account of the diversity of our country so that different parts of the country, different regions, different religions, different cultures can all participate in faster growth, and also that that growth must be sustainable. If we do all of this right, we can provide human security.

But no government is perfect, and certainly in a democracy where political forces are very active in a diverse democracy like where I come from, government by itself is not able to achieve these goals.

So we have and I think every society needs an active civil society, the non-government organizations that can keep governments in check, that can demand good governance, and democracy itself is, as we have often heard, the least bad form of government, that it provides some checks. But along with democracy, if you have civil society engagement

working towards human security, one day we will achieve this goal of human security in our countries.

I would like to emphasize that women can play a very, very important role in the area of human security, and I am not saying this as someone who is an expert on women's issues. I am a mainstream economist. I am saying this out of experience of what I have seen, not only in India but in many, many other countries. No matter how rich or how poor, no matter how modern or how not-so-modern, the fact is that women are the bridge to two generations.

So if you want change and if you can modernize your women, if you can get them focused on human security, you will get there faster because they say when you educate a woman, you educate three generations. And therefore, I think the first thing of course is at the level of the country. In each country we have to work toward human security. In the past we used to think of this as only the responsibility of the government or civil society.

Now we have had a very happy development in the past ten years or so where the corporate social responsibility has also emerged as a very important concept. Today we have sometimes specific regulations and sometimes understanding between the private sector and the government that they have to put a certain part of their budget toward inclusive development, toward social development. This is very important in poor countries. In rich countries you have the tradition of philanthropy, mostly in the areas of culture and art, but even for human security in countries with large amounts of vulnerable population, the corporate sector has an important role to play in human security.

Now let me turn to the global governance, security across countries.

Having started with the building blocks in each of our countries, we then look to the United Nations, we look to the IMF, we look to the World Bank, we look to the WTO as global institutions which frame rules within which countries must operate and interact with each other.

Now many of these institutions were really put in place after the Second World War, and they were addressing the challenges of that time. They also reflected the power balance of that time in how many votes a country will have, and the IMF, for example, what its quota would be was determined by the economic power of individual countries at that time, and this has really not substantially changed since then.

And as Dr. Surin mentioned, given that Asia has played a very major role in accumulating wealth, reserves, and its very important contribution to the global GDP that Asian countries have made, that should be reflected in how the World Bank and IMF boards are structured,

how much quota is given to an individual country, because the way it is right now, it does not reflect the reality of economic power in the world.

The United Nations has done very well in responding to natural disasters, to some despotic leaders. There is not always an agreement on how to deal with the despots. And we've also seen coalitions of willing partners, subgroups emerge and all.

Now it's not a perfect world and the solutions are also not perfect, but I think nobody will disagree that we need to change the institutional frame of these global governance institutions and we need to have something functional and effective. I think increasingly the United Nations is not able to deal with the complex challenges of the real world and this is where programs like GSDM, when we make our students aware of their national realities, their recognition that nations are increasingly interdependent even for their economic success, and therefore you can't say, I will go and live in that hole and I don't have to worry about the United Nations. It's the planet that we share for our economic success, also for our environmental sustainability.

So with an understanding of what each nation is about and how we need to reframe the system, it is really the responsibility which our generation is now passing on to you, that ten years from now, when you are in positions of importance, both nationally and internationally, then you can make the IMF, the World Bank, the WTO more effective. There are dispute resolution mechanisms which are followed so that the world does not fragment into regional groupings and subregional groupings. These are interim solutions. It is true that if some countries have found a way of interacting and bypassing the global impasse, as with free trade agreements, that's a desirable step in the interim, but in the long-run the only sustainable way is for us to live as part of the global community and frame rules with which we are comfortable.

There will be situations of, let us say, even economic wars like an oil price increase, what it does in shaking up nations' economic security. You will have situations where foreign aid is used as an instrument of foreign policy, good or bad. These are the realities of the world as it is, which is not always fair, and we probably will never be able to make it perfect, but we should not make good the enemy of the best, and we must learn to look for second-best solutions, while all the time keeping our eye on the goal of the first-best.

So I would say that with all the knowledge that you gain and all the connectivity and networks that you establish, try to make your own country, whichever country you come from, economically strong because that gives you the ability to be at the high table and discuss with other countries. Try to ensure that there is human security within your country. And then try to set up, help set up an international institutional framework in which human

security is the focus and everything else is subsidiary to that.

With those words, let me thank you for giving me this opportunity.

Moderator Orsi: Thank you very much, Dr. Ahluwalia, for your excellent intervention. Again, a very rich and very dense speech with a lot of meaning.

And I will now ask Dr. Heng, Prof. Heng, to have his presentation. Prof. Heng is a professor at Lee Kuan Yew School of Public Policy of the National University of Singapore, but also now is a visiting professor here at the University of Tokyo, Graduate School of Public Policy. We are just waiting for technical assistance.

Heng Yee Kuang: Good morning, everyone. As you can see I am currently dual-hatted, so I have positions at the LKY School in NUS in Singapore but I am also a visiting academic this semester here. So firstly of course I'd like to express my thanks to Prof. Shiroyama and Prof. Fujiwara for their hospitality having me here and also inviting me to speak on this panel.

Let me open my comments by firstly making one observation in terms of what we have been discussing so far.

I think we can argue that there are at least two types of human suffering on discussion here today. First is, as our speakers before have covered, the notion of human suffering that's intentionally inflicted by fellow humans, namely, acts of ethnic cleansing and genocide. And my comments are going to follow on the second type of human suffering and that is related to natural disasters, and you might argue that these are acts of god, like the 3/11 earthquake that we are commemorating here today in Japan.

So in my presentation I want to suggest that human suffering serves as a useful lens to explore evolving dynamics of security and foreign policy in Asia, especially this idea of disaster diplomacy, and we all live in Asia, which is, as you all know by now, one of the most disaster-prone regions in the world today.

Dr. Pitsuwan mentioned earlier the typhoon that hit Myanmar and the French foreign minister's response that this was a clear case of R2P and therefore international intervention. Now as Dr. Pitsuwan mentioned, this was a more forcible, a more aggressive type of intervention. But what about other types of interventions where you have a more consensual

context, whereby the military forces of foreign countries are allowed or invited to deploy in another country's territory with permission of the host country? And this is where the idea of disaster diplomacy comes into play.

So disasters, there has been lots of work done in the academic field on disaster diplomacy, and particularly in the context of human suffering. The question being asked here is, do natural disasters induce international cooperation amongst countries that have traditionally been enemies or perhaps the relationships are not as good as you might want them to be?

So the assumption here is that a more cooperative spirit induced by shared common efforts to deal with disasters may be able to overcome preexisting prejudices, hatreds, and in the process different countries across the world may be able to rediscover a common sense of humanity. And after all, this is what motivates this idea of human security and human suffering.

Now what is interesting in the case of disaster diplomacy, and particularly in Asia, is how we often find countries using what nominally are hard power military assets in a soft power context, particularly by providing humanitarian assistance and disaster relief. And there are also many implications for foreign policy and security that we can draw from when countries deploy their military forces in such contexts.

Now we talk about the earthquake in Japan, but let's not forget that there are other countries within this region that have also experienced earthquakes, and these earthquakes have also provided opportunities for countries to build relations and demonstrating a common sense of humanity.

So the Sichuan earthquake in 2008 was one of the cases whereby Japan was able to provide assistance and relief to China, and the picture I show is from the Japanese warship Sazanami which actually was the first Japanese vessel, Japanese naval vessel, to visit a Chinese port since the Second World War. So you can see that disaster diplomacy can also provide symbolic instances for trying to build relationships and foreign policy between countries.

It also enhances the image of a country that sends relief assistance. So for example the Chinese media gave quite a lot of attention to images of Japanese rescue teams who actually cried and bowed to the bodies of Chinese victims which they helped to recover from rubble in earthquake-hit areas, so this also helps to enhance public perceptions of your country if you are able to provide assistance for disaster diplomacy.

Now let's not forget of course the 3/11 earthquake in Japan, and this was a very good

example of disaster diplomacy in action where the US deployed its military forces on a massive scale to provide assistance. This is of course known as Operation Tomodachi which means friendship in Japanese.

Now what has been the impact of these types of missions, military missions?

Now there have been a lot of assessments done and the Cabinet Office conducted a survey of public opinion in Japan in December 2011, and it discovered that there was a record of 82 percent of Japanese respondents that felt friendly towards the US and this was largely attributed to the impacts of the massive US relief operation. So the picture here I've shown is of the US aircraft carrier Ronald Reagan, which was positioned off the coast of Tohoku. And this of course we often associate US aircraft carriers with hard power projection. We see them being used in wars on Iraq and also recently in military campaigns against IS in Syria and Iraq, but we should also bear in mind that these military assets provide dual use to the nations that have them. They can also provide assistance in a soft power context, in this case providing assistance and disaster relief.

Now there are other instances whereby we can see such examples of disaster diplomacy in action. So for example the Super Typhoon Haiyan that hit the Philippines in November 2013. This was an example whereby a country that somehow did not provide sufficient disaster assistance in turn generated negative global publicity and perceptions, in this case, China. It was reported widely in global press and media that China provided initially 100,000 US dollars in assistance to the Philippines, and this was widely ridiculed for being less than what Coca Cola and Ikea had agreed to contribute to the Philippines. So this creates massive publicity problems for China to address, especially when it has perception issues in Southeast Asia given the rise of China and territorial disputes over the South China Sea to manage.

Now in contrast to that, we see Japan becoming extremely generous in its contributions to the disaster relief efforts and provided one of its most high-profile and significant missions to Southeast Asia since the Second World War. Particularly in the Philippines, this was the scene of massive battles in the Second World War, but by sending Japanese naval vessels and military forces back to the same area but this time in a different context, it's not about hard military power, it's about providing soft military assistance and disaster relief, so this was in turn able to enhance the perceptions and image of Japan within the Philippine media.

So you can see there I've provided some examples, anecdotal evidence perhaps of how the Philippine perception has been towards Japanese efforts in this region.

So just a list of the assets deployed by Japan: about 1,000 military personnel, including

major military vessels, such as the helicopter destroyer ISE there, which I've put on the slides. So these efforts by Japan are presented as rather normal and desirable behavior by Japanese military forces in Southeast Asia, and this was presented in contrast to China's perceived stinginess in responding to the disaster in the Philippines.

Now the other examples more recently where we can see the use of such military assets in an assistance mode, notably the hunt for the missing Malaysian airline's flight MH370 last year. We again see similar instances of countries sending military forces to provide assistance in a soft power context, so on the left you see pictures of American surveillance planes. These are one of the most advanced planes in the US arsenal to date. They are often used in the normal context to hunt for Chinese submarines, but in this case they were deployed to hunt for missing civilian airliners and providing assistance as well.

So on the right, a picture of a British Royal Navy attack submarine which was also deployed to help look for this missing civilian airliner. So we see again here examples where countries are providing assistance here, in this context, trying to alleviate human suffering.

And finally we talked a bit about diseases earlier. I think Dr. Pitsuwan referred to it in his comments, about the Ebola outbreak in 2014, and once again I think we can see numerous examples of countries deciding to send their military forces to help address these types of human suffering. China this time has decided that it will play a more high profile role. It has actually sent an elite army medical team with experience of treating the SARS disease outbreak in 2003 and it has also built treatment centers in Liberia. The US has also sent its elite parachute regiment to provide treatment. The UK has also sent military medics and naval vessels as well. Japan has sent transport planes with supplies but it has actually recently cancelled plans to deploy ground forces in the theater.

But nonetheless, I think again the Ebola outbreak is a rather different type of disaster but at the same time it links up with the earthquake disasters because we're talking here about the overarching theme of human suffering and human security, and these are examples whereby countries can contribute their military forces in an assistance mode, helping to enhance to some extent their own public perceptions as well.

I think I've run out of time so I think I should stop there and let Roberto take over. Thank you very much.

Moderator Orsi: Thank you very much, Prof. Heng, for the very comprehensive presentation about what we can call soft power and the impact of disaster diplomacy on the broader question of international relations.

Now in order to start our panel conversation here, I would like to ask first of all some initial questions, one for each of the panelists, starting with Dr. Surin.
In your presentation you touch upon a lot of different major problems which are revolving around the theme of human suffering and how this is largely linked to the way in which global politics is managed.

And on this topic, also our students are preoccupied with the problem of how UN governance has been evolving over the course of the decades. Dr. Ahluwalia has also highlighted the issue that many of these institutions are somehow aging because they were designed in a very different time. You have problems of over-representation, for instance European countries are definitely over-represented in many institutions, and under-representation of parts of the world.

And since you are also a diplomat I would like to ask you, very briefly, although it's a very complex theme, what do you think is the perspective of a UN governance reform or what could be for instance the inspiring principles behind this? Very quickly.

Maybe I can ask all the questions to the various panelists first.

To Prof. Fujiwara, I think it was an extraordinary overview of many of the crises that we suffered in the post-Cold-War era and many of the problems that the international community faced in order to respond to those. And one of the questions that comes to mind is the following. In the previous system the idea was that the world was divided into states and every state was supposed to manage its own population, and if that worked of course we wouldn't have had the problem of protecting people in failing states, but we know that many states are actually failing or they are not able to protect their citizens.

And now we have moved to another system in which there might be other problems as well, but the question is that the mechanisms that led to the failure of the previous system or why states are not always able to protect their citizens, the mechanisms that led to that, are they not still operating in a different context now? So what about the possibilities, that's only of abuse of a certain responsibility to protect mechanisms, but whether there are more embedded risks or problems that we haven't studied enough, and especially with reference to the problem of defusing crises at earlier stages. Sometimes I fear that, couldn't we really have done something more about the Yugoslavian crisis before they started to shoot, when Yugoslavia was already in a crisis in the second half of the 1980s, for instance. So whether it would be possible to create mechanisms to identify and defuse crises earlier than that.

To Ahluwalia, I was always impressed also yesterday by your charm and optimism. You always convey a very positive message, so I'm going to be a little bit provocative here and

I would like to ask you, what could actually go wrong? So what are the risks here? And in fact, even in the professional field of International Relations, we are moving more and more toward a question of risk , international politics as risk rather than security. Security has been criticized as a concern in many ways. Risk is a more economic concept but also somehow it allows a more pessimistic understanding, at least to be prepared for the worse-case scenario.

And lastly, to Prof. Heng I would like to ask something in relation to the role of media. Since you are an expert on soft power and you have worked a lot on this, my question is related to the prevention of especially man-made disasters. In what sense, if media could highlight more the cooperative spirit that can exist internationally, could this be helpful, could it have an impact in terms of improving international relations in general? Thank you very much. So Dr. Surin?

Pitsuwan: Prof. Orsi, thank you very much for being such an effective moderator. Let me also thank my fellow panelists, my discussants, for their very, very valuable and positive contributions into my own earlier presentation.

I think the view presented on the paradox of power is extremely important, and that is something Prof. Ahluwalia said yesterday – that you solve one problem, you have other problems as a consequence so you are not going to be able to solve the problem in finality. There will be implications. There will be problems in the future. But we have to do our best and that is responding to the existing situation and challenges, and my presentation was based on the assumption that we are embellishing on the concept of security. We are shifting the focus on security from state to human security because that's exactly where the world is at.

More people die from landmines, die from small arms, die from diseases, die from suffering from environmental degradation than from nuclear bombs. Speaking in Japan that may be a bit sensitive, but that's exactly the case, that the big issues, the big weapons have their own somehow balance of terror. But the small issues, the pervasive issues that we have on the ground, are now the hallmark of human suffering across the globe.

On the basic insecurity on the ground that my fellow panelist, Prof. Ahluwalia, was talking about, that is, health, education, and the availability of basic services on the ground for the people, these are also very, very real, and they are necessary to provide to support the security of fellow human beings.

From Prof. Heng, the issue of soft power or turning the catastrophe into opportunity for better cooperation, better collaboration of human society, even from the arsenal of weapons that you have, from planes, from ships that you have, but you can respond to disaster, to human suffering, in the soft power area of our situation is also an addition to what I was trying to convey.

But coming to your question Mr. Orsi, very briefly, the international community now is a state of multi-polarity or no polarity. That is, no center of power seems to be able to call the shots in order to solve the problems and face the challenges together as a community. Yes, after the Second World War the UN was an effective instrument for international cooperation, but now it's multipolar, it's no polar, and there is no multi-pluralism, a multi-plural system, that can sustain this multi-polarity. It seems to me the situation is ahead of us and we don't have the instrument, we don't have the concept, we don't have the ways in which we can deal with the problems that we are facing.

Definitely the UN has to be restructured, it has to be changed, but how? From G7 they have opened up to be G20, recognizing the fact that there are other centers of influence and power that could contribute to better management of the global community, but G20 seems to be running out of steam too. They were good at putting off the fire of global financial meltdown, if you call that a forest fire, but then we need to grow up new forests. New ideas don't seem to be coming from the G20. They are stuck.

So what do we do? We need to create a new institution, better institution, a better system. The UN now is expecting, calling, and requesting regional organizations to come into the picture. So there is a lot of work, a lot of cultivation, of cooperation, relation with the AU, African Union, with the EU of course, and with an entity like ASEAN, knowing that the UN is no longer resourceful enough, with legitimacy high enough, and with the efficacy and efficiency enough to address a lot of these problems. Propping up natural disasters is just one, but there are other things in other areas, of conflicts, of problems, of threats that we are facing as a human family.

So there is a need for a new reflection on the structure of global governance, and I think we are in that mode now. I think we don't have it yet but we know that we need one. That's already a good beginning. And I think if we experience more problems and inadequacy of the existing systems, existing organizations, as a human family we will be forced to invent new systems, new processes, and new institutions. It's inevitable.

And definitely we were talking yesterday, a sense of awareness, a sense of common consciousness that we belong to this human family together, that we belong to this little planet together, that if something happens to the global warming threat that seems to be

very present, all of us will be affected; that will lead to a sense of urgency, that will lead to a sense of necessity, and necessity will lead to invention, and that invention, innovation will come in the face of the threats, the common threats that we feel together. I think we are in that mode now. Thank you.

Moderator Orsi: Thank you very much for your reply.

Fujiwara: The question addressed to me was about the underlying causes of state failures and what we can do about it. Wow. You are asking me to answer this question in, what, three minutes? It's impossible. But at least we have to distinguish a question into structural causes and immediate causes.

Structural causes, underlying grounds that lead to state failure are many, and covers a wide terrain. Among the many factors, say, for example poverty is one, most certainly, and authoritarianism or dictatorship, monopoly of political power is another one. And then again we might focus on ideologies and exclusivist ideas that put the blame on human suffering on somebody else. We have a whole series of exclusivist ideologies that have had enormous impact in the world, and I dare say that this is something most Muslims would disagree with, and in fact it has nothing to do with Muslims but the idea of global jihad has become a major ideology defying Islamic traditional beliefs, but spilling over in the Middle East and Northern Africa, if not even in cases in Southeast Asia.

The trouble, however, is how we should deal with this. We should drop, and I dare say we should drop, the idea of social engineering, that this poverty alleviation or transition to democracy or change to universal values can be achieved by a well-programmed intervention from overseas. I am extremely skeptical about these ideas. This has been implemented, by the way. Especially after the end of the Cold War there have been many programs that would address poverty alleviation in Africa. The Clinton administrative was very much supportive of such programs. Or transition to democracy; democracy assistance became a cottage industry in Western Europe for example where there was a whole scheme that was coined out to strengthen democracy.

And of course there was this call for a more universalist idea, and I dare say that I support that. The trouble is any kind of short-sighted social engineering can bring out reverse impacts. I assure you that I'm not a supporter of Boko Haram or anybody who simply takes away the right of education from women, but one of the problems is the activity of Boko Haram is supported by this sense of fear installed in local communities, that introduction of

Western civilization is endangering the traditional way of life, and this is a very easy way to justify abuse of militant power, and that we can see in Afghanistan, Pakistan, Nigeria, in many corners of the world. What is necessary is not only social engineering but about confidence, that poverty alleviation, democratic transition, actually empowers people living there. Without developing this kind of confidence in local communities, any intervention will fail.

And then we also have to focus on the immediate causes of state failures. It's a very nasty thing to say but people become interested in intervention only after severe disasters. Nuclear reactors became dangerous in Japan after the severe incident in Fukushima but not before. Many alarms were put out but we did not pay attention to such alarms, and then after something breaks out, a more extreme measure gains support from the public. The public who showed little interest in changing the kind of energy programs in Japan, many Japanese are now against nuclear reactors in general.

The same applies to severe crisis in Syria for example. The severity of the humanitarian disasters lead to very simple-minded military operations and gathering support from the public. And here something more careful should be in order.

The Obama administration is a government that has very little support in Tokyo right now, although, well of course the media loves Obama but the diplomats hate him because it shows a lack of political will and a lack of will for engagement. But having said that, the Obama administration has been successful in Myanmar and Cuba, and I certainly hope the Obama administration works out its current policy toward Iran regardless what Mr. Netanyahu might say. There is a high likelihood that the policy of Iran might change from the terribly confrontational policy that has dominated the government for more than 30 years, it's been 40 years, these kinds of small incremental changes can lead support to more solid-based conflict management which we call preventive diplomacy. We need preventive diplomacy but I didn't use the word before because it has to be grounded in more solid operations on the ground. Thank you.

Moderator Orsi: Thank you very much.

Ahluwalia: Thank you. Just to say something support of what you have just said. I happened to be in the United States when the Indian elections took place in 2004, and out of habit in the morning··· I had watched the whole thing on my computer late at night on how the elections had delivered a very unexpected result. I was very full of it. I went to bed. And in the morning, out of habit, when I

opened the newspapers, I expected that there would be something on the front page; there wasn't. Then I moved pages, one after the other, and I'm talking of the New York Times, Washington Post and Wall St. Journal, three newspapers that I subscribed to when I lived for those two years in America. Not a word. And this was the time when the US wanted to bring democracy to Iraq.

So I think what you say is so true. First, of course we recognize, as Indians who have lived with democracy and very low levels of income and education, the strengths and weaknesses, but we would still not give it up for any system because we think it is the least bad system and it is serving us well.

Now as for the question of risks versus security, I would like to say, whether you talk about national institutions of governance to deliver human security or international frameworks that can bring this about, if I conveyed the impression that this was an easy job, then I did not communicate well enough, because I recognize all the challenges, especially for a poor country like mine, that this requires players at all levels, government, civil society, corporate sector, diplomats, international levels, a deep understanding of where we want to be and how we want to shape the world so that we can get our human security and don't come in the way of other people's human security.

So far as risks are concerned, in fact I should think that just as the corporate sector has a risk assessment strategy, each country in its foreign policy should also have a risk assessment strategy on what should be their fallback position if they are really trying to achieve these basic outcomes of human security.

So I would really say that, you know, we need some out-of-the-box thinking for solutions. It's very clear to us that the present institutional frameworks are not being very effective. Maybe what we need is not so much incremental fixing but perhaps even layering. You know what Dr. Surin just mentioned, that if you have strong regional institutions with cohesion and if you have effective national governments, perhaps it's easier to rebuild a United Nations which will be effective than if we started at the top trying to redo that.

Second, today what makes me feel optimistic? Today we have new instruments of governance, such as IT. These have delivered extremely well within the countries when we talk of service delivery and more transparency, better accountability that you can extract, because of IT. Perhaps we should think of more technological ways of addressing the issues where nations are forced to be more transparent in their functioning and it will be easier to set up rules for global governance. Thank you.

Heng: Thank you very much, Orsi-sensei. Your question was about the role of the media

in preventing disasters and, secondly, highlighting the cooperative spirit in international relations. Let me just address the first question to begin with.

The role of the media in preventing disasters, I think that's very pertinent, a very interesting question because it also raises all sorts of issues about the risks that you mention, particularly perceptions of disaster risks, and whether the message gets across to the public really depends on the public perception of the risk. And a good example here is how different risks are perceived differently, for example, in the US, statistically more people are killed in traffic accidents than by terrorist attacks, yet, the perception of terrorism incidents is more significant than a perception of a traffic fatality. So this again I think raises some issues for media or even governments to think about in terms of public communication. You can keep telling them about something but if it doesn't really get across to them, then it raises this issue of how do you sculpt and shape your message efficiently to hit the right target?

The second point about highlighting the cooperative nature of international relations, I think this is dependent on the nature of the media outlets that you have in mind, particularly on whether these are state-run media outlets in authoritarian political contexts or whether these are more free and liberal media systems.

So when I talked about the Chinese media highlighting the Japanese assistance in a positive light, this very quickly shifted to a more negative perception depending on state-run frameworks whereby they want to sculpt and shape messages depending on the prevailing political strategic context. And of course we do need to bear in mind that media cycles nowadays are run on a 24-hour, seven-day-a-week basis which means that the media attention very quickly shifts to the crisis of the day.

So for example last year we were talking about the Ebola crisis, but in recent months I think very few people actually talk about it in the media these days, simply because it's been displaced by a more dramatic, a more risky presentation in the form of beheadings and the rise of IS in Syria and Iraq.

So again, the media cycle I think generates its own momentum in a way, and it's quite difficult I think to sustain the role of the media in promoting cooperative relationships, especially when its attention is really driven by crisis of the day, whether it's Ebola, whether it's North Korea's latest nuclear test, whether it's IS, so these are I think just some of the difficulties when we think about the role of the media in promoting friendship in international relations.

Moderator Orsi: Thank you very much, Dr. Heng. If any panelist has any question to other panelists, please let me know. Otherwise, well, it's ten to noon so essentially we are

also running out of time, and I really want to thank all the panelists for their extraordinary contribution today. It has been an extremely informative panel I think for every one of us who has attended and who has participated, and we have learned definitely a good deal of new information and ways of thinking about international crises and human suffering. So I would like everybody to join us in thanking the panel. Thank you very much.

Just a brief housekeeping announcement. The second session of the symposium will start at two, and it will be important for those of you who are not attending the second part of the symposium to return the simultaneous interpretation devices because we'll get in trouble if we lose them. Thank you very much. Thank you.

「情報集約環境におけるイノベーションの創出に向けて：社会構想マネジメントの可能性と課題」
：
Opportunities and Challenges for Social Design and Management。

基調講演 Keynote Speach

ティモシー・ダルトン（IBM リサーチ）

Timothy Dalton (Nano-Science Technology Partnership Program Manager, Master Inventor & Member IBM Academy of Technology, IBM Research)

Coordinator, Roberto Orsi: Good afternoon, ladies and gentlemen, and welcome back to the second part of today's symposium. We are now going to have Session 2 and Session 3 of today's event. Session 2 is dedicated, as you can see, to innovation, to the idea of innovation. It's actually entitled, "Stimulating Innovation in an Information-Intensive Environment: Opportunities and Challenges for Social Design and Management." And the session will last until 20 to four. After that, until four we will have a short break, for about 20 minutes, and after the break, the last session of the day will be, "Transforming Our Cities: Challenges of Urbanization in Innovative Ways." It is dedicated to the idea of how to create better cities and better urban environments. And finally, we'll have closing remarks by Prof. Shiroyama, who is the program coordinator of GSDM.

So I will now invite the Session 2 moderator to take the floor. Prof. Masaru Yarime, the floor is yours. Thank you very much.

Moderator, Masaru Yarime: Thank you very much for you kind introduction. My name is Masaru Yarime. Currently I am project associate professor of Science, Technology, and Innovation Governance at the Graduate School of Public Policy.

In this session we are going to talk about innovation, and particularly, as you see, we have a current explosion of data information available, increasingly having impacts on a wide variety of areas and also many industries. So we'll discuss what kind of trends are there and what kind of impacts we are seeing in many areas, including industry, security, energy, environment, peace-building, and also sustainability. And what are the challenges, and also what kind of strategies, public policies, can be introduced and have an impact in navigating these new trends to tackle societal challenges?

Today we have a distinguished speaker from IBM Research in the US, Dr. Timothy Dalton. We are very pleased to have him here today and I am very much looking forward to listening

to his views and his expertise on this very exciting challenge in this area. So please, Dr. Dalton, the floor is yours.

Timothy Dalton: Good afternoon. Konnichiwa. I want to talk today about the general area of innovation, innovation using data, and show you some of the possibilities that exist when you use data combined with physics to understand physical systems. So I'm going to come today with the engineering viewpoint, science, technology, engineering – half the students in the program are from the engineering side – and I want to show you examples of engineering work motivated by societal needs.

So I want to begin with an outline. So today we're going to talk first about innovation, and some questions. What is innovation? What are some of the characteristics of innovation? What is the holistic view of innovation? And then in particular focus on data. What can you do with the data being generated today? And look at some case studies, case studies in the areas of water and energy. And then show a general model and vision for how this can be applied, and finally talk about some obstacles on the path forward before we complete.

So let's start with a question of, what is innovation? I've put together a brief outline here. Let's first begin with the origin of the word "innovation." It comes from Latin, from the word innovare, to make changes or, importantly, to do something in a new way. And I list at the end, over on the side, innovation versus some other similar concepts. Invention is creating something new, creating a new idea, creating a new method, but that's really innovation and how do you use that new creation? It requires changing what you're doing, doing it in a different way. It's not improving; improving is just doing better. It's doing it completely differently. It's not doing things a little bit better in an incremental way. It's not just being creative to be creative. It's really changing the way you execute.

I sort of sum it up as saying, utilizing new ideas that create value. Companies, organizations, can be innovative to create strategic value, create economic benefit through innovation.

So let's ask a question: is this innovation? So tissues, blowing your nose. Somebody has come up with an invention to do this. Is that innovation? It's different but does it derive value? Or another example I want to show I just found a couple of weeks ago. You have a runner who's out and takes a break from running and wants to eat a tomato. You stop, you get a tomato out. Well, has anyone seen Kagome's Tomaton, the robot that feeds you tomatoes while you're running? Is that value? It's different, but is that really innovation?

One of the key thoughts is, not just does it have to be different, do things in a new way, it has to create value when you do it in a new way for it to really be innovation.

So in the next couple of pages, I want to talk about characteristics. So we already said it's going to create value. What are some of the other characteristics of innovation?

First here is timing. Timing is everything. And there's a quote here from a fashion magazine. It's about timing: You can't be too early; you can't be too late. Innovation has to occur within a context that you are ready for the innovation.

And what do I mean? Let me give you two examples. I don't know if anyone is aware of this, but in 1994 IBM made a smartphone. Probably no one knows this. It sold 50,000 units through Bell South. And it did all the things that your current smartphone does today. You could make calls and you could also have address books and task lists and it even supported apps. You could plug a PCMCIA card in the bottom of it and load a third party app. All those features were there, but what happened to that? You haven't seen it? It didn't catch on. Was the rest of the ecosystem in place to support that innovation? So there's one example, timing. The ecosystem has to exist.

Smartwatches. Apple just had a big event yesterday or Monday, they announced their Apple Watch. Does anyone know that in the years 2000 and 2001 for the commercial version, IBM had a Linux smartwatch? You could run Linux on a wristwatch, and look at the features it had. It had a fingerprint sensor. It had Bluetooth for communication, it had a touchscreen. Anyone buy these? No. Instead you had to wait 15 years for the rest of the ecosystem to be ready for innovation. So value, ecosystem, and timing.

And there are some quotes here from some famous people about some other aspects of innovation. You can look at those and you get key messages like fast, break things. You have to push the boundaries. You have to be iterating. You look at for example the quote from Marissa Mayer who was at Google at the time, now CEO of Yahoo, talking about iterate. Get out there early, work on it, keep experimenting, and you learn from your failures. Innovation doesn't succeed the first time every time. You learn as you go through what works, what doesn't work.

So I list some of those characteristics. We've already talked about the value, the ecosystem, and timing, but also speed, iteration. And then the fact that innovation today occurs at the boundary. It's multidisciplinary. You have to go across the existing silos and bring together different schools of thought in order to create many of these new innovations.

It's collaborative. It's not the single worker that's doing this. You look at the quote about the

phone system. If Alexander Graham Bell had fallen in the river, there'd still be a phone. The ecosystem was there, the technology was about to emerge, and someone else would have invented it. It wouldn't be Ma Bell, the phone system, it might be Ma Gray or someone else. It still would have occurred. It's collaborative. It's built upon the work of other people as well. And it's co-created. It's no longer a company being innovative by itself. It's working with partners and innovating together. So a few key characteristics I want you to keep in mind.

And the other thing I want to talk about in innovation is the holistic view. Innovation extends over different domains. So the traditional thought, products and service innovation. Create some new product. Somehow differentiate yourself in the marketplace. And there's examples of it up here. So think about 3M for example, 3M and their little Post-it notes. They created a market. Before Post-it notes, what did people do? Scraps of paper taped up somewhere or something. They created the market for those easily removable notes.

The adhesive that did that was actually a failure. They were developing glues and that glue didn't work. And what do you do? You say it's a failure, the glue doesn't work? Or do you recognize that there are other applications for that beyond the original application of glue? An easily removable adhesive that could stick and it could also be removed. Someone came up with the idea of putting it on paper and they did this in the office. It wasn't a product. They created these notes in the office and started using them, and the guy that did this was getting requests from all of his coworkers. Hey, can I have some of those? Those are great! Next thing you know someone in marketing says, we can sell that. They created the market.

Go back to Ford. Ford created the mass assembly model for automobiles. It may have been a century ago but it was completely an innovative idea. Change the manufacturing process. And they revolutionized how automobiles were made. And Nintendo, the Nintendo Wii. It completely changed the interface, the human-computer interface for playing games. It's not sitting there with a little controller pressing buttons; it's now a more natural gesture. The whole area of human-computer interface, the emergence of speech as a next interface, those are all revolutionary ideas that required innovation.

So first, products and services, we think about that all the time, but what about operations? Can you revolutionize your business processes and innovate in business processes and create business efficiencies?

So look at some examples here. Wal-Mart, everyone knows Wal-Mart. They've revolutionized supply chain management, getting supplies from their manufacturers to their warehouses to their stores. They really excel at how do you optimize the whole supply chain in order to get business innovation.

Clothing company Zara. Zara has revolutionized the timeframe from design to market, one week between designing a product and delivering that product to their stores. The fashion market in general, something like six months. They've completely changed how they do their operations in order to be able to get there first.

Other examples, Southwest Airlines, a large airline in the US, they only fly 737 airplanes. What happens if you fly just one kind of plane? Your spare parts are easier, your crews, your training. Everything is easy. You don't have to worry about what kind of plane is where. They've changed how they operate and that has made them more efficient.

So products and services, operations, and the final area, think about business model, another area for innovation. Fundamentally change how you create value. And there's many different examples here. Look at UPS for example. UPS is a delivery company but they've changed to be far more than just delivery. They are now a logistics management company.

I've put Apple up there. Apple has revolutionized the mobile industry, created the iTunes Store, where they generate value from themselves through the sale of other people's assets. You sell your apps; they get money out of it. They created an ecosystem for their products locked into their iTunes Store and continue to generate value from that. Google, with the whole concept of ads and targeted advertising, changed the business model for how advertising is delivered. Uber changing how you get a taxi service. Ikea, changing furniture from pre-built to flat pack.

So the message: holistic innovation. Different areas: product services, operations, business model. All of those are important. But what I want to talk about today is data.

So think about today's world and the volume of data that exists. I've seen a reference that compares data to being the new natural resource. Data is transforming industries and professions. Think about the comparison to a natural resource, oil. There's a quote I found from 2006, one of the earliest quotes I could find, from advertising industry that says data is the new oil. There's books on the new oil, very similar. You pump oil from the ground, it's unrefined. What do you do to it? You have to process it to derive value from that oil. The same thing in data. You have a flood of data and is it worth anything if you have all this data? No, you have to analyze it. You have to refine it to generate value.

How much data is out there? First thought. Right now we're generating about two-and-a-half trillion gigabytes of data every day. That's about an exabyte a day, a zettabyte a year. And 80 percent of that is unstructured, so it's no longer a relational database with things in rows and columns and you look it up and you find your answer easily. It's being generated from audio, from video, from satellite feeds, sensor data, mobile data, geospatial, social media, all these

different forms of data are created unstructured. How do you deal with that unstructured data? There's a trillion devices generating data out there.

So I saw one study that said in 2014 the total volume of data grew by 50 percent to about 6 zettabytes, and by 2020 the total volume of data in existence will be about 40 zettabytes. So how big is a zettabyte? You can't even comprehend it. Take a four-drawer filing cabinet, fill 20 million of those four-drawer filing cabinets, and then do a million more of those, a million times that, 20 million. It's incomprehensible how big a zettabyte is. And this data that's being generated has some characteristics. Huge, huge volume.

It comes in many different forms, unstructured, structured. You have real-time data, it's in motion, it's data that's not static. And how do you trust your data? You have to have high-quality data in order to make decisions from it.

So businesses will apply this data, they will apply analysis techniques, and they will try to generate value from it, they will do it quickly, and they figure out how to analyze unstructured data through cognitive computing capabilities. That's far beyond the scope of what we have to cover today. There are new emerging analytical techniques to deal with that unstructured data.

So the data exists. How do we be innovative in the use of this data? There's some interesting trends. This data exists. The world is becoming instrumented. There are sensors everywhere. The data is available. There's the software, the middleware, the interconnectedness to get that data, and the analytical techniques all exist to analyze that data. It allows us to fundamentally change the way we execute certain operations. And I want to give you some case studies that show you how you can take this general model of instrumented, interconnected, and intelligent, and apply that to the creation of value in a smarter way.

So the first case study I want to talk about is water. I don't think anyone can argue that there's a societal need for water conservation. And my original example I was going to work with was California but I also have a second one to throw in but I won't go into a case study on it.

So the State of California in the US is in its fourth year of a record drought. The map here from a month ago, actually I looked last week and the map didn't really change all that much, it shows you the severity of the drought over the entire state. There are pictures that show you reservoirs before and after the drought. A huge loss of water in the state. Agriculture uses 41 percent of the water in the state. Are there opportunities to utilize data to make agriculture more efficient? We've been farming for millennia. It's gotten better as we went to

mechanization, industrialization, but what else can we do now applying data and applying physics to it? So that's the case study we're going to look at.

I also wanted to point out, and I just saw this in the New York Times so I put this in as well. Has anyone looked at the city of Sao Paulo, Brazil? So Brazil has 12 percent of the world's fresh water. So you could argue it, they have no shortage of water in the country. But look at the reservoir. The city is down to about 60 days of water. If they don't get some rain soon, they are in trouble. They have cases where typically people get one or two days of water and then they have no water for four days, or they'll have a couple of hours in the morning and no water the rest of the day. This is the world's 12th largest mega-city? And they can't supply their citizens with water in a water-rich country?

So there's a societal need for water conservation. Now what can you do? Let's go back to agriculture. So we'll take an example of a vineyard. They grow grapes. So how do we get high tech and innovative in growing grapes? So you can get some data, and I had to blur it out here to get rid of the specifics but you can generate yield maps. You put a GPS on your harvester and you count how many grapes you get over this grid. That's a 15 by 15 meter grid. That grid size was chosen on purpose as I'll get to, and so you can see that map. What's the first thing you see looking at this map? Non-uniform. Greatly over this little area does your yield change.

So let's think about data and science and technology. What can we do? So we get satellite data. You can easily get data from LandSat, from other commercial satellites that let you see from above what's going on in near real-time. The 15 by 15 meter cells for the analysis were chosen to match the pixel size of a satellite. You can start adding sensors. You can put moisture sensors in the ground. You can put thermal sensors in. You can do it wired. You can do it through wireless, through a low-power remote technology we developed. You can do special infrared cameras that view the field. There's lots of way you can gather data.

So now what do you do with data? If you take that data you can now start to apply physics to it. In this case you do evapotranspiration models to look at how does a plant utilize water, depending upon sunlight, depending upon temperature. You can construct a control system, a dual-drip line that can deliver water, that can deliver fertilizer, based upon some level of control.

And so then you say, let's measure what you can do once you start taking data, taking control actions on this. Okay, so, the two maps over there are something called normalized difference vegetation index. The important thing is it's a measure of the greenness of the field. How green is the canopy? It's been shown that how green it is correlates to your yield of grapes. So the more uniform it is, the higher it is, the better it is. It's a quality metric.

So what we showed is that you can do this, you can significantly improve between 2012, the business-as-usual case, and 2013, the physical analytics case where we applied our techniques to this field. We improved the yield, we improved the quality, we reduced the variability. Vineyards typically grow grapes, they ferment them in batches and it's someone's job to blend them. They make these wines and someone has to add the different wines together to get the taste profile for that vineyard. If it's a more uniform product, it's far easier to do. You have less variability.

Just announced in January, this work won an award within the vineyard industry for innovation in how you can run a vineyard business. So the net of this was, we reduced water consumption by 20 percent, at the same time improved yield, improved quality, reduced variability, through the use of data. So first case study, water.

Second one, let's talk about energy. So where do we use a lot of energy? In data centers. We all have our computers and our Wifi and our mobile devices, and somewhere there's data centers that run all this stuff.

Look at the data center. About 3 percent of all electricity is consumed in data centers. It's increasing at about 10 percent. If you look at one rack of computers, you can dissipate 20 kilowatts in a single rack. That's a lot of power, and only half of that power goes into doing any computing. Half of that power goes into support systems.

Think about every company has data centers, and you know the large data centers, the Googles, the Amazons, IBM, we all have massive amounts of data centers. Even little companies have their own small data centers. They're everywhere. So what can we do with data to optimize energy usage?

So we start being good engineers and think about what we can do. We can build a cart sized to the tile of a data center floor, a three-dimensional cart that lets you measure thermal profiles, lets you measure air profiles, and by doing that you can generate maps of what the data center looks like. Once you have real data in three dimensions, you can see features like hot spots forming in the data center. So traditionally if you're managing that data center, what do you do? You do some temperature measurements and you find, it's warm here. In order to keep that area in the specified control range, you run the air-conditioning a lot colder to bring that one hot spot down. Some spots are colder than need to be. You're using a lot of power.

So we start thinking about the physics aspects. We have these measurements. We can start to apply physics, the Navier-Stokes equation. Analyze the flow fields in the data center and start to make corrections. Simple things. Put a baffle on the back of a rack that changes the

direction of airflow. That can change how it mixes in the whole thermal profile of the data center. What can you get out of that?

So I show a couple of examples where we've done this, the before and after where you can see hardware in the data center and you see the thermal profiles around that hardware where we can reduce hotspots significantly, by four-and-a-half degrees C, we can improve the efficiency the chillers operate at. We've seen cases where air-conditioning flows into a data center and flows right back out the air return and never cools a thing. That's not very cost effective. The example shown over on the right, we turned air-conditioners off. We dropped the power usage in air-conditioners, 11.5 kilowatts to 3.5 kilowatts, and improve the temperature at the same time by understanding what was really going on. Ten to 15 percent reduction in energy by applying data and physics. We've done this in over 300 data centers. Five hundred million kilowatt hours of energy reduced, and that was a number from about two or three years ago when we did this study. Significant savings are possible by applying data and physics.

So let's talk about that general model. Put this together into how could you do this on a bigger scale? So you want to take real-time data. You want to have modeling. You want to have control actions. And use that to drive intelligent feedback control in the vision of smarter planet, smarter city, smarter building, smarter agriculture, smarter data centers. It applies anywhere you can get data and act upon it.

So the model, you have some platform that lets you get the data. The data is out there. You have to make sure it's trustable data. I said before the four V's of data, the final one, veracity. How valid is that data? Make sure it's high quality, you can trust the data. Once you trust it you can act upon it through an analytics platform. You can take predictive models, control based upon those models, and apply this to many different domains, into water, into supply chain control, into buildings, energy systems. The domains this applies to are basically endless.

Two simple case studies taking data, in water and energy, and think about here, we've shown there's value in data. So leaders are going to do this. They can see that there's cost-savings, there's quality improvements, a green brand image. You do this and you start to cut water use, you start to cut energy use, reduce your carbon footprint. It's positive to a brand image. So the leaders are going to get out and do this. How about the followers?

Are followers going to do this or are they going to need some sort of impetus to take these sorts of projects on to cut their use of water? As droughts worsen, this may become mandated. In some way you have to cut your water by 20 percent. How do you do it? This is one technique.

So think about this applied to a broader scale, taking data, and what can you do at the city level?

So there's many different visions of what we can call a smart city built upon data, and I showed four examples here. One, think about the idea of mission control. There's a picture from NASA there of a mission control for a space shot, but the concept is the same: a mission control for city infrastructure, for drinking water, for waste water, for transportation, for traffic, for energy, data available, instrumented, and you can visualize what's going on. Is it a showcase for urban planning? Take these concepts of location, of work, of home, of overall planning, combined with data, is that what smart city means to some people? Is it the wired city where all data is available, where you can act upon things in new ways?

So take an example working with police on security issues for the safety of citizens. We've demonstrated systems where you can put microphones in cities, and if there are things like car accidents or gunshots, these microphones can pick it up. You can triangulate based upon the time at different microphones, a position, and you can dispatch a car to respond before a citizen even calls and reports it through the use of data. Or the final example, self-sufficient, the eco city, this is like the Masdar example, a city that doesn't have any cars, it has transportation pods. It has renewable energy. It has a goal of not just reduced carbon emissions, but zero carbon emissions. Through innovative technologies, could you have sidewalks that generate energy while people walk on them? There's concepts, there is data that goes into that. The message: it's broad. What you can do with data to generate value is endless.

So let's talk about now some obstacles. All right. So obstacles. Does anyone recognize the Soritatsu Kabe, the Warped Wall? That's an obstacle, but in the competition people climb that, an obstacle that can be overcome.

So what are some of the obstacles? The first one we think about – privacy. There's lots of data available being used in new ways. So an example. We worked with the American city of Dubuque, Iowa. They were interested in many different aspects of city management control. One of them was transportation. So the city provides bus routes. How do you know as a city planner that those bus routes go where the need is? Well, you design routes and people show up, but is that really where the buses need to go?

So we worked to take data, data from cellphones, from smartphone apps, but do it in an anonymized way, take that data, and now you can generate a view of where people are, where they go to to get to the transportation, and is the transportation at the right location for them? Or are a lot of people coming and walking from somewhere far away to reach a bus stop? Should you change routes?

Doing that though is you have a privacy concern. As people give up that data, what is being done with it? So you have to think about people's privacy. If you're taking GPS readings, people's speed while driving, what happens to that data? So there is concern.

The second part of the privacy is security. That data goes out there. What happens to it? Do you know for sure that some third party is not going to come in and steal that data? You have to have some mechanism of guaranteeing the privacy, the security aspects.

Think about funding. Innovation projects. Okay, so they take money. You're an organization, you have a budget. You don't have an infinite budget. To fund innovation projects takes money away from existing projects. How do you balance that? The innovation project may take a year, two years, three years to execute and start deriving value based upon your business-as-usual which has small incremental benefits you can get next quarter with an investment there. So you have that funding issue.

Think about risk avoidance. How many organizations want to do something risky? It's far more natural to say things like, no, we tried that and it didn't work. Or, that's too hard, we can't do it. They don't want to take risks. You have to overcome that mindset of avoiding risks in doing these sorts of projects.

Siloing. Organizations create their vertical silos for a reason. They want to be able to get credit within that silo for something. They want to segregate themselves from someone else, be it for budgeting, for planning, for execution. Many of these projects cut across silos. They are interdisciplinary. They go across departments of organization. You have to overcome the mindset that it's not my problem, it's their problem. Oh, that doesn't benefit me, why should we help fund that, that's going to help them more. Well, there's no more us and them; you have to go across these different organizations and break through the silos.

It's about time. These projects take not only money; they take time. There's no supply of engineers sitting on the bench somewhere waiting to do something. You have to take time away from other projects to execute on this.

What about the metrics? What do most businesses use for a metric on a project? They use ROI. Is that the right metric? What about things like brand image? What about things like attractiveness of recruiting talent? Executing somebody's innovation projects helps to build those intangibles that don't show up in that ROI calculation.

Infrastructure. So we talked about data. There's huge volumes of it. It comes in in real-time. Does the existing IT infrastructure even support the capabilities to gather and analyze the data?

And then finally, are we ready for it? We said earlier, you need to have the market, the ecosystem, the clients, the timing has to be right. If you're too early, you're not going to be able to execute. The market won't be ready for it. If you're too late, someone else has already done it and they're off selling it.

Looking at those obstacles, there are solutions out there, but you think about that, the security framework, the privacy guarantees, the commitments to do this innovation work through funding, through policy, and then having the ecosystem to execute in order to find that value hidden in the data.

So what about the path forward? How do you build an innovation ecosystem, an innovation economy? I said there's obstacles, but just like that Warped Wall that can be climbed, you can overcome those obstacles.

Think about the first step here to innovate in all sectors of the economy. Innovation just doesn't happen in high tech. It's not something that's limited to microelectronics, to mobile devices. Innovation has to happen across all sectors. You can take these approaches that derive from the IT industry and apply them everywhere. You have established industries that need to be maintained and enhanced at the same time as nurturing and growing new industries.

So first thought, look everywhere across the economy. The second thought is focus on partnerships. I said it's interdisciplinary, it's collaborative, it's co-created, partnerships between academia, between government, between what I'll call innovation institutions. And then what sort of businesses? Small- and mid-size businesses, startups, the companies that are smaller, more agile, that want to take new ideas and run with them because they don't have some of that risk avoidance mentality. If you're a large established company, you may have a research organization you run to do this, you may just acquire companies. You have a cash flow to go buy a company. You also have a mindset that it's risky to do this, maybe I don't want to try it. These small and medium companies very much want to get out there, take this new technology, and take them from lab to market.

And the third part of this is the innovation institutions, partnering with the government as a focal point for industrial engagement, and there are a lot of examples out there. I listed some. Fraunhofer in Germany, ITRI in Taiwan, INRA in France, the Advanced Manufacturing Research Centre in the UK, the Industrial Research something partnership in Canada. All of these combined, there are many institutional examples out there that bring together technology, IP, and people. Part of the output of these organizations is not just the innovations. It's the people that may leave these institutions and take that innovation out to the companies, and so development of the human capital side. It's not just developing

human capital at school level; it's over their entire lifetime.

You have continuing education. You have experienced, skilled workers out there. As these new innovations occur, continue to teach them about the technology so they can improve their skills, they can adapt these new technologies into their industries, into their products and processes.

To kind of wrap this up, we talked about innovation and the concept that it's a new way of doing things that creates value. And some of the characteristics: the multidisciplinary characteristic, collaborative, co-created, the fact that you want to be fast, you want to iterate and try to get it right. It's not going to be right the first time out there. You need the ecosystem that this innovation lives within. You've got to get the timing right. And take that holistic view of innovation across different sectors, across products and services, across operations, across business models.

We looked at data. Data is a new natural resource. We have to figure out, how do we refine it to generate value and transform industries? I showed those two case studies, in agriculture, in data centers. Beyond those case studies there are endless opportunities to innovate and use data to foster progress and growth.

There are obstacles. I listed some: security, privacy, the commitment, the whole ecosystem. Those obstacles, they can be overcome.

And going forward, think about all sectors of the economy. Think about partnerships. Think about the people. And with that I'd just like to say, thank you very much for listening.

- スリン・ピッスワン
  Surin Pitsuwan
- 坂田 一郎（東京大学工学系研究科教授、政策ビジョン研究センター長）
  Ichiro Sakata (Director, Policy Alternatives Research Institute (PARI) / Professor, Graduate School of Engineering, the University of Tokyo)
- 松尾 豊（東京大学大学院工学系研究科 准教授）
  Yutaka Matsuo (Associate Professor, Graduate School of Engineering,the University of Tokyo)

【モデレーター　Moderator】

- 鎗目 雅（東京大学公共政策大学院特任准教授）
  Masaru Yarime (Associate Professor, Graduate School of Public Policy(GraSPP), the University of Tokyo)

Moderator Yarime: Thank you very much, Dr. Dalton, for your very informative and also inspiring talk about recent trends in this area.

This session is about stimulating innovation in an information-intensive environment, which is kind of a data-rich environment, and how we could identify and utilize the opportunities and also challenges for social design and management, which is the theme of this GSDM program.

Following his keynote speech, we'd like to ask the panelists to first react to the address of Dr. Dalton and then to discuss some of the challenges in this area. And we have here today our panelist, first, Dr. Pitsuwan. He was the keynote speaker in the morning session. And then also we have Prof. Sakata. He is director and professor of the Policy Alternative Research Institute of the University of Tokyo. And then we have Dr. Matsuo who is also associate professor of the Department of Technology Management and Innovation at the School of Engineering of this university.

As you know, today is the day when four years ago the big earthquake occurred, and I think this was a good opportunity to remind us of the value and also the difficulties of obtaining and utilizing a vast amount of very different kinds of data and information. So I think that initiated a lot of interest and also research exploring how we could utilize the large amount of data and what are the impacts of the big data on our behavior and innovation.

And then in other areas like medicine, what is called precision medicine is also increasingly introduced into the medical area so that it's not only about implementing medical treatment after you've found some disease but also we try to do utilize some individual data at the

gene level to try in some cases to predict or expect some kind of disease in advance.

Also, it's not only limited to the technology area, but, as we discuss in this area, interactions between innovation in technical fields and social practices are also important. And this one, just such an example, concerns politics. In the Obama campaign, 2012, they used massive amounts of data, SNS and Twitter and Facebook, and they tried to identify who would be potential voters for them, so they used this connection through Facebook and then tried to identify their backrounds and preferences, and they asked volunteers to convince these voters who are not yet decided.

Also in education, MOOCs, massive open online courses, are transforming university education. And particularly to the University of Tokyo, which is not located in a country where English is the native language, that creates opportunities as well as challenges to our faculty and students.

And then international development. The United Nations has also recently started a new program to try to tap into this big data for development issues in many areas, including water and energy, as mentioned by Dr. Dalton.

This is what is now being called Internet of Things (IoT) or Cyber-Physical Systems (CPS), which describes the large amount of data and information, which is not physical, can be linked to physical things and phenomena, and which suggests that it's not only informatics but rather it's kind of complex dynamic interactions between physical and cyber spaces, involving social, economic, and political phenomena.So we need to explore how these new trends have impacts, effects, and consequences, and what kinds of opportunities and challenges are available.

These are some of the questions I'd like to ask to the panelists.

Basically, as Dr. Dalton mentioned, there are some very interesting and potentially radically-changing trends in this area. What are the benefits and what are the advantages of utilizing these new trends and making innovations? And what are the obstacles and also challenges, technologically, economically, socially, and politically, and institutionally? And what are the barriers we need to tackle in implementing these kinds of innovations?

And then here we have this program of GSDM, which is administered by the Graduate School of Public Policy (GraSPP) and the Graduate School of Engineering, so we would like to discuss what kind of strategies, what kind of policies, what kind of interventions we could make to achieve the potential and avoid the cost and the risk posed by new trends in this area.

And then, as Dr. Dalton mentioned, how we could collaborate with stakeholders is also a big challenge to academia. We are no longer allowed to just stay in silos,focusing on writing papers in good journals, which of course remains very important, but at the same time we need to address societal challenges in collaboration with stakeholders. It is also required and demanded by the people in society, and also financially speaking I think we can no longer just ask the government to give us money, but rather we need to respond to needs and demands in society, which would require us to have a kind of new contract with society.

Then this is a symposium for GSDM, so I would like to ask what the panelists would expect in this program, and all the panelists here have much expertise, knowledge, experience in different countries in different areas, so we are very pleased to listen to what would be your expectations and what would be your questions, suggestions, and recommendations to us in implementing this new academic initiative for innovation.

So first I'd like to ask Dr. Pitsuwan to make his comments and reactions in this area.

Pitsuwan: Hello. Thank you very, very much, Mr. Moderator, for the summary of the presentation, which I think was extremely stimulating. I don't know about the audience but I feel heartened and I feel very much frightened at the same time: heartened because of the enormous power of information and of knowledge of big data that somehow if you manage it well, if you use it well, it can be very, very innovative in solving problems that we face, but; frightened because coming from the policy side, not science, not technology, not innovation, but the policy side, I have seen so much inequality, so much discrepancy, so much inability to even access information, access technology, access the power that technology can unleash.

In ASEAN ten countries it's very unequal. Japan has transferred its production network into the region, working very well, helping us to become all exporting economies. But the real transfer of technology is not quite there and the real investment and management in the kind of thing that Dr. Dalton talked about has not been present. Three countries have made it to the high income; the other seven are likely to be stuck in the middle income trap because of the lack of innovation, because of the inability to save enough money in order to invest in the research, in the development, in the innovation.

So in that sense, what is needed is a very good governance system for this information technology, for this new knowledge that we derive, that we use information analytics, that we can use them to solve many of the problems that we are facing.

Dr. Dalton used two examples. One is how to manage the water usage. I understand that in the next few decades, fresh water is going to be a reason for war, a reason for conflict, a reason for confrontation among us. What if one country on one side of the globe, one hemisphere, or one group of nations command the technology to manage the usage of water well, the rest do not have that technology, that ability. I can see this inequality among us and I can see this discrepancy among us and I can see another source of tension among us. It's not economic inequality; it will become technological gap, technological inequality, innovation inequality. So what are we going to do? We have another problem.

We need a very, very effective governance system in order to take care of the distribution.

Now we talk about intellectual property. Now we talk about safety, safeguards against intellectual property theft. There is this concept about compulsory licensing in the pharmaceutical industry, that if the country is in dire need with its AIDS or tuberculosis and you cannot afford it, your government can go ahead with what they call compulsory licensing, meaning ignoring the intellectual property of the one who has it, whoever it's Pfizer, Sanofi, whatever pharmaceutical company. You can put that aside and you do it.

What if countries and groups of countries or regions are facing dire challenges on technology? They don't have it, they need it, they don't know where to get it, it is too expensive to get it. They don't have the power to create or to innovate themselves. This is a challenge.

The other one that you use is energy conservation. Again, some countries don't have the capability to analyze every stop of the engine of energy, of electricity production, in order to save it, in order to manage it. So they will not have that privilege to save, to manage it well, to use it well, and they will go on wasting that resource, that precious resource. In the end they are not going to have enough, in the end they are not going to have electricity, in the end they are not going to have energy, they are not going to have power. What's going to happen in that world of tremendous inequality?

This is from the policy side. My first reaction is, if you don't have a good international governance system, institution, body, processes, big data is going to be good for only some of the countries, some of the people, some of the time, not the majority of the people, and that will be a source of tension and conflict later on.

Countries that you used, Prof. Dalton, I said your presentation is extremely fascinating. It's heartening that we will have this power into the future. The question is how to share it because sharing is going to be the issue of the future. Nothing is enough anymore. To breathe clean air you need an air purifier in your room. To live in a room that is cool enough

in the summer, you need an air conditioner, so you pump the heat out to the streets. Those people who are on the streets who can't afford air-conditioners will have to live in an atmosphere that is hotter than it should have been without us using air-conditioners. This inequality exists in everything that we do, in many things that we pursue.

So the example is Germany, Taiwan, France, the UK, Canada. How about Mongolia? How about the Congo? How about Thailand? Unless we have a good and effective management process and system, what you have just described is more frightening than heartening. But I hope, again, that as a species, as a human community, human family, we will evolve into that state of mind that whatever we have, for the good of the species, for the good of the community, we must share; how to devise that sharing, that sharing procedure, how to devise that effort to create equality among us, of access to information, of access to knowledge, if we don't address this problem, it will be an additional issue of tension and conflict among us.

Extremely exciting, extremely stimulating, with some cautions from someone who has experience in trying to manage inequality among us and between us. Thank you very much.

Moderator Yarime: Thank you very much, Dr. Pitsuwan, for your very insightful comments, particularly the effect of this vast amount of data information on the inequality which already exists, but somehow if we don't have a kind of appropriate system to manage it, then it could somehow worsen the situation. So the challenge is how we respond technically and socially to tackle this very serious challenge.

And then I'd like to ask Prof. Sakata to present his reaction and his comments on that.

Ichiro Sakata: Thank you for your kind introduction, Prof. Yarime.

もともと日本語で駆け足でやろうと思ってましたけど、皆さんも通訳・翻訳機を使っておられないので英語でやらせて頂きます。

I worked for the Ministry of Reconstruction for 600 days, from 2013 to 2014, and at that time I collaborated with NHK to produce the shinsai big data, earthquake big data, as Prof. Yarime introduced.

This DB is very, very informative and very, very influential for our society. And after this broadcast, our government started moving to accept information technology for their planning and especially supporting local government for regional economic growth.

Right now our innovation are actually differently innovation-rich. This is a chart of the number of journal papers in the field of nano-carbon, graphene and carbon nanotubes. In 2000 the number of papers published each year is approximately 5,000, but now 30,000 journal papers are published every year. And the total amount of the journal papers in this field is actually 300,000 papers. So the knowledge in this field becomes very huge. This is very good for our human society. However, we face another problem; that is, how to manage and how to use this huge knowledge potential. It is not easy.

This is a slide about photocatalysts, government support for photocatalyst research. As you may know, the Honda-Fujishima effect is very famous. Honda-sensei and Fujishima-sensei discovered the Honda-Fujishima effect in 1972 and published in a paper in Nature. But the government could not decide to focus on this research until around 2000. The year when the amount of total kaken support for photocatalysts is over 100,000 yen is around 2000. So it took around 30 years to support this area significantly by the government.

So this fact shows us the difficulties of detecting an emerging research field or deciding on the emerging research field, even by the government.

So far, we use the expert-based approach to decide the target areas, but, as I said, the information we can acquire becomes very large, so it is very hard to know even a piece of the knowledge world in each field.

So actually the traditional expert-based approach faces difficulties because of the scale of the knowledge, also the speed of the changes of knowledge. As Dr. Dalton said, the timing is very important, but an expert-based approach needs a long time to decide something, so the expert-based approach becomes very, very hard and difficult.

Right now we are developing a computer-based intelligence approach for R&D management. So the 300,000 nano-carbon journal papers, basically they are non-structured, but we have to get structured data for deciding something. So with a computer-based approach we try to detect the trend of science and technology or emerging research fields or complex industrial structures, and even collaborative international networks.

Our university has developed an academic/industrial technology meta-analysis system, so we have already opened this system for GSDM students for writing papers, writing drafts for discussion papers and so on.

This is an example of the meta-analysis. Our system provides the tools for identifying the hot spot between two research fields or between journal papers and patent papers. First of all, we group the journal papers and patent papers, and then this system can provide the tools

to measure the similarities between knowledge groups.

So GSDM, the main target is to discover the challenges and produce solutions for such challenges, so this system can support identifying the linkages between for example the usual technologies and the targeting challenges.

But we still face barriers with this computer-based approach. First of all, there is a lack of reliable data in the field of innovation activities. Of course we can get the journal papers very easily by the internet and patents as well, but we cannot get the other innovation-related activities, such as the invention itself.

And the second barrier is the lack of a public platform for handling innovation-related big data. Big data includes public data and private data so such a platform should handle both private and public innovation-related data.

The third barrier is the lack of organizational culture to actively take advantage of data science. The Japanese government knows the usefulness of big data, but in reality there exists a big, big barrier using big data for their decision-making. At first, I mentioned about shinsai big data. So this DB is very, very influential and this DB pushes the government to go ahead.

Right now we are developing a new big data support system for regional revitalization. The Japanese government Cabinet Office decided to accept this concept and we will open this platform maybe next April.

However, in the areas of local activities, local governments, we face still a huge gap or huge obstacles, especially about the organizational culture. However, I believe we started moving. In the near future a world aware of decision-making will be changed. Thank you.

Moderator Yarime: Thank you very much, Prof. Sakata. It was a very inspiring talk, particularly based on his actual involvement in analyzing and assembling a vast amount of data after the earthquake, and that was a kind of turning point for the government, also society in general, with regard to the value and difficulty of utilizing data. Then there are many obstacles, like reliable data and organizational culture and also platforms involving stakeholders, and these are I think the topics which we should discuss in the last part of this session.

And then I'd like to introduce Prof. Matsuo, who is one of the leading experts in this area in Japan, and I am pleased to have him here today in his very busy schedule.

Yutaka Matsuo: Thank you for the introduction. I will be talking about big data analysis and also artificial intelligence, which is recently getting much attention.

My major is web engineering and artificial intelligence, and I am working on big data analysis for a decade. Let me start with an example.

Does anyone understand what this is? This is the number of tweets mentioning the earthquake. For example, August 9, 00:00 PM, the number will grow rapidly, which means that there was an earthquake in Japan, so the number of tweets increased very rapidly. So the number of tweets mentioning the earthquake works as a sensor for the earthquake, sensory data.

Actually, at that time someone was talking about an earthquake, like, there was an earthquake, it's shaking, and so on and so forth. So we regard a tweet as a sensory value, and using natural language processing technology and machine learning technology we can get the sensory value from the vast amount of tweets, and then we can build a probabilistic model to detect the earthquake or it could be any kind of event, a natural event or a social event.

This was an architecture we developed in 2008 or 2007, and maybe this was a very early example of utilizing that social data for detecting a real-world event. Actually gathering the tweet information about earthquakes enabled us to find out the center of the earthquake because there is a speed of earthquake running. So there is a time lag between distant locations.

And we can detect almost any kind of event from social media, so we can get for example traffic jam information, we can detect flu information, so we were working jointly with some companies to monitor what is going on in society.

Also, this technology could be used for example for an election. We tried predicting the result of an election in 2008, and recently many media companies or technology companies were doing this kind of thing, but our trial was a very early initial one.

And also, we are analyzing the big data from companies, focusing on consumer behavior. We are working with a wedding information company, a housing information company, and even an idol group to understand customer behavior, which will influence how to promote their product or services or finding good catch copy or a good message for the customer. We are using the network analysis method, like Prof. Sakata, and finding out the keynote or the

very important flow in the network.

And we are working collaboratively with METI to understand the potential market of Japanese products. For example, anime or manga is very popular in many countries but we don't really understand which manga or anime could be popular if we bring that product to a country, so our approach is to get many data from the web, like the number of tweets about a particular manga or anime or the number of queries or the number of Wikipedia edits, such kind of information could be merged into one trend prediction model to show the potential need of the manga and anime. And this technology could be used for various products in Japan, even automobiles, so we are trying to predict the potential popularity for each car type. And also fashion or music, many fields could be applied to this technology.

Lastly I want to talk about deep learning which is a breakthrough in the artificial intelligence community recently because there was a very strong limitation in the classical machine-learning technology, which is that we have to create features. Features mean variables in the model. So we have humans that should create or invent the variable to analyze the data. On the other hand, the deep learning technology will enable us to automatically find or create the variables to analyze and it is a very dramatic, drastic breakthrough in the AI field.

And of course IBM is putting much investment in this technology, and Google or Facebook is also putting huge funds toward the technology. And this could expand the applicability of AI technology to various parts of society, for example Google is doing research on a robot car, an automatic-driving car, and that will influence society a lot, and in many areas in society we could use AI technology in the near future. Especially in Japan we have a very aging population. We have to have a workforce for the next few decades and robotics technology and AI technology are very strong in Japan, and maybe we can utilize the technology to increase the productivity in Japan.

And one thing that's very important in the coming AI age is that we have to create or give an objective function to the AI system, so the AI system works automatically but it should be given the objective function or goal, and how to define the goal is very important. For example, maybe we can reduce the number of car accidents with robotic cars, but what is the objective function? Is it the number of accidents or is it the number of dead people, people who will die in the accident, or the number of weighted sum of people injured in the accident. That kind of thing should be discussed in society and that is a very important issue. Maybe we have to talk about how the social system is created. We have to get back to the very initial or primitive stage of creating a new society.

So in order for that, I think the GSDM program is very key education, and maybe the discussion here could play a very important role in the coming society. Thank you.

Moderator Yarime: Thank you very much, Prof. Matsuo. I am very impressed by his research in this area with all these advanced technologies available, including the deep learning. At the end he mentioned thatsome technologies are already there. And then we wonder how we could utilize this new potential available, with risks and vulnerabilities. Thatcreates a kind of anxiety and also precarious feelings, at least to some people.

Then the challenge is how this technological potential can be utilized to tackle societal issues, needs, and demands. To do so I think it's not simply decided by engineers or technologists, but rather we need to talk with and work with society, and in that sense, as Dr. Dalton mentioned, a partnership would be particularly important.

I'd like to ask all the panelists how these new trends in potential technologies can actually be used to deal with the reality, the physical reality there, involving a lot of complexity, confusion, and friction. What can we do to make a linkage between technology and society? And what kind of policies could we make? What kind of institutions do we need to establish, locally, nationally, and globally? If the panelists have any ideas on that, I would be very pleased to listen to them.

Dalton: So we gave a couple of case studies from the cyber-physical realm of getting this data from physical systems. Think about other cases where data can be used in new ways that then require additional concerns and safeguarding how the data is used.

For example, we'll take cancer. Cancer is a concern in any country around the world. When we first did the human genome project in the US, does anyone know how much it cost to sequence a human genome? It cost 2.7 billion dollars to sequence one genome. Now you can do it for 1,000 dollars. So that opens up the concept of personalized medicine through data, but at the same time, when you give up that data for treatment, what happens if your insurance company gets that data and says you're predisposed to certain diseases, we're not going to cover you?

You can take that data though and use it positively. Different forms of cancer respond to different drugs, and as a doctor, how do you know which drug to use? You know we could try it and see if it works, try and see if it works. What if you could analyze a whole genome and come up with a treatment based upon what science says is the correct treatment course? That's a powerful use of data that could save lives all over the world, but at the expense of giving up this data that could be used in some way you don't want it to be.

So it comes back again to the need for strong privacy guarantees, strong security guarantees on that data, and how it's going to be used as we go from getting this data into realistic usage situations, so it's partially policy, it's partially technology security needs. So I

think the mandate that data be used for the application where it's supposed to be and not be allowed to be used elsewhere other than it's intended use because you have to guarantee that it doesn't cause problems as we get the generation of all this data.

Moderator Yarime: Thank you very much. Prof. Sakata, please.

Sakata: I'd like to talk about the questions from Prof. Yarime, based on an example. The platform, as I mentioned, the Japanese government established and maintains the new platform for data handling. In this case, the government player has a very, very key role in handling and utilizing the big data.

The data actually includes the GPS data from your smartphone and the GPS data of car navigation, and even includes the transaction data of sell and sold data between enterprises. These data, the nature of the data is actually public, but the holders of the data are private. The private companies are thinking about the security of the data, the problems of the privacy. As you may know, when JR announced to sell the data of Suica, JR was heavily attacked by the mass communication, so JR finally gave up selling secret data. So private data holders worry about such things.

So in this case, the government covers insurance for the private data holders, but still we face additional obstacles; that is the trust of the data, actually, how can I say this, obstacles of the results detected from the data.

So far, the public government, including local government, they may judge something based on public data, and the public data in this case, the trust or accuracy of the data is ensured by the government, but the data science cannot assure 100 percent accuracy. Predictions include some noise so that the data accuracy or trust of the result from the big data becomes another hurdle.

So the government so far does not use such data, but maybe such results of analysis are very, very useful. So we have to change the culture, the organizational culture, handling such results of big data for utilizing and absorbing public challenges. Thank you.

Moderator Yarime: Thank you very much. And could I ask Dr. Pitsuwan to react to that?

Pitsuwan: Yes, and that course probably should be called the ethics and morality of information, of big data, of technology. Many business schools have courses on the ethics of business, ethics of investment, because it is going to lead to multiple issues, multiple problems in the future.

So students of this school, this GSDM school, will go out to the landscape and will have to wrestle with this very issue of information inequality or technology inequality. Initially I think there is a need for that awareness, for the people who have the control of and have the technology, just their awareness that it could create problems, enhance even inequality. Stiglitz is concerned about inequality economically in the world, the price of inequality. This one is going to enhance that inequality, going to worsen that state of inequality, and might bring about other consequences in the future.

But eventually, and I think the global community will have to think about this, and that is a governance system that would somehow guarantee that technology, information technology, will lead to positive and productive use to solve human problems, social problems, and we will have to guard against negative use and the unfair use of information, such as Prof. Dalton mentioned. What will happen to your own personal well-being vis-à-vis personal interest, vis-à-vis the insurance, the health insurance companies? You're not going to be covered, so you're exposed. So what to do. There must be some other ways of addressing that problem of individuals exposed to this inequality.

Eventually there must be some kind of governing body that is thinking very far in the future, and I think eventually this issue of emerging technology is going to ask for that kind of eventual creation and establishment that would be intergovernmental, that would not be controlled by anyone, that would be guaranteed, that everyone has equal access and equal ownership of, and that is going to take time, but short of that, I think we will continue to have these problems and difficulties and discrepancies which will lead to other sources of tension and conflict among us, the price of inequality again, this time not economic inequality but power of knowledge, power of information inequality.

Moderator Yarime: Thank you very much. I wonder if Prof. Matsuo would like to add something.

Matsuo: I totally agree with the opinion. Actually, regarding artificial intelligence, we are recently always asked, what is the impact of AI on future society, and will AI destroy human society or such kind of thing. So actually the Japan Society for Artificial Intelligence established an ethics committee last year, and I am working as the chairman of that committee, and we are discussing the social aspect. And the ELSI issue, ELSI is the ethical, legal and social issues, and that discussion is greatly needed recently.

Moderator Yarime: Thank you very much. I'm sorry, but I thought I could have time available for taking some questions from the audience, but I think the time has already run out.

And well, it's a huge issue so I can't summarize so nicely, but I just mention one thing which

could be asked, particularly to the students and researchers in this program of GSDM. In a way the emerging technologies in an information-intensive environment expand the whole scope of possibilities, with a lot of potential, but at the same time, a lot of risks, and so this kind of variety and diversity is a critical point which we need to consider in the role of government public policies. So we can't probably think only about the average or majority any longer, but rather we need to take into account seriously that things are so diverse. Some people can utilize the large opportunities available by taking risks, whereas some others are somehow left behind, and inequality could expand. So what will be the role of government's public policies to deal with this very precarious future?

I think that poses a lot of questions to students, engineers, scientists, and also social scientists, which would also require re-examination of the whole concepts of, let's say, elections, democracy, human rights, and these kinds of cherished modern ideas. How could we think about adjusting to the new reality created by innovation in an information-intensive environment, with considerable amounts and types of opportunities as well as risks and challenges? I think that is something we need to explore in the future in this program of GSDM.

Thank you very much to the speakers, panelists, and also the audience. This concludes Session 2 on Innovation.

Coordinator Orsi: Thank you very much, Prof. Yarime, and thanks to the panelists for your participation and interventions.

We now have a small break, about 17 minutes, until four, and at four we will have our third session entitled, "Transforming Our Cities: Challenges of Urbanization in Innovative Ways," where the keynote speaker will be Dr. Isher Ahluwalia. So please, if you are not attending the last session, please don't forget to return the devices for the simultaneous interpretation. Thank you very much.

Session 3

「都市化が抱える課題に革新的手法で挑むには」

基調講演 Keynote Speach

イシャー・ジャッジ・アルワリア
（インド国際経済関係研究評議会）
Isher Judge Ahluwalia (Chairperson, Indian Council for Research on International Economic Relations (ICRIER))

Coordinator Orsi: Ladies and gentlemen, welcome back. We are ready to start with the third and last session of the event for this afternoon. The third session is entitled, "Transforming Our Cities: Challenges of Urbanization in Innovative Ways," and it will be moderated by Prof. Toshiro Nishizawa to whom I give the floor.

Moderator, Toshiro Nishizawa: Good afternoon, everyone. I am Toshiro Nishizawa, professor at the Graduate School of Public Policy. It is indeed a great honor and privilege for me to be the moderator of the session with a distinguished speaker and panelists.

The session is on challenges of urbanization, which is common interest among many emerging countries in particular, and I believe that discussing this subject is most relevant and suitable in the context of GSDM, Global Leader Program for Social Design and Management.

Many cities in Asia and perhaps elsewhere in emerging economies are in crisis. Pollution, congestion, degradation of living conditions, and in some cases, impoverishment of marginalized city dwellers are widespread phenomena and becoming very common. And the economic and social costs are huge, getting bigger and bigger. Therefore, transforming cities into inclusive, sustainable, and livable ones is becoming the biggest challenge of the day.

Transforming Our Cities is the book title. This book is the most recent work by Dr. Ahluwalia, the keynote speaker. It has the subtitle, "Postcards of Change," a very charming and enchanting subtitle. I enjoyed reading this book with a lot of stories about cities and towns in India. I was quite impressed by the description of her childhood enjoyed with family, the green, nice city environment. But now a lot of city and town environments are faced with big trouble, so we have to think about how to fix that.

Now the collection of lessons based on these case studies of cities and towns in India is shared by Dr. Ahluwalia, and their implication for future urbanization strategies are discussed

with the panelists.

Maybe an introduction of the keynote speaker was made earlier, but let me say a few words. Dr. Isher Judge Ahluwalia is currently chairperson of the Indian Council for Research on International Economic Relations, called ICRIER, and she has been leading a research program on urbanization in India since her service as chairperson of the High Powered Expert Committee on Urban Infrastructure and Services, appointment by the Government of India in 2008.

Dr. Isher Judge Ahluwalia is one of the best-known and respected applied economists in India, and also has been contributing actively to policy debate regionally and globally. She is going to share her views on challenges and opportunities of urbanization in India. So, Dr. Ahluwalia, it's time for you to share your views. Thank you very much.

Isher Judge Ahluwalia: Good afternoon, ladies and gentlemen, and thank you, Prof. Nishizawa, for your introduction. Why I had originally thought that I will be speaking on my book, after hearing the discussion and debate I thought this was perhaps a better topic and a little bit more general to give you an introduction to what India is passing through today in terms of challenges and opportunities.

As I mentioned in the morning, India for quite some time now, has been among the fastest-growing economies in the world, next only to China. Except for the last couple of years, if you ignore the last couple of years when we had a significant slow-down from which we are beginning to recover once again, and if you look at the previous ten years, our growth rate was close to 8 percent per annum, but we still have 25 to 30 percent of our population which is below the poverty line, which means that we have close to 300 million people who would be classified as poor, even as described by the official poverty line.

Therefore, the Government of India has declared as its objective, faster, more inclusive, and sustainable growth to begin to make a dent on poverty and also to lead India towards a middle income country. About 40 years ago we technically entered the ranks of middle income countries but at the low-income end, and we need to ensure that we sustain and improve our status in that.

Now the growth that we experienced in the last ten years was led by the private sector in the Indian economy, where for a long time the public sector was the leading force. This

was a major change. And, as you all know, this growth was also led by the services sector. India's role in the IT revolution across the globe is well-known. What is less known is that in the last ten years there were also some industries which took off, and these industries were pharmaceutical, auto components, and to some extent now the automobile sector, which are knowledge-based industries, and this was very different from the experience in China where growth was focused on labor-intensive manufacturing industries. In India the manufacturing sector has not done so well and there are good reasons for that.

So what has been the problem with the Indian growth process? Let me first give you four major or five major areas of challenges of the Indian growth process, and then I will come to how urbanization is one of the most important challenges facing us.

The first problem with the Indian growth process has been that it was not employment-intensive. India, as you know, is a country of 1.2 billion, and given the abundance of labor, we should have expected our manufacturing to have focused on labor-intensive industrialization, right? But what happened was that initially, because we were a heavily-protected economy from foreign trade and foreign investment and the trade unions within the country were very strong, entrepreneurs at the margin always found it more profitable and more secure to go for capital-intensive technology rather than labor-intensive.

But even after we deregulated and liberalized, beginning in 1991, tariffs came down, quotas for imports were abolished, even then labor elasticity of manufacturing did not improve. And this was partly, I would say largely, because of our antiquated labor laws and that the labor market was really very rigid because of the very strong power of these trade unions, and this is becoming a great challenge as we go ahead.

The second feature of our growth process was that when we were growing at 5 percent, five-and-a-half percent per annum, in India, up to the end of the century, up to 2000, you never heard Indian industry complaining about a skill deficit. In fact, we always used to say, you know we have so many engineers, so many scientists, and there's no dearth of knowledge-based human resource, but that was perhaps enough for 5, five-and-a-half percent growth.

When we transited to close to 8 percent growth for ten years, we found that we did not have skills to supply the kinds of demands that were coming up. So increasingly Indian industry was talking about a skill deficit, about the mismatch of skills that the kind of educated people that our educational system was delivering was not what the industry wanted, and we needed to fix our higher education, we needed to fix our skill empowerment, particularly because we are increasingly a young nation. The weight of younger people, working-age people in our population, is increasing.

Another major reason why our manufacturing sector did not do well generally, and this is well-known in Japan because Japan was one of the first economies that went with foreign direct investment into the Indian manufacturing sector in the 1980s, even before we had started liberalization, one of the main challenges, is the difficulty of doing business, and this had to do with government red tape, regulations, inefficiencies, corruption, all of that.

But today there is another very important dimension added to this difficulty of doing business: it is the state of our cities. Because in the last ten years there was very rapid growth and some cities acted as engines of growth, these were mostly cities in the south of India, Bengaluru, Hyderabad, Ahmedabad, Mumbai, Delhi. As these were the only cities which were acting as engines of growth, they were fraying at the edges because there was no planned urbanization, there was not adequate and adequate quality infrastructure in these cities. They could no longer provide the economies of agglomeration which will attract more investment. And so the difficulty of doing business was further complicated by the unlivability of the cities in which investors would go.

And in that context, when you look at the Indian economy going through a major structural transformation, when we are moving away from agriculture into industry and services, when we are moving away from rural contribution to the GDP to increasing contribution of the urban sector to GDP, what are the challenges that we are facing and how do we attain faster, inclusive, and sustainable development? – this, when incomes are rising, education levels are rising, the youth is impatient and their aspirations are rising even faster than their incomes. So in that context, what you find is that because we are a democracy there is a lot of noise and dissatisfaction with the way things are happening, and in order to understand what is happening in India, you need to filter the noise and look for the signal. So what I'm going to try to do in some of these slides is to draw your attention to some of those features which enable you to understand what we are going through.

So if we can have the first slide. You see, we have only 33 percent of our population that lives in urban areas, and look at China, 56 percent, Mexico close to 80, Brazil 83, so as the numbers go, our urban population is not very high, but we can't even seem to manage this urban population. If we go to the next slide.

Now this takes the largest 18 states of India, and what you find is that there are only about five or six states in which the urban population is more than 40 percent. For the rest of the country, for the other states, it's somewhere from 12 percent to 35 or 36 percent. So we still have a long way to go if the growth process takes off and there is migration from rural to urban areas.

If you look at the next slide, what this slide tells us is that just as you find in the case of

countries across the world, if you were to map the countries of the world with their per capita income on one axis and level of urbanization on the other, you will find a curve like this. We see the same thing in India. If you map the different state governments' GDP, their per capita income, and urbanization, we find that as you go to richer states, the level of urbanization increases. So if more poor states in India are going to become rich, we will have them moving closer to the higher-end of this chart and that again would mean that your urban population will increase at a very rapid rate. The next slide, please.

So today, India's urban population is about 420 million, and this is projected to increase to 600 million by 2030. Cities with a population of 1 million and more are today 53 in number, and they will increase to 87 by 2031. Let's go to the next slide, please.

This is actually a very, very important slide, but maybe you can only look at the all-India number. What this tells you is something about the political economy of India. Mahatma Gandhi had said in the 1940s, when he was engaged in the struggle of political independence of India, he had said that India lives in villages. Now that was in 1945. Today we are in 2015 and we have just started the process in the last ten years of migration happening from rural to urban India, but the politics of India is fixated on the rural sector. In the politicians' mind, India lives in villages, so a lot of the government schemes are directed at the rural sector, whether it is road development, rural health insurance, employment guarantee, all these schemes are directed at the rural areas.

Now if you have these schemes coming from the center and you are going to distant corners of the villages in which there is money being dispensed, there is a lot of filtration along the way. As a result, the village political leaders would rather be called village leaders than town leaders, even if the census of India declares that they are now ready to be called a town. So if you look at the so-called census towns and you look at the all-India column, between 2001 and 2011 there were more than 2,000 areas which the census of India had declared that they should now be called towns rather than villages.

But you look at statutory towns, towns which the state government have notified as towns, the increase is only about 200-plus, which means there is reluctance on the part of the state government because there is a reluctance on the part of village leaders to concede ground saying this territory is now ready to be called urban. So these are areas which are on the outskirts of major cities. They are crying for urban infrastructure, but the leaders in charge of those areas are really not willing to argue for urban infrastructure, and this conundrum has to be resolved if we have to go for planned urbanization. Let's go to the next slide.

As I mentioned earlier, we have about two-thirds of our GDP which is coming from urban areas. This is expected to go to 75 percent, so we need many more Indian cities to act as

engines of growth, so we need to fix our cities and we need to provide services of high quality, we need to have design and planning properly, we need to create a financial model by which we can do economically-sustainable and environmentally-sustainable development of these cities. Shall we go to the next slide? Maybe we can pass that. Let's go to··· Yes.

So the challenge of faster and more inclusive growth is that if we are going to grow at 8 percent per annum, let us say, then this growth will have to come from industry and services. In order for this growth to really provide employment in the cities we need to have an employment-intensive growth model, we need to modernize our labor laws, and provide social protection to those who cannot be part of this system. This last statement on this slide is very important. In India very often people ask a question when you talk about urbanization: Do we have to urbanize? Can we not stay and improve the infrastructure in our agricultural areas? What's wrong with that?

Now what's wrong with that is the following. Of course you should improve your infrastructure in rural areas, but at best the rural areas will give you 4 or four-and-a-half percent growth. So if you are satisfied with that growth, you don't need to do anything else. But given that 300 million people have to be lifted out of poverty you need faster growth, and that growth can only come from industry or services, and what we need to do is we need to improve the productivity of the land in the rural areas. We need to move away from low-value crops to high-value crops. We need to invest in logistics and refrigeration so that urban demands for food can be met by the rural sector. So the truth is that the fortunes of the rural sector are crucially linked to the manner in which growth in the industrial and services sectors unfolds.

Now if we go to the next slide, I think 17 is what I'm looking for. Yes, that's the one.

Now here you see about seven years ago the government of India had set up a committee in which I was invited to be the chair, and we were supposed to give them an estimate of how much money was needed to bridge the infrastructure deficit in Indian cities. Now we did detailed calculations and we came up with an estimate of a little over 800 billion dollars at that time, over a 20-year period. The question was, where would this money come from?

So very often a pat reply would be public-private partnership or from municipal bonds, but we made the point that neither municipal bonds nor public-private partnerships will put finances forward unless you had a revenue model. So it was very important to have user charges which will cover the cost of service delivery, and when you go down that path and you look at what is needed, actually, what is most crucial for India to be able to plan and manage its cities really is governance because, as you may recall, very often when you study any developing country and you go to the phase when there was a sudden take-off in growth, you will be able to pinpoint some policies, either the economy became very open to

trade and investment or they did some major reforms and growth took off.

But now we have realized the hard way by looking at the experiences of many developing countries that policies are not enough to sustain growth. Along with policy reforms you need institutions to be reformed. So if you say that we have opened up our telecom sector to private investment or we are inviting private investment in electricity to come, that's very good, but you need a regulatory framework which can ensure that the competition, both domestically and from foreign investment, is channeled in an efficient way to deliver what you are looking for but you do not…

In India the problem has been that regulatory reforms have come after we have opened up the system, and indeed in many countries you find that institutions take time to adjust, not just the institutions of regulating markets, also institutions of legislation. If you need modernization of laws, that takes a long time. Institutions of judiciary. If your judiciary has to see that contracts are enforced, but you don't really modernize your judiciary with proper infrastructure and demanding better governance from them, it will not happen.

So very often we find that when an economy takes off, we call it collapse of governance. Actually, it should not be called collapse of governance; it's the time taken for institutions to adjust. And while all this is going on, it looks pretty chaotic, especially if you are dealing with a democratic country because political vested interests are always there. So that is the state in which we find the Indian economy today, in which, given its structural transformation, we need growth of industry, we need a lot of employment, we need the kind of cities in which innovators, skilled people, and entrepreneurs should want to come and invest. And all of this is happening at the same time but to different degrees in different state governments because the principal players in this are the state governments, and they have to motivate the city governments to actually do the job because the constitution has now transferred the responsibility from the state governments to the city governments. But finances have not been transferred, so state and city government have to work together to build capacity and manage this challenge of urbanization as the Indian economy finds its feet in the big wide world and works toward global competitiveness and faster and sustainable growth.

So I think with these words I have probably laid out the challenges and the opportunities, which are tremendous, 800 billion dollars only for urban infrastructure. And then different areas of manufacturing and services sectors where you have tremendous attraction, but if we don't fix our cities, neither domestic investors nor foreign investors will find it attractive to come and participate in our growth process.

With those words, let me say thank you for giving me this opportunity.

- ティモシー・ダルトン
  Timothy Dalton
- 加藤 浩徳（東京大学工学系研究科教授）
  Hironori Kato (Professor, Department of Civil Engineering, the University of Tokyo)
- ヘン・イー・クアン
  Heng Yee Kuang

【モデレーター　Moderator】

- 西沢 利郎（東京大学公共政策大学院教授）
  Toshiro Nishizawa (Professor, Graduate School of Public Policy (GraSPP), the University of Tokyo)

Moderator Nishizawa: Now it's time for our panelists to come on stage and we'd like to hear from each of the panelists their views about how to deal with urbanization challenges. I'm sure that each of them, with different backgrounds, could give some hint on how to deal with these challenges ahead.

So I'd like to invite Dr. Timothy Dalton to give us his views. I assume he's going to talk about how to utilize data sources to deliver solutions.

Dalton: Yes, you will see synergy from my earlier talk to the comments now. So my thoughts on the area are going to continue along the lines of what I was talking about earlier, and I'd like to begin with looking at a thought here. We look at the number of megacities that are here now, the number that are growing. The 21st century really is the century of cities and the need to have sustainable, viable cities with a goal of a prosperous sustainable city with efficient service delivery for the citizens and for the businesses there. And the thing we have to realize is that cities, urban areas, are living entities, they are very dynamic, and they require planning and operation to deal with this dynamic nature. Data gives us real-time awareness, let's us efficiently operate and efficiently manage.

Think of a city as a system of systems, and how do you operate all of those systems synergistically to get optimum performance and efficiency? And I'd like to show some examples of delivering insight to city managers through data, and this data is really enabled

by this confluence of IT trends that are happening right now, the emergence of cloud-based IT, analytics available upon data, the access to data through mobile platforms, through social platforms, as we saw in the response earlier in the analysis of Twitter data to enable a pulse of what's happening, all of that also with the requirement for security.

What are the data sources available in urban areas? There is a wealth of them. You can put all kinds of sensors out there. We have surveillance cameras to give you video feed. Mobile phones are everywhere. Are we going to reach the point where the mobile manufacturers start to integrate specialized sensors and give you a distributed sensor platform? What if you had some sort of pollution monitor built into everyone's phone and you could get real-time maps of where pollution is in urban areas just from everyone who is traveling around?

We have cases where we've designed special smartphone apps to collect data and transmit it anonymously and it lets us get another source of data. You said social media as a source.

City agencies have their own databases. There's weather services, satellite data. There's all kinds of other databases out there that all need to be pooled together to enable these solutions and enhance service delivery, and it's going to allow us to address the needs of citizens and businesses and bring forward that prosperous future, sustainable future, to these urban areas. So let's look at some ways to do this.

So the three thoughts I want you to take from this is we use data to do three things: insight, efficiency, collaboration. And I'd like to go into some examples on that.

So we look at, what does it take, what are the three key service areas in this city structure: planning and management, infrastructure, people.

So planning and operations. Right now think of systems of systems, but how do these systems run now? Typically they're siloed. You have someone in charge of water, someone in charge of waste water, someone in charge of transportation. How much do they talk to each other? If you want to think about planning and operations, think about the smart city sort of view, I had it painted first, of an integrated operations center.

So an example of this we did in the city of Rio de Janeiro. Rio is going to host the Olympics in 2016 so we brought together 30 different city departments and all kinds of data sources, and one of those data sources, the ones we listed, plus things like rain gauges, the possibilities of rain and flooding during Olympic events. Another thing to worry about is all that storm runoff. All that data together, 30 city departments with an integrated view of all the systems and how they're operating allows them to have very rapid, very coordinated responses to the needs of citizens and businesses in the city.

Buildings. Think about the fact that buildings utilize, one estimate is that 72 percent of energy goes into buildings in some way. If you understand the usage of buildings, who is in it, what the conditions are outside, you can more efficiently control all of the systems within a building.

We get to the energy infrastructure. We've seen where you institute smart metering of energy. We've seen 10 to 15 percent reduction in energy usage by people just allowing them to have access to a portal that lets them understand their energy usage patterns, and if you add to that smart energy meters that trade energy essentially, let them have tradeoffs to when they utilize energy based upon market prices, again, that drives down consumption from peak points at highest price to off-peak at much lower price. Giving citizens the data on how their energy is being used, what it's costing them, they can make trade-off decisions.

There was a pilot project we did with Pacific Northwest Labs and some utilities up in the northwest US that let people set metrics and control schemes for their heating and cooling systems in their house, not just based upon what you do now, like temperature versus time or something, but allow them to institute tradeoffs: you have a desired temperature, but if the prices goes up you're willing to make tradeoffs and deviate from your desired set point based upon cost. That drove down energy use.

So water. I talked to you earlier about one way of conserving water in data in agriculture. Let's talk about leaks. Thirty-six percent of all the water in Sao Paolo was lost due to leaks and theft. How do you understand where leaks are? If you start looking at your water system and all of the high-value assets in it, you think of the pipes, the valves, adding smart meters, those are assets in your system. Once you get data now at every point in your system, you can see where water is going and where you're metering at different points and where it disappears. When we instituted smart water meters, again in Dubuque, Iowa, in a project there, we were able to find leaks at eight times the rate that they were being found in non-smart-metered areas of the city. So huge improvements in efficiency by understanding the utilization of the resource.

Think of transportation as a network of systems that form the overall transportation system. I discussed earlier the example we're utilizing data to map out routes of where people are, where they want to go, and where the services should be delivered to optimize that service delivery. Communications is critical to growth in the modern innovation-driven economy.

The people aspects of this. Education, can you use data to identify at-risk individuals and deliver services to them? For example, in North Carolina, a project where we deliver through the cloud, educational services that are the same, whether the student is in a poor rural district or in a rich suburban district or in an inner-city district, it doesn't matter. They get the

same education delivered, and you can target their performance, how they're doing, and deliver extra educational services, delivering an equality of service.

Delivering health care, social programs to get the right care at the right time in the right location.

Public safety, the example of utilizing data to locate accidents, to locate crime, and being able to respond to it before the citizen calls it in. Utilizing data.

Government agency administration. So typically government agencies are siloed. We talked about how data in one case in an integrated operations center can bring them together, but what about their processes that the government agencies utilize? Typically each agency has its own process, its own paperwork, they're not integrated. There's no economy of scale when you deal with government in that way. We worked with the city of Helsinki, Finland, took 35 government agencies and put them on a common platform to share data, to share processes, increase their response time, cut their paper usage by 40 percent. Great possibilities by having people share data, utilize data, to deliver benefit.

So I said insight. Real-time awareness and sharing of data and analysis across those agencies to delivery services more efficiently. That efficiency: reducing the cost, better response time. You can now do scenario modeling, what ifs, as you change the way you deliver services and how that will impact the people those services are delivered to. And then improved collaboration by having this data and access to it, collaboration between city agencies, departments. And then who are the end users? The citizens, the businesses that make up that urban area.

So to summarize it, delivery of insight and planning and operation, the efficiency of that operation, collaboration across the whole ecosystem through urban data and the variety of sources that I list there, enabled by this confluence of technologies. It's going to enable the smart sustainable cities of the 21st century.

And I'd like to stop there and say thank you.

Moderator Nishizawa: Thank you very much. These comments add a new dimension to the discussion. Technological advancement are expected to help address existing challenges.

Next I would like to invite Prof. Hironori Kato to talk about sustainable urban transport. The focus is on urban transportation issues.

Hironori Kato: Thank you, Prof. Nishizawa. Good afternoon, ladies and gentlemen. I am Hironori Kato from the University of Tokyo. I am a civil engineer, particularly studying transportation. I really appreciate the impressive presentation for Dr. Ahluwalia about Indian cities. Unfortunately I have never been to Indian cities, but I have many experiences working in eastern and southeastern Asian countries.

Today I talk about the views from transportation engineering or transportation planners about urban issues or sustainable urban transportation.

Dr. Ahluwalia emphasized that urbanization could be a quite important issue for future Indian cities. This is also the case in other eastern or southeastern Asian countries. Actually most of the cities in eastern or southeastern Asia have already experienced this very rapid urbanization, including China or ASEAN countries. Most of those countries actually suffer from too much high-speed urbanization. Efficient urban transportation could be one of the most important or critical factors for sustainable urban development.

Let me start with the so-called “motorization spiral.” I would like to introduce the concept first.

The motorization spiral consists of three components: “transportation service,” “people's lifestyle,” and “urban structure.” We can start with any component, but let me start the people’s lifestyle. In many cities of eastern and southeastern Asian countries, people's lifestyle has already become a car-dependent one, so most of the people prefer using cars. Particularly because of the recent economic growth, more medium- or high-income people start to own their personal cars, thus the number of people with car-oriented lifestyle has become larger. Such people live typically in suburban areas, commute to their offices in the city centers by car, and they may also go shopping to big mega-malls located in the suburban area by car. They could changes the urban structure into car-oriented or car-dependent one with very widespread area and low population density. It may become a city like many cities in the United States.

Unfortunately in the car-oriented city with low population density, public transportation has difficulty to survive. This is because accessibility to the nearest station is so poor that the public transportation operators cannot get sufficient revenue from ridership. Then they must reduce service frequency, and the poor service level of public transit promotes people to avoid using public transportation service and to use cars more.

A series of those events is a kind of cycle. This is a reason for calling it the motorization

“spiral.”

Many cities are facing quite similar problems. Under this cycle, cities are becoming more and more bigger and widespread where more energy is consumed because car uses more energy than public transit users and also because the travel distance in widely-spread cities is much longer than that in the compacted city. How can we stop this spiral? This is a key question for urban planners as well as transportation planners.

Today I will show three potential approaches to stop this spiral. One is the psychological or educational approach. Actually, education is one of the most important components for changing people's minds. The second is a joint planning of land-use and transportation. And the third is a traffic demand management, including some kind of user charge-based management system as pointed out by Dr. Ahluwalia.

The first is the psychological or educational approach which aims to cut the links connected with the car-oriented lifestyle.

Not only in Japan but in some developed countries, so-called “mobility management” has been becoming more and more popular, in which people are educated for sustainable behaviors, for example without using cars, and for understanding the importance of sustainable development.

Of course school is one of the important places where children learn about sustainability, but in addition to schools, even in the job places and workplaces, workers could also learn how their use of car impacts the environment or urban conditions. This kind of curriculum or special innovative teaching program have been developed using the theory of marketing or management or psychology.

Several specific ideas have been proposed for mobility management, as shown in a diagram proposed by Jones and Sloman. This is originally from the UK. “Awareness,” “acceptance,” “attitude change,” “action,” and “assimilation” are the important components. This type of cycle could be quite significant for changing people's way of thinking and actions. This may be quite traditional but quite significant to stop the motorization spiral.

The second one is the joint planning of land use and transportation which intend to cut the links connected with the car-oriented urban structure. In Japan recently a keyword of “compact city” has become more and more popular. This concept tries to guide the urban land-use patterns into smaller space with higher population density in a specific area, particularly along the public transit stations.

Joint urban development with the transit line is often called “transit-oriented development” or TOD. TOD is a mixed landuse pattern of residential, commercial, and even business areas, designed to maximize accessibility to public transit. We may use some special financing schemes for gaining fund from land users for investing the public transit system under the TOD. For example, value capturing is one of important methods, which is related to “unlocked land value.” Although its application may be quite difficult in developing world because of its poor governance, but in some countries particularly in the developed world, for example in the US, it has been introduced as the tax increment finance or TIF. The joint planning of land-use and transportation could be very useful for promoting the public-transit use due to better accessibility and it could also contribute to collecting fund from land users for better public transportation system.

One additional map. This is Tokyo where the black lines show railway lines and the red-colored areas are highly-developed areas. You find that most of the red colored areas are located along the railway lines. In this sense Tokyo may be one of typical models of TOD. But how has Tokyo realized the integration of land-use pattern and rail network development? This is still a challenging question. We may need to explore the reason, process, and history of Tokyo’s urbanization in the past.

The final one is the “traffic demand management.” It tries to cut the links connected with more car-use and less-use of public transportation. You may know “road pricing,” which has been introduced into Singapore, London and some cities in European countries. They collect the charge for using roads particularly from car users. When the car users want to enter the center of city, they need to pay money; otherwise, they cannot enter it by using car. People who do not want to pay money for using cars, they should give up traveling or should shift to public transit. In this sense it is a way to motivate people to stop traveling or to change their transportation mode from cars to public transit.

The road pricing is just one of many methods of traffic demand management. Other example is the number-plate regulation, which has been introdueced into some cities in China or Korea. For example, cars with only odd-numbered plate are allowed to enter the city center on specific days. This kind of regulation is expected to reduce the car-use demand. However the travel demand management policy is often difficult to be introduced actually because car users usually do not agree to introducing the regulation.

Then in the final slide I would like to highlight the importance of consensus-building. To realize the sustainable development in cities, we should get good discussions among stakeholders and to get the consensus among the people with different ways of thinking.

Although an integrated policy should be a keyword for sustainable urban development, it

is always challenging because different people may think and act in different ways. Urban system is very complex, which is related to various issues and various people. Thus public policy approach should be more highlighted in addition to engineering approaches. This is all of my talk. Thank you very much for your attention.

Moderator Nishizawa: Thank you very much, Prof. Kato. The three approaches are very specific, and afterward I'd like to hear Dr. Ahluwalia's comment on whether these approaches could be introduced in India. A question to be asked might be what conditions should be met.

The third panelist is Prof. Heng Yee Kuang. He is going to shed light on a different aspect of the challenge and opportunity. He is going to speak about Transfer of Urban Solutions Between Cities: Rebranding. A very different approach and it should be very interesting.

Heng YeeKuang: Thank you, Prof. Nishizawa. Well, I'm from Singapore which is classified as 100 percent urban, so I should have something to say about urbanization problems. When Prof. Nishizawa asked me what I want to speak about on this panel, I read Dr. Ahluwalia's fascinating book, and what struck me was the central significance of urban solutions to urban problems, like sewage and water treatment. And Dr. Dalton also mentioned earlier the importance of detecting water leaks efficiently and quickly. So I thought I would like to share with you some of the research projects that I'm currently involved in at the Lee Kuan Yew School of Public Policy in Singapore where we have tried to develop interdisciplinary approaches or try to understand and analyze the behavior of cities. So this is a funding scheme that we've launched recently to try to foster collaborative research across different disciplines.

So this is one of the first projects that we have funded, and I'm involved in this because of my background in international relations, but there are other colleagues who come from other disciplines. For example, I've got a colleague from Thailand who works on public management and I've got a colleague from Korea who is a specialist in urban studies. So what we want to try to do in this project is to look at cities in Asia, bringing our own disciplinary lenses to try to see what is actually going on.

So we formulated several research questions for ourselves, and I've listed them there. And particularly our focus is on urban solution providers, and how are cities rebranding themselves as urban solution providers?

The second question that we wanted to ask is, how can networks be used to explain the transfer of urban solutions internationally between cities?

And finally, how is this branding or rebranding strategy related to the city's international profile and international power as well.

So we chose three cities as our samples and we conducted fieldwork and data collection in 2014, last year, as you can see, Tokyo, Seoul, and Bangkok. We conducted interviews at the various metropolitan authorities in these cities focusing on issues related to water, waste and sewage treatment, urban planning, disaster management, and also, more crucially, the collaboration and transfer of urban policies between these different urban entities.

Let me just talk a bit about one of our cases and that is the export of water expertise from the Tokyo Metropolitan Government to Bangkok, and we see this as an example whereby megacities, global cities like Tokyo, are positioning themselves as urban solution providers, and internationalization of policy transfers between cities.

We've done a bit of document analysis and also interviews, as I mentioned earlier, and these are just a sample of some quotes that we have gotten from the Tokyo Metropolitan Government. You see there planning documents which try to present what Tokyo should look like to the world, particularly I think if you look at the second quote whereby then-governor Ishihara suggested that, "Tokyo should present the world with a vision of how cities should be lead to solving common problems shared by humanity."

And what struck us from our interviews, for example at the Bureau of Waterworks at the Tokyo Metropolitan Government, is this desire to position Tokyo as a world-class supplier, seeking to support developing countries and developing cities that are all facing the same problems of securing safe and reliable water supply and sewage treatment.

We see there again all these brochures that tell us about what Tokyo is trying to do in terms of providing solutions to the world's problems, particularly as they result from accelerating urbanization.

So looking at the collaboration between Tokyo and Bangkok, we see that there are several ways in which this has developed over the years, international cooperation for example, dispatch of engineers from Tokyo, and this was also often undertaken under the umbrella of JICA, and we see these involvements of national-level agencies working with municipal-level entities as well.

But what struck us also from our interviews with Bangkok engineers was this emphasis on

strong personal relations, which they feel they have developed over many years of drinking sessions with Japanese engineers who have been sent to Bangkok. And let's not forget the crucial involvement of business companies and private actors as well. So Tokyo Metropolitan Government has actually set up a subsidiary, a private company called Tokyo Suido Service, and it also invites private companies to bid on all these projects that it has collaborated with, with regard to Bangkok. So we see also these involvements of business networks and private companies as cities seek to export urban solutions overseas.

Now it's not just a one-way process. We also discovered that Bangkok has also tried to share similar technology advances that it has developed on its own, for example trying to manage flooding. We all know that Bangkok experienced severe flooding back in 2011, so it's been trying to share some of its experiences with trying to manage flooding problems with Tokyo as well, so it's more or less a two-way process as well.

So what are some motives for this urban solution provider strategy? Is it possibly related to a desire of major cities, like Tokyo for example, to influence the development of new global urban norms? Or is it also driven by the desire of private sectors, like private companies, to generate new avenues for generating revenue? Is it also related to private sector profit-making? But what also emerged from our research was the need to maintain expertise, especially in Japan, with a shrinking population, a shrinking pool of engineers. And particularly when Tokyo has already a well-developed infrastructure, it also needs to provide training for its engineers by sending them overseas to developing countries to develop their skills and expertise as well.

And this is not entirely controversy-free, so there are several issues that also arise in terms of policy implications. Why should a city for example use taxpayers' money to build someone else's infrastructure? What are the benefits that it hopes to gain from doing so? Cities are not really set up to make profit; they are not profit-making bodies. But should they also be if they want to maintain expertise and develop and provide better quality services to its citizens?

And we also discovered several gray zones emerging whereby we discovered there were several cases of retired city public engineers who set up their own companies, private companies, who then bid for projects which were then awarded by its former employer, so this also raises lots of gray area issues for us to think about.

This is a preliminary stage of research so we don't actually have final conclusions as yet.

Just to conclude, what is the significance of this move by cities to position themselves as urban solution providers? Is this a new city branding strategy where cities compete amongst themselves to provide the best solutions? Tokyo is not the only city that is doing this. We've

done interviews in Seoul, in Korea, and Seoul is also very actively, aggressively branding itself as a solutions provider.

So when we think about cities, often in terms of branding we often come across ideas related to, say, tourism and trying to attract tourists by branding itself in an attractive manner, but I think now there are developments in the way in which cities are trying to rebrand themselves, not just as attractive tourist attractions, but also as attractive urban solution providers as well.

And secondly, the importance of intermestic networks where there are multilevel agencies and multilevel actors that are collaborating in this attempt to facilitate the transfer of urban solutions across cities around the world. So it's not just cities themselves, it's not just business entities or private actors, but we also see national agencies, like aid agencies, JICA, KOIKA, these are also actively involved in facilitating the transfer of urban solutions. So with that I'll end my comments. Thank you for your attention.

Moderator Nishizawa: Thank you very much, Prof. Heng. I'm quite impressed and encouraged by the new ideas, approaches, and strategies.

And now I would like to ask Dr. Ahluwalia. The question is how you would connect these ideas, approaches, strategies, with urbanization challenges and opportunities in India. Could we hear your views on that?

Ahluwalia: Thank you. First of all, let me say that this discussion has been very rich. There are some very, very rich ideas that have been presented. And let me go backward, from the last presentation by Dr. Heng. He talked about cities in Asia, how they are rebranding themselves and how there is transfer of urban solutions from cities like Tokyo, Seoul, and others, Singapore, to cities in many, many developing countries and perhaps even other cities.

Now, you know, these solution providers will need the transfer at three levels: first is technology transfer; second is policy advice because even the best of the technology transfer will not work if the policy environment was not right, and; third, the most important is the institutional framework within which the new technology and new private sector or new public-private partnership has to function.

So, much of what you are saying is being attempted in a small measure in some cities. We have Veolia from France working in public-private partnership to deliver 24/7 water in ten or 12 cities in India. They have succeeded in cities in which they have been able to get the institutional reform and tariff revision. In other cities, their presence and that of other private

players with the right technology has not worked because government is not willing to cover the cost with user charge revision and the governance mechanisms are not quite right.

Even within India, in my book that Prof. Nishizawa talked about, Transforming Our Cities, there are some sectors in some cities in which you have seen a huge transformation in a very short period, and what were the factors that brought it about? You had new technology, you had IT, you had private sector participation, you had the state government providing an enabling framework, but above all, above all of these things, there was a champion that was pushing for reform. In the end, human leadership, which we normally tend to discount, ends up playing a very major role when you are talking about big changes.

I was once in a meeting with the president of the World Bank when I was still working on my book but I had my case studies with me. He had called a meeting of about 20, 25 people from all over the world, and he had just come in as the World Bank president, and he was fascinated by the slogan of science of service delivery. He said this is the time when cities have to play a major role and I want to understand the science of service delivery so that we can really bring about a change.

I said to him, I said, President Kim, I have been working for the past five years, I have visited 50 cities of India and I have case studies of about 30 or 40 of them, and at the end of it, while each case study I can look for, in each case study I can look for financial and environmental sustainability of a project which has turned things around so that outcomes on the ground are better, that much is there. But it's in the end when I look at all 40 of them, it seems to be the art of service delivery and not just the science. It's not about technology – it's about behavior change, it's about institutional resistance, whether it is from trade unions of municipal workers, or it is from local level politicians.

Tim, you talked about IT. I have also documented cases of improvement in grievance redressal by use of IT and e-government where you actually do back-end integration, as you talked of, of departments and all, and if you find that your community bin has not been cleared, you can take a picture, download it on the server, and the municipality is bound to get back to you to say how they will get it cleaned up.

But you will be surprised to know that in this dust bin cleaning where surveillance cameras where used, the only reason they were successful in the first instance in Hyderabad was because it was private contractors who were cleaning the dust bins and the municipals workers were only supervisors who were given cameras, so they had nothing much to lose and they were doing this. But even that system did not last because in the end they knew that the axe will come to them also.

So can you imagine what reason was used to roll back the system? They said, we will agree to biometric attendance, which means we will come on time to the municipal office and go back, give our biometric attendance, but take back this candid camera surveillance. Why? Because we don't want our women to be caught in pictures while they are cleaning the community dust bins. So there is no end of imaginary bottlenecks when political groups come together, and if municipal workers have been used to not working but being paid with full job security for decades and decades, you are not going to change this overnight. But that doesn't mean that···

Then two weeks ago, I was in another small town, Daklyan-Dombivali, which is near Mumbai, and I was told that now what they have started is they have cut out the municipal people. The municipal corporation is broadcasting everywhere that any citizen who finds a dust bin not cleaned can take a picture and send it to us because now most people have these smartphones, and the municipal officer is obliged to get back within 24 hours either with a solution and a new picture or giving you a reason why he or she is not able to do that.

So in our countries with so many entrenched interests, reform is always two steps forward, one step backward. But what intrigues me and what I told the president of the World Bank, and that's what I want to tell Dr. Heng also, is that there are 40 successful cases of solid waste management, waste water treatment, water issues, public transport, green spaces, with these examples in front of people as demonstrations, why are we not able to scale it up? What stops us from bringing about a change in a very short period? It is not all about technology and it is really not also all about political resistance also, although political resistance plays a very major role in democracy.

I will give you another example since you like technology, IT. With IT, a municipal commissioner in a small town of Pimpri-Chinchwad in Maharashtra decided to go for consumer grievance redressal in a big way, so he prepared brochures on all the questions you ever wanted to ask your municipal commissioner, all the numbers that you need to know if you had a grievance and we will get back to you. People could use the internet. He set up internet cafes. You can go there if you don't have your own computer. You could use mobile phones. You could use the brochures and turn up there. He transformed the scenario. People were very happy.

This is before the last election of last year. Three months before the election this man was moved, and what was the reason? I happened to know even earlier on when he was bringing about these changes that the corporator, the municipal councilor of that area, complained to him saying that earlier on I used to have 400 appeals over the weekend to me saying this is not done, that is not done, and I would get this done. Now if through e-governance you are going to do all this job, what would happen to my woods?

Now it's true that the transfer was temporary and Pimpri-Chinchwad will pick up again, and after two or three efforts the citizens will demand good governance, they will not allow these things to happen, but it's not about big data, it's not about technology solutions. It is much more than that.

Now I know for a fact what Japan is doing for urban infrastructure, for urban solutions. Even in many of the Indian cities they are playing a very major role. JICA has been a major driver in our transport connectivity. In fact tomorrow I will be visiting, thanks to the University of Tokyo, a water plant of Hitachi and I'll be going to an incineration plant and meeting with some municipal officials because Tokyo is a place from where we have a great deal to learn, but the sad part is that it's not only about knowledge.

Beyond knowledge it is about building awareness, getting engagement of the people, driving home the point that sustainability is not important because developed countries are asking you to make your development sustainable – sustainability is important because the health of your children and grandchildren is at stake. That's the agenda that we have to push when we move in this direction. In fact, the Center for Livable Cities, where I had the good fortune to be invited for a month, what I learned in Singapore has so much that can be transferred to Indian cities, and we are trying to do it in a small way but it's a very messy process.

Second, I want to thank Dr. Kato for the points that you've made on transport. In fact, since I was covering such a large area I actually did not emphasize the transport point, but believe you me, if we are going to get 8 to 10 percent growth, metropolitan connectivity, connecting cities with each other, large cities with small cities, small cities with rural areas, is most important. Then building roads. I mentioned to you the 800 billion dollars bill that we have presented to the government saying over 20 years you need to invest, half of that amount is for urban roads, and that is not even talking about traffic support infrastructure and all of that.

My only point is, you know, we should not jump to smart cities without first creating the basic precondition of clean cities. If we don't have water and sanitation, if we are only treating 30 percent of our sewage in our cities, if our solid waste is not being reduced, processed, recycled and finally disposed of in a scientific manner, then what good is it to use big data to put in smart infrastructure unless we have that?

So today the new prime minister has started two major campaigns: one on Clean India with a focus on cities, and the second on smart cities. There is no question in my mind that Clean India has to be the number one priority, but for smart cities I would say that there are some cities in some parts of India which can really benefit from smart infrastructure and there is every need for us to showcase them to prove. You know, where we can show the

model of what smartness can do, particularly in our new industrial corridor where we are developing six new cities, and JICA has a major role to play. Definitely with the use of smart infrastructure and improved governance we can achieve a lot, and there are other cities in which we could do that. But if I had to choose between the two, the question of clean cities is a life and death question and the question of smart cities is to improve our global competitiveness.

As far as the consciousness of mobility is concerned, you know, some cities are trying out some experiments, like on Sundays, no cars in the central area. So for the first time residents of Indian cities are seeing what the air is like to breathe when there are no cars. They can go with their kids. And the idea is that as you sensitize people to that, from one day you can make it two days, and now civil society is getting engaged in developing the foot paths that we have lost, and cycling lanes. In Beijing when I visited in 1992, I was so impressed by the eight-lane roads, and when I was there last year I couldn't believe my eyes. It seemed to me as if the eight lanes had shrunk. They had not. It's just the cars had increased.

So now you talked about air quality. It's one thing to say, yes, we have technology which can monitor air quality, but if we don't have the common sense which tells us that we should really not encourage diesel-driven vehicles in cities, then first we subsidize diesel so you have BMW cars being run on diesel, then we import smart technology to measure that the air quality index is very poor. That's not the solution.

So we can use IT for the right reasons, but we first have to use our common sense and confront those political lobbies, like the car lobby which would not accept us first building roads before we have cars. So I think all these areas, you mentioned the unlocking of land value, in Hyderabad and in Ahmedabad, two cities where the outer ring road is being developed with this philosophy of unlocking land value, and they are going for transit-oriented development, higher density along the transport corridors. I did not have time to go into all of these things but the challenge is there. These are small things here and there. We need to make this into a movement.

Now, Tim, I am actually really very impressed with the power of technology and the power of big data, but the only thing I am trying to tell you is that in a country like India with a civilization that goes back for thousands of years, changing behavior is not easy. And don't forget, even education levels are not at a point, we are at a very low per capita income, low level of education. There is a small part of the population which is globally connected, but we need to carry the rest of the population with us. So while we learn from global practices, global technology, and all those things, we need to remain rooted in what our challenges are and we need to engage our society. We need to get our women to come out and speak on

these issues because I believe women will be the best ambassadors when it comes to water and sanitation.

As far as IT is concerned, the Indian IT sector has helped improve the bottom line of so many multinationals. Now they are beginning to make an impact on improving governance, but the resistance is coming from government and the resistance is coming from political lobbies. My solution to this is, if we can sensitize our people to demand good governance, then democracy means that we will be able to extract good governance. And a very good example of that is the last election in Delhi where both the national parties were completely swept out of power by a new party which is an urban-based party, which came on the promise of better service delivery. It is a separate story that this service delivery was promised on populist terms, so they did not talk of financial sustainability. They did not talk of environmental sustainability. They talked of handing out water and this and that. But we will have to go through that and engage people to see that we build the right awareness for these challenges.

But I have to say that I really appreciated the comments of all three participants. I think we have a great deal to learn, but we need to look at our ground conditions as we assimilate these findings. Thank you very much.

Moderator Nishizawa: Thank you very much, Dr. Ahluwalia. Unfortunately ,we don't have enough time to have interaction between the panelists and questions and answers with the audience. The final words from the moderator.

The urbanization challenges are huge and very complicated and I believe that only a holistic approach could address such challenges, and today's discussion shows clearly that this is the case.

And for GSDM students, this is a very, very relevant and suitable subject for you to work on. You have different backgrounds. So if you could form a group with your peers who have different backgrounds, such as engineering, public policy, technology, you might be able to find solutions. So I strongly encourage and suggest you to form a group and to work with professionals to find solutions to this very challenging subject.

Let me conclude this session by saying a few more words. I look forward to receiving "postcards of change" from India, from Dr. Ahluwalia, and I would like all of you to join me to give Dr. Ahluwalia and the panelists a big hand.

閉会の言葉 Closing Remark

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Hideaki Shiroyama (Dean, Graduate School of Public Policy (GSPP) the University of Tokyo / GSDM Program Coordinator)

Coordinator Orsi: Thank you very much, Prof. Nishizawa, for the excellent timing and time-keeping. It's now time for the very last step of today's event, the concluding final remarks by the GSDM program coordinator, Prof. Shiroyama. Prof. Shiroyama, the floor is yours.

Hideaki Shiroyama: I'll be short. Thank you very much, Orsi-san, and also thank you very much to all the panelists and the presenters and also the participants at this all-day meeting.

As Prof. Matsumoto mentioned in the introductory remarks, this is the fourth year since March 11. One of the lessons we can learn from March 11 is somehow this is connected to each other. It began as a tsunami and earthquake issue but it had an impact through the nuclear power accident, then had radiation of farmland and the issue of food safety, and also because of the concern about radiation, patients, elderly people were forced to evacuate, but the evacuation itself has some impact on health, especially for older people. So many of these things are connected to each other and we have difficulty managing these kinds of complex issues. So this is the kind of lesson we can learn from the experience of March 11.

But what we showed today in the three sessions is exactly the same. Maybe when you see the title of each session, you think those are a very different issues, beginning with the security issue, then innovation and the information technology issue, then the urban planning issue. But sharing the discussion in each session you may realize that those three themes are somehow interacting with each other also.

In the first session, in the security session, the importance of non-traditional security and the human security aspect was emphasized in contrast to the traditional security of borders of states, and the human security issue clearly incorporates such kinds of water and sanitary issues relating to urban planning, which was discussed heavily in the last session.

And also, somehow the urban issue also relates to the security issue perhaps. And today Dr. Heng did not talk about his paper about risk management for urban cities, but he tried

to emphasize the risk management of Singapore as a part of the security strategy, so how to manage the urban system in an integrated world is a separate security issue. And also, networking relating to technology transfer might also have some impact on security in a broader sense. So those two interact with each other.

And technology and innovation are clearly relevant to both issues. And also you realized that the keyword of GSDM, interdisciplinarity, or the necessity of an integrated approach, were heard repeatedly in the sessions. So those are how three different areas that interacted with each other.

So maybe conveying that kind of message to the students and also the participants may be the purpose of this symposium, and in that sense we think it's very successful.

Then it is not just a discussion of policy, but we have to think about the system for tackling it, and human resource development is the basis for that, and as the students introduced at the beginning of today's symposium, how to train the next generation of people to tackle those kinds of issues might be a big challenge.

And this leading program is so-called all-round, and all-round is very hard to define actually. We have many leading programs in the University of Tokyo, altogether I heard so far maybe there are nine programs, tackling sustainability or medical engineering collaboration and so on, so those also need an interdisciplinary approach and integrated approach, but still they are very limited.

But in our case we have to think about the capability for tackling everything. So we have to have a scenario but usually what happens is usually beyond the expectation and beyond the scenario, so how to train and how to make an education system suitable for that may be the challenge for the GSDM program and also for the university itself, as Prof. Matsumoto introduced at the beginning.

And one related word on that is one of the discussions we had yesterday at the Advisory Board Meeting. It is the importance of the kind of – how do I say it – the metaphor of one-stop service, the Singapore one-stop government or one-stop service for the Japanese local government. The social issue can be brought to the university. It relates to the different disciplines but we cannot say, oh, this is not my issue or this is not my issue. These kinds of issues have to be tackled in an integrated way. So how to make the university itself responsive to that kind of societal demand might be a related organizational challenge.

But on the other hand also we have to be a little bit careful about being too practical. For the university, distance itself is also sometimes important to have a kind of objective view and so

on.

And some of the impressive words I remember from the first session are some remarks by Prof. Fujiwara, and he mentioned that relating to democratization or promotion or the poverty alleviation approach, he said that we should avoid short-sighted social engineering. Some social engineering is needed; as we repeatedly say in the concept of GSDM, engineering and scientific solutions have to be combined with policy and institutions, but too much focus on the nano issues sometimes produce other problems, the trade-off issue comes up. So we have to be careful to avoid short-sighted social engineering, not short-sighted but wide-sighted, a combination is necessary, so how to balance that. That will be an important thing we have to think of.

But anyway, so this is the second international symposium, and we undertook the first one in the previous year, and our program is expected to continue for another five years if the evaluation is okay, and it is expected. But anyway, we will continue the practice together with the students and we may have this kind of opportunity again maybe next year. So I would like to hear the input and responses from the participants. And also this program is very important, especially the interaction with people in practice.

Anyway, I would like to thank you again for all the input we got during the symposium and we would like to get some more next time and also sometime in between. Thank you very much.

Coordinator Orsi: Thank you very much, Prof. Shiroyama. So the very last things. I want to thank all the people, the extraordinary individuals who have contributed to the creation of this event, and particularly of course Yoshikawa-sensei and Lockman-san and Okuhara-san of the GSDM office and everybody who contributed. Thank you very much. I wish you, everybody, a good night and a good evening.

And please don't forget to return the devices for the simultaneous interpreter. It's very important. Thank you very much for attending.