



Possibilities and potential of global collaboration Plenary 3

Moderator:

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Panelists:

Simon Kennedy, Deputy Minister, Department of Innovation,
Science and Economic Development of Canada

Jean-Eric Paquet, Director General, Directorate for Research and Innovation,
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Moderator: Welcome to the closing plenary session of this conference on possibilities and potential of global collaboration. I'd like to thank the team leads and parallel theme participants for their wonderful summaries that we are following.

I am Roseann O'Reilly Runte, President and CEO of the Canada Foundation for Innovation.

[00:00:27 French language]

Jean-Eric Paquet, Director General, Directorate for Research and Innovation, European Commission; and Simon Kennedy, my Deputy Minister of Innovation, Science and Economic Development for Canada. Both are respected and extraordinarily experienced leaders.

Mr. Kennedy has held six deputy minister appointments in Canada, including the Privy Council, Foreign Affairs, Industry, International Trade, Industry Science and Economic Development, and Health during the opioid crisis. He and Mr. Paquet share international education and are global scholars.

Mr. Paquet has served in a number of portfolios, including Transportation, International Relations, Innovation, Radio Navigation, Policy Coordination as ambassador to Mauritania, Director of Bosnia and Herzegovnia, and for the Western Balkans. Both extraordinary people and as this conference draws to a close, it's appropriate that we bring them together and ask them how we can continue the engagement fostered by the wonderful conversation that we've held over this week and we must move forward.



I'm going to ask them to start with their deep thoughts in their rose-coloured glasses and tell us what they think are some of the potentials and possibilities for global collaboration as we look to the future.

Simon Kennedy: Thanks, Roseann. It's great to be here. Jean-Eric, it's great to see you as well.

Just in terms of the potential for international science collaboration, I guess what I would say, is that science has always been in one form or another, an international endeavour. Whether it was a collaborative endeavour or whether it was the maybe haphazard exchange of ideas. No one society and certainly no one country has a monopoly on ideas and if you look at the big problems that we face as a global community and the big questions that are there, increasingly those are global problems and those are global questions that need to be solved and they depend on scientific collaboration.

I think the COVID-19 pandemic really brings that into focus. There's been a lot of press coverage, for example, about vaccine competition and about the rise of nationalism and so on, but what we can't lose sight of is that the rapid development of vaccines, the tracking of the virus around the world, this has been a triumphant time for international scientific collaboration. And certainly when I work with our scientists and when I sit with the policy makers in Canada from the health community, it's quite clear that we're depending very heavily on international scientific collaboration to track the emergence of new variants, to understand the epidemiology of this particular disease and the development of therapies has also been an international endeavour. So we depend, as societies, on international scientific collaboration and we can be very grateful that we have an international scientific community that's been able to come together to very rapidly bring solutions to the forefront in confronting a challenge such as COVID-19. And we need the same kind of collaboration, and there is the same kind of work going on in other areas such as confronting the challenge of climate change and adaptation to climate change and how to address the technological problems and the societal problems arising from a change in climate.

I think it's a time when international scientific collaboration is needed more than ever and it's a time when I think we see actually, the possibilities of international scientific collaboration more than ever.

So maybe I'll stop there and give Jean-Eric a chance to weigh-in.



Moderator: Mr. Paquet.

Jean-Eric Paquet: Thanks Simon, and thanks Roseann. And maybe just to say that I was also very impressed and pleased with the discussions into actions, and I think the agenda which is emerging from this [00:04:47 INAUDIBLE], I hope that in our short discussion and our interactions with the audience, we can allow to close it effectively so that we can then also use all that energy and these ideas to bring the agenda forward together in this global context, as Simon very well put it. I don't think I have anything to add to what he set out.

What I from my perspective could maybe say, is that I think that research infrastructures are increasingly seeing themselves as very central actors of science, not just places where scientists come together and benefit from in many cases an absolutely amazing scientific service but full actors of science and research development. And in the context of the pandemic, I think this was particularly powerful, be it in the context of data sharing. You probably are aware that the European Molecular Biology Laboratory (EMBL), together with the Commission, created the COVID-19 data platform. Fully open to the world, we had tens of thousands of sequences put there, tens of thousands of scientists from all over the globe are coming to share their results and use results from others and obviously, also the results of scientific publications being shared on that platform and this really made EMBL a major actor with many other endeavours of the pandemic.

I think the pandemic, Simon—I don't know if you would agree—also shows that indeed, science collaboration allowed us to be so spectacularly fast in sequencing the genome and then developing this vaccine. I also observed that it has nevertheless, in some cases—and you mentioned vaccine nationalism, also brought us back a little bit in national-regional context. So I think that we really need to pay attention to that because global collaboration will be needed. And if I can take maybe one example where I think we are now in a better place than we were six months ago but more needs to be done, is in developing platforms for trials: therapeutics, vaccines. This was much too fragmented in the first months, including because this was done in absolute urgency. But these types of network infrastructures are going to be particularly powerful and important beyond obviously, what is done by the industry. I think public actors also have a lot to do in the context of the pandemic. But there are many, many examples where we will, I hope, in the future including as a follow-up to the conference tomorrow, and I'm sure then you'll come back to also climate



change and sustainability where I think more will absolutely need to be done.

Moderator: As we talk about science as the problem-solver and we look ahead to the world, when we're all looking at the climate and what we can do for the environment and I think we've heard in the conference, great goodwill to come together to solve other problems like the environment. But in our efforts to solve those problems, do we risk losing the individual discoveries, the pure science for the joy of science that may someday be used to solve a problem but not. And when we put all our resources towards a single problem, is that necessarily a good thing? And how do we keep some kind of balance, or is balance necessary?

Jean-Eric Paquet: I would love to see that we put all our resources in tackling climate change. This unfortunately, is not yet the case even if we are, today, in a different place than we were a few months ago. And I hope very much that the political developments around climate change in the U.S., in China, will indeed spur these much greater investments in deploying existing technologies, but indeed also put the necessary resources to sustain the needed climate science and to develop the technologies and also to test these technologies with society as we move forward. So I would argue that we certainly will need to do more there. I don't think this will distract us, Roseann, from fundamental science and research where infrastructure plays such a central role. And again, COVID-19 illustrates how this needs to be brought together and is being brought together. The messenger RNA (mRNA) is very basic science. The founder of BioNTech, the key vaccine today, is today still, as we speak a grantee of the European Research Council. So this is really disruptive basic research at its best and it has immediately, spectacularly brought these results and will I'm sure, allow our societies to move back to normal now in the foreseeable future. So there will be no loss of efforts done, I expect globally on this fundamental research and the same therefore goes also into the necessary investments in infrastructure.

To finish, I think I can certainly count also, on scientific communities to remind my boss and to ministers of research in member states and I'm sure Simon is reminded every day as well that there are many, many areas which require attention and physical resource.

Simon Kennedy: So Roseann, I guess maybe what I would say is, I feel like this debate about fundamental versus applied science or discovery science versus



science, it's maybe focused on big problems, has been going on for a very long time. I'm not sure that there's an answer to it.

I very much agree with Jean-Eric. I think we can't necessarily say that scientific work on one big problem area might not yield all sorts of important insights that will be relevant to other problems that we face as a society. And I see, for example, the Canadian government is providing a lot of support to the development of artificial intelligence (AI) technologies and machine learning. And we've seen in the pandemic that AI has been extremely important for drug discovery and for work in the development of new therapies. Quantum materials, quantum science, is an area that the government in Canada has spent a lot of time and energy supporting. There are potentially significant applications of quantum science to climate change. And so whether you're working on more fundamental research, or whether you're thinking you're working on solving some of these big problems, I think there's a great deal of leakage and crossover between applied and fundamental science and science that's perhaps just kind of more discovery based in science that's maybe a bit more applied at looking at big problems. In some respects, I think the debate's a little artificial.

If we look at one of our biggest science facilities in Canada, the Triumph, the cyclotron in British Columbia, that was built in the 1970s. It's focused on kind of fundamental physics, but it's had significant discoveries and has done a lot to advance work in medical isotopes, work on quantum computing, high temperature superconductors, this large science facility that's really doing this kind of really amazing looking at big questions has actually led to a lot of applied outcomes. So I tend to think that the debate is a little artificial, personally.

Moderator: We have these wonderful big science facilities and I think that there are two things that we can consider with them. One is, can the facilities themselves contribute to the good use of energy and be contributors to a good climate of the world? And then the second one is, as we build them and we live through pandemics and people can't travel, how much do crises like the pandemic slow this down? Or do they make us look for other ways electronically where we can use the equipment? Is there a good and a bad side or how do you view that?

Simon Kennedy: Well I get asked this question a lot actually, Roseann, and not necessarily just in the context of science or major science infrastructure but just more generally, like how has the pandemic affected my role as a senior civil servant in the government in the work that we do? And I borrow that line



from a Tale of Two Cities, “It’s the best of times and it’s the worst of times.” I think clearly, the cessation of international travel, the necessity of social distancing, a lot of the new realities we’ve had to adopt because of the pandemic, they’ve obviously put a crimp on ways that we used to engage and our ability to do certain things. What I think is also interesting, though, as I mentioned at the outset of our conversation, the pandemic has actually accelerated new ways of working together, as revealed anew the importance of collaboration and the huge contribution that science can bring to the table. So while I think yes, it’s more difficult, I suppose, if you’re in Canada to travel to CERN or to go to Paris for a meeting, but at the same time we’ve actually seen in real-time, the huge contribution that international scientific collaboration can bring to the table. And what’s interesting is we have technologies. This virtual conference is proof of that, the discussions that have taken place over the last number of days is proof of that. This conversation is proof that we have technologies and we have capability now to overcome some of the barriers that used to be there and collaborate and can continue to work together.

The other thing, too, without wanting to get too philosophical, but it is in a crisis that the crisis kind of creates a pressure cooker environment that brings people together, and we’ve certainly see that. If I think, for example, Canada’s been part of this mechanical ventilator Milano initiative, which has brought together private sector partners and governments from Canada, Australia, Europe, the U.S., to develop a ventilator model that’s easy to produce, off the shelf, something that can be made available in countries without a lot of health infrastructure. We have our VIDO vaccine, the International Vaccine Centre in Canada at the University of Saskatchewan that’s worked with the WHO and a number of countries on vaccine research. Clinical trials are being run around the world because you have to go to where the clinical trial environment is most hospitable in order to kind of advance the science. So COVID-19 has been both a huge challenge for the global community, it has also been a huge demonstration of the power of international scientific collaboration. I think there are kind of two sides to the question and we won’t really know, I think for some time, exactly what the shakeout of this will be. But my prediction will be it will accelerate the understanding and it will accelerate the kind of policy making that will facilitate these kinds of international collaborations. Just in the same way that’s potentially driven a bit of nationalism internationally on the necessity of having certain safe production capacity in your own country and concerns about the vaccine supply chain, it’s also underlined for scientists and for the scientific community, the necessity of open data, the necessity



of collaboration and we see this now with climate change. Look at the way in which the pandemic, I would argue, has accelerated. You might have thought with a pandemic that actually people would be so preoccupied that some of these other problems might take a backseat and then the exact opposite has happened. It's just my own personal view. Yes, we face these restrictions, but at the same time we also have had a signature lesson on the value of working together.

Jean-Eric Paquet: Simon, I completely agree. I think we will on the contrary have more and more closely knit together teams internationally because that can be done now in a much more straightforward way in this hybrid and digital format. So that is going to be staying with us over time. You alluded to it in science. I think this is also one area where I think it should not be possible, it will not be possible to go back on open access publications, in particular. Peer review articles were shared immediately in open access during the pandemic and that, I think, has shown that even six months makes a major difference. And we should make this available widely, immediately.

I also think that the pandemic has shown the value of the investments we did over time in these infrastructures. I spoke of EMBL and there are many other examples. Of course, the very first phase of the pandemic has had some impact as we were rearranging ourselves. In Arctic science, for example, we lost a season to a large extent and that is no doubt the case. But as we move forward, I'm also very, very optimistic. I saw few delays in the deployment infrastructures being built, [00:19:26]. There are no delays which you can connect per se to the pandemic. I think nevertheless what we also need to be aware of and therefore deal with, is that the nature of ideas coming together in the real physical environment in a lab or in a conference, this we are losing a little bit. So I would argue that where the connections existed, the human team connections existed, bringing it forward and probably faster and in some cases better was absolutely what was happening. In areas where this was less closely knit, I think the pandemic has had more impact. So as we move into a hybrid new normal, I think this will certainly be taken into account.

Moderator: We've had two such inspiring and extraordinary speakers to bring this conference to a close. I'm really sorry to actually say we're going to now have a question period. [00:20:24 French language]. I am totally inspired by your words and I think we are so fortunate to have wonderful scientists in the world and infrastructure that supports their work so ably and admirably, and our government leaders that believe in the work that everyone's doing.



So thank you so much and thank you for staying and answering the questions that we will have to end this conference.

Thank you.

Moderator: Well we have seen so many examples of inspiring collaborations in this conference and I'm wondering, do you have any secret ideas that you can put forward for the ways that we can make them continue, make them carry on, keep that hopeful collaboration moving forward? I know you talked about policy making and access to facilities, but are there specific things that you can see us doing?

Simon Kennedy: Roseann, it's partly a function of my role as a policy maker. I'm not a bench scientist. I run a government agency that has significant responsibilities for industrial policy and for science policy. But I would say if I look right now, and I would imagine this is exactly the same in capitals all over the world, this is a really important time for policy makers and for policy making and particularly for science policy making. We're thinking right now about how best to move ahead with investments that our government, the Canadian government, has made in its last budget, which just came out six week ago in pandemic readiness and biomanufacturing, for example, the Canadian government has made a very significant commitment to support the country getting to net zero emissions and actually wants to accelerate emissions reductions and has set aside significant resources for that and has made commitments to put in place regulatory mechanisms. And I think what we've seen during the pandemic, in particular with the development, for example, of these vaccines and new developments like messenger RNA, we have relied very extensively on the best scientific experts from Canada to give us advice because a lot of that advice wasn't inside ministries like mine that had the responsibility and we've relied on international collaboration, very close work with our allies in Europe and elsewhere in the United States for things like monitoring for variants and the emergence of variants, sharing of clinical trial data that sort of thing. So I think government policy makers, politicians and others have always understood that science is important. They've invested in science, but as I noted earlier, this pandemic has just underlined in a really dramatic way, the value and the necessity of having this kind of scientific input into decision-making and so we right now, are thinking about what are the more permanent structures we need to put in place to make sure that science remains at the heart of



the big decisions we make for the future and those big decisions are going to be made now and they're going to be made over the next couple of years. It's a little bit like the rebuilding after the war with the Marshal Plan or the reconstruction after some devastation. You want to build back better and I think there is an acknowledgement that science has a very big role to play in building back better and actually, we need to find ways to get the scientific expertise to the table. And you would know this because we've actually had some exchanges on this, but we're now trying to figure out what are the advisory and decision-making bodies we need to establish to make sure science is driving our policies on a go-forward basis both in terms of future pandemic readiness and biomanufacturing and biosecurity, as well as de-carbonization. So I think the worlds got these big problems, if you like.

We've now learned that we have another problem we haven't been paying enough attention to, which is pandemic readiness and the world had to scramble. But as we rebuild institutions to be better ready for the problems that we are now acutely aware we face and as we confront problems like climate change, I think there's this huge opportunity to double down on the contribution that science can make and on the voice of scientists and kind of science to help set policy, but now is the time to do it. It's like the soufflé is starting to thicken and it's going to gel now and if we wait too long, we'll lose the opportunity and I think that's the conversation we're having now.

Moderator: Jean-Eric, do you want to add something?

Jean-Eric Paquet: I think we do need indeed, to nurture this momentum. Science has indeed shaped the response to the pandemic in public policies to begin with, epidemiological frameworks put in place at great cost across nations coordinated to a degree internationally, certainly between European nations was based on scientific advice. Then of course, more importantly, the solutions, the vaccine now but therapies as well and testing capacities, this was all made available through accelerating delivery of scientific research. So this needs to be nurtured because this doesn't go without saying. I think science has always been a strong feature in global cooperation but the attention, I would argue, needs to be greater in all geographical areas around the world, certainly also in Europe. But what I think is also a lesson to be learned from the responses to the pandemic and to the present momentum discussed during the conference, is that a lot of these solutions were also developed internationally. And so the case for international collaborations, the case for having an open science policy which is very



much what Europe wants to promote with like-minded partners, the open science efforts which are ongoing, we discussed it but I think this is a particularly important dimension, research data, curation and sharing, and of course, research results are made available on day one. All these are features which have been instrumental in helping science provide impactful solutions during the pandemic and need to inspire us as we move forward.

Moderator: Well thank you for that.

And there's a question that asks us how around the world, politicians receptive to the arguments presented at the conference to support research infrastructure, collaboration and open science. You just spoke about collaboration and open science, but for the infrastructures we heard that there were good contributors to the economy, that the place that solutions were found to big problems, they were actually the places that brought together scientists so they could collaborate, so they were the enabling facilities. Do you think around the world, politicians are supportive of that in these days?

Jean-Eric Paquet: Well certainly today, more than a year and a half ago because of the demonstration now done by scientists, but I don't think that this is necessarily going to carry us completely into the future. The cost of infrastructure development is in many cases, quite daunting, which is of course also why there is so much need to develop infrastructures globally in partnerships to share the cost of development and then to ensure that they are used as much as possible by scientists and the best scientists around the world, but that cost is indeed for national budgets, a serious constraint and consideration.

I think Simon is already better placed than I am to say how difficult it is to make a case on very, very far future oriented investments. Not only in time, because developing science infrastructures is a matter sometimes of decades.

Now when you look at CERN in Europe, when we are looking at the 100 kilometre radius which CERN is now preparing, we are speaking of the end of this century. So this goes way beyond any cycle of a political and even human nature. And so that really requires, I would say, that you don't consider only the infrastructure and argue the infrastructure on the basis of science itself that is I don't think going to be enough. I think you need to make the case that the knowledge which comes from science, the solutions which come from science, technology in many cases, are what will allow



governments to deliver better policy frameworks, better investments, and therefore, provide solutions to the challenges of our society So connecting the very basic fundamental research allowed by infrastructures with the knowledge which is generated and the solutions, and then the challenges which politicians are confronted. Reconciling the time frameworks is the art, in fact, of it and so this is not necessarily always straightforward, but many politicians are willing to do that. And again, the momentum of today should be used to the maximum extent possible.

Moderator: Simon?

Simon Kennedy: Well, I have a lot of sympathy for politicians. They have a very, very tough job. I've worked around politicians my whole professional career and I know that the questioner wasn't suggesting it, but I think sometimes certainly in a democracy, politicians can get a bad name because we want them to focus on certain things that you think are strategic and how come they're not doing what we want. And I think it's just useful to remember, and I tell this to my own staff, and when I'm trying to discuss policies with my own government that I feel are the right policies, I spent a lot of time thinking about how do I help them explain the virtue of this to the public? Because if you think okay, so we have a Westminster style of government in Canada, which means that any minister that I work for is as a senior official, that minister, to get anything really done, the minister has to convince the cabinet. And the cabinet may not have the direct immediate interest that my boss has. Those ministers have other things they're worried about and they may have their own priorities they want to pursue, but it's a collective kind of form of government. So the minister has to go and has to have a compelling story for 20, 25 other people about why this is a great idea. And those people sitting around the cabinet table, it isn't just a matter of convincing them because even if they agree on policy grounds it's a great idea, all of them have to get re-elected every three or four years and they have to go back to their constituency and we're a far-flung country in Canada, we're a big country, people live across four, five time zones. They have to go back to their hometown and at the end of the day they're going to have to explain why they made certain decisions and why their government took certain action. And so it's very hard to divorce the big investments and the big choices a government makes at the end of the day from whether those choices have public support, whether they resonate with the public, whether they're explainable or not.

And I think that if I just come back to the pandemic, it's pretty hard to avoid just given what we've all gone through. This has been a terrible tragedy, a human tragedy in a global scale. It's also been a really unbelievable example of the power of science and the power of research to actually affect people in their individual lives and to solve real problems. And so there's a real opportunity in a sense, and I doubt anybody anywhere in the world that's got any problem with the government pouring vast amounts of money into vaccine research and to collaboration internationally and to high-risk discovery based research to deal with the pandemic because everybody understands what this means.

I think where it can become a little more challenging, which isn't to say that these are not worthy endeavours we should pursue, I think it can become a little more challenging if it's very large investment in very large facilities, where for the average person on the street, the benefits are very abstract. And I have to say, which I hope isn't heresy for the members of the conference, but this issue of like basic science versus applied science is a real friction point, I think, in public policy because it's easier for elected officials, frankly to be able to explain well we're investing in the science to achieve this outcome. It's often a little harder to say well we're investing because now we're not quite sure what we'll find but it'll be amazing. And that's okay if it's a small amount of money but if it's 5 billion Euros or if it's a billion dollars for something that looks like a big science project, that can be a little harder to explain, which is why sometimes for these very projects that span border, to be honest, there's a public policy discussion about dividing up the industrial benefits. If we're going to contribute to this major project, there's a desire to make sure that it creates jobs and opportunity and it helps to advance science domestically because politicians need to be able to say they're not just contributing to the common good. This is actually going to have concrete benefits in this community. It's going to create jobs and so on. So it's not a matter of politicians being parochial, it's the reality is certainly in a democracy, they're accountable to the public, they have the win the support of the public to pursue any policies. We obviously pay them to take risks and to show leadership, but that leadership and that risk-taking can't be completely outside of the context of having some measure of public support for the policies they pursue. Otherwise, it's kind of suicide.

If you look at, say, even the moon launch and when NASA was sending rockets to the moon in the 60s, it was a constituency who said why are you doing this? We have huge problems in our own society. We have racism,

we have riots. We have the generation gap, Vietnam, why are you going to the moon? But people were inspired by the mission. It was like it captured the public imagination. So even though it was an investment, if you like, in fundamental science, it had broad public support, everybody was glued to their TV set. I'm not sure that's the standard for every major science project, but you can't be indifferent in a way to what are the kinds of drivers and concerns that elected officials have to worry about when they're allocating funding to these projects. And that's not getting your hands dirty, that's not politicians not doing their job. That's actually how it works and people like me and other scientists who wish to seek public support. We've got to spend a bit of time thinking about that when we're making our pitch. We've got to think about what our pitch is and how to make it as attractive as possible, frankly. It's no different than any other public policy. It's got to get through cabinet. It's got to enjoy some minimal level of support for the populace otherwise it's not going anywhere.

Moderator: I think Jean-Eric has something to add to that.

Jean-Eric Paquet: I must say, I completely agree with Simon and whilst I work slightly less directly with national politicians, we of course interact with ministers of 27 EU member states. It's not that they're confronted with having to go back into the electoral cycle, I mean they are elected by the people and they are serving the people, which is what we do as public servants as well and which is what scientists which are supported by public funding are also doing. You are working and I think that's also how you see yourselves. You're working for society and therefore this is absolutely essential. And I think there are two dimensions. The one which Simon covered, a story which is intelligible for the broader public, but I would also argue that there's another dimension in which we need to invest much more. We did it a little bit during the pandemic. We are now trying to do it on a slightly larger scale in Europe around the missions which we want to launch in [00:16:33] Europe. Maybe some of you are aware that we want to work on oceans, cities, soils, climate adaptation and cancer. In each of these areas, we are setting ourselves a very concrete objective: 100 cities which are climate neutral by 2030. And then we will deploy research investments now in the next few years to provide knowledge and solutions to achieve that objective but that objective, of course, is not just research. And as we devised the objective and work on the plan to achieve it, we did that with citizens and I would argue that if citizens are part of the design, of science policy and it's done, I'm sure, possibly also in Canada, it's done in several member states in the EU. They are part of choices made, including choices maybe made in



labs and if this is done on a regular basis and is also very public as an effort, I would argue that this is of course, also would increase the ownership of the science and the necessary investment to sustain that science so not just citizen science or citizen's communication but a genuine effort to associate citizens in a smart way to design to choices.

Moderator: Thank you for that.

When we talk about the pandemic, which we inevitably do these days, we talk about pandemic fatigue. The people are tired of being confined at home. They're tired of being afraid and they have great hope in science. But we also know that our first responders and the doctors and hospitals are tired, the teachers are tired. And our scientists, we don't often think about that. They're tired, too. They've been running their labs on 24-hour a day systems to try and get samples tested and to do all they can to support people. And now that fatigue, I think, hits the world and we all have hope that we're going to come out of this and it's going to be better and beautiful. But everyone is tired and as we come out of it, we notice that there are all the things that we let go, some of the cancer research, some of other things that we should have been pushing forward that we have to make greater progress on the environment, but we also see subsequent pandemics like mental health and addictions. So when we face an economy that's fragile, and a population and researchers that are tired, how do we support that agenda that you have, Jean-Eric? And how do we pick what it is that we absolutely have to do first, second and third, make priorities?

Jean-Eric Paquet: I think the issue of policy choices is, of course, a challenge. And the right way to prepare the ground for choice is to then be made by political institutions is, of course, particularly acute in these circumstances now. What I would say is indeed that I think we need to acknowledge that all professional categories have been deeply impacted by the pandemics and we have certainly seen the science communities adjust very remarkably. I mean the very first few months of last year were more difficult but since then, science has been able to really continue to deploy its activities and in the case of life sciences, remarkably so for the pandemic. But I think we will now move out of the pandemic around the summer, at least in many parts of the world and then progressively, hopefully, with also the big international effort around COVAX to ensure that vaccination becomes universal progressively in the course of the year across the globe. We will move into a new normal, which is going to be different from what it was before the pandemic. We have now a new capacity to work globally, as we discussed

early on, to the outreach which these digital system offer is absolutely remarkable and amazingly productive and high impact. But at the same time, we will, of course also have, again, the benefit of more creative interactions in a normal work environment. But I would argue that we need also to accept that we will need a few months as individuals, as teams, as institutions to find our bearings again.

As far as my department is concerned, of course, there is a lot which is happening which will have to happen until the end of the year, but we will also, in the management team, pay particular attention to ensure that we have a bit of breathing space for the teams to adjust to this new normal. And in that context, we will argue that we need to ensure that we complete the pandemic response that we absolutely focus on learning the lessons from the pandemic. We haven't had that large-scale pandemic for a century, so now we will learn lessons and I would hope that we can also embed them in the institutional memories, which was not done in smaller scale pandemics over the last few decades so that we are effectively ready for the future. And then we need to tackle climate and biodiversity. There is no greater urgency for the planet than to tackle climate change and the erosion of biodiversity. This is amazingly complex, amazingly systemic with apparent deep trade-offs, at least when you look at traditional economic or public policies. So a major effort will be needed, but one which I think is also particularly positive in mobilizing energies from researchers. A lot the squaring of the circle will be done by science. Not only because society also will need to change, but science will produce a lot of the solutions and so the second priority is going to continue to invest in our green transformation in Europe as far as the centre of gravity of the work of the commission is concerned, but also in partnership with Canada and many others which have the same agenda and that, I think, will be really what will drive and energize the teams as well.

Moderator: Simon, do you want to add to that or would you take the next question?

Simon Kennedy: Maybe just a couple of brief words, Roseann.

I don't know whether I agree with the premise of the question and it's not to be combative, I think you can look at this issue in a number of ways. So I'll be brief because I think we should get to other questions, but we do surveys of our employees to get a sense of where they are. People are unquestionably tired. I mean they're just exhausted. You can see it in the survey data and we do surveys every six months or so. But the other thing we see, and this is my language but you can see coming out of the survey

data, there's also a certain exhilaration, like people feel like this is very important work. I'm paraphrasing a little bit, but you see contradictory results which is people are very tired and people are also feeling like what they do really matters and it's important to show up at work and it's important to be doing this because it's helping fellow citizens, it's helping to save lives and keep people employed and keep people from going bankrupt and that sort of thing. So I think there may be, and I only say may be because I want to have enough humility to not suggest there isn't a real issue there, but if I look at my own universe, what we need to make sure is that people, yes, everyone's tired but are they spent? And that's the part that's a little unclear to me. And I think you can see after many other crises, whether it was the Second World War or others, there's the possibility of a flowering of activity after a fairly horrendous experience and so I'm not sure coming out of this, we're necessarily going to have a scientific community, a policy community that is just going to want to quit and move to the mountains, I mean we could have the opposite, frankly. But I think people are going to need a rest, there may need to be a pause. We've been thinking a lot about how to we ensure people can take a breather because we're not out of this yet. But I'm not sure I would agree with the premise that people are spent. It's possible, but it's just equally possible that the trauma of the last year and the demands that it may have been on science and the way in which science has kind of risen to the call and produced really, miracles, that actually might be energetic in some respects. So that would be my hope.

The second thing I would say would be, again, I don't think we're going to know what the impact of this pandemic is on the way people think about problems and how they attack problems for some time. My own feeling is that many of these challenges you've cited were there before the pandemic and the pandemic may have made them marginally worse but they were pretty terrible. We had a really serious opioid addiction problem in North America well before the pandemic. I spent several years working on it. It was a pandemic in its own terms. It killed thousands of people a year and was getting progressively worse, and the government was working on it but it didn't have the kind of broad societal attention the way the pandemic did. I think what we've seen with the pandemic is that a lot of things we presumed previously were not thinkable. Vaccines take 10 years to develop. Okay, well we developed vaccines in 10 months. We can't run a budget deficit that's 40 per cent of GDP or whatever it is. Well, we had to do it because that was just what was required to make sure the economy didn't go into free fall, all kinds of truisms. We can't close the border, the idea that



we would shut down all air traffic and close the Canada-U.S. border, I mean can you imagine? It's just unthinkable. And it's just what had to be done, so it was done. And so I think for a whole generation of scientists, policy makers, young people, I do think one possible longer-term lesson of the pandemic might be why can't we solve that problem? Why can't we attack that differently? Why is it acceptable that we will allow this issue to fester because there's not enough creativity to figure out how to deal with it? So that will be my hope, but it's just to say, if I were to turn your question around, how are we going to possibly crawl out of this thing in one piece and which are the few things we should pick to focus on because we won't have the energy? I think there's a possibility that the opposite will happen, and I feel that the way in which governments have continued to attack with gusto things like climate change and inequality and those sorts of things are a reflection of that. It's a realization that we have big problems. It's possible to attack and tackle big problems if we have the will to do it. Creativity matters. And so at least optimistically, I don't know that we'll be able to make a judgement on the present moment for maybe 20 years, 30, 50 years.

So that's just my nickel.

Moderator: Well that's actually more than a nickel. That was very inspiring. It's worth a lot more than five cents. It's a wonderful thought.

During the conference, we had people from the global South who talked about the frustrations and those scientists there not having access to the same facilities and possibilities that we have in other parts of the world and also the extraordinary basic human needs that people in certain parts of the globe suffer. How can we, coming out of this pandemic and using that great energy that you identified, Simon, continue to address this problem and ameliorate the situation?

Simon Kennedy: I think this is an urgent question. Sorry, it's a bit stream of consciousness, Roseann. I remember I had seen on TV or I had read somewhere, it was some well-known actor from the global South. It was a politician or a scientist or something, but they had been posed a question: What do you think about the reaction of the West? Or what do you think about the pandemic? And in effect, the answer was, and I'm paraphrasing because I don't remember the specifics, but it was in a sense now, you are having to confront the world that many people in my region live daily and have for a very long time, like the death hovering at your door, uncertainty about the future.



One of the things, I think, that we have to acknowledge is the tremendous privilege that we have, certainly living in developed countries having access, as you noted, to resources and scientific expertise and manufacturing facilities and those sorts of things. And I think there's kind of a dual challenge, it's a little bit like if a flood comes through your community, understandably your immediate thoughts are to your own family/ I'm responsible to my kids and my spouse and it's like your immediate attention is you've got to save yourself and your family. But of course, that doesn't mean you don't have profound concern for your neighbours and the rest of your community. And so I think, again, if I look at the scramble for vaccines, having been involved in democratic governance for a long time, governments are elected to serve their people. They have expectations that the government is going to look after their interests. It's not unreasonable that governments in Europe and North America and others have made heroic efforts to procure vaccines for their own people. That is the basic expectation that the citizenry have and at some level, it's not an unreasonable one. That doesn't mean that we don't also have obligations to the rest of the world. So I think you can have two things going on at once. I actually think you can have concern about the global situation and the inequity, and you can also have governments that kind of in the first instance are really focused on trying to get their own people vaccinated. I actually have hope for greater international collaboration, more dose-sharing, vaccine-sharing, technology transfer. These are all things that are live and they're in discussion now. I think there has been debate about shouldn't this have all happened earlier? How is it that Canada can be so far ahead in the league tables? We should feel privileged that we're still far ahead in the league tables, but I'm not sure for democratic governance and governments around the world that the way things have unfolded, until all countries have equal capability, I think you're going to see democratic governments trying to take care of their own citizenry. But I don't think that means that we're not also concerned about the global South and not also concerned about the inequities that are there. I think we'll see in the next few months, frankly as, for example, as vaccinations in Canada start to level off, I think you're going to see a lot more attention shift in that direction. But in the early months of a crisis, I think understandably, a lot of governments are immediately concerned for the welfare of their own citizenry.

Jean-Eric Paquet: I don't think I should go very much into the vaccines, except that I think there is the COVAX facility which is set up to allow a universal reach for vaccination. Of course, Simon, put his finger on the issue. It was the limited

availability of vaccines at the outset. The COVAX facility is very well-funded, but the availability of vaccines to be then distributed was limited. Having said so, there's one figure which is not well known, is that Europe has produced massively, vaccines in the first six months of this year. Half of those vaccines were exported out of the European Union, so only half of it stayed in the European Union. So we remained also for vaccine production and trade, very open and admittedly, quite a bit of these vaccines went to developing countries also but not entirely. But this, I think, now requires a genuine additional global effort across the globe.

But I think the question was also on science capacity and science infrastructure. The European Union works, of course, very closely with the African Union. We also have corporation frameworks with other parts of the world and science increasingly moves up the agenda of these corporations and I must say this is extremely welcome. There are science and research excellence in Africa. There is capacity in many African countries but of course, much, much will need to be invested in this capacity building and we will with others, be available to help where we are asked to that. But I think what would also be particularly impactful, and we are doing it as well, is to open research infrastructures to scientists coming from regions which have not had the capacity to develop these infrastructures. That's the logic of global cooperation around infrastructure development, as we said in our conversation. Not just sharing the cost of them, but then also having large universal access to these infrastructures based of course, on scientific merit and excellence but increasingly also pen to scientists from areas of the world which don't yet have these infrastructures. And that's what we are doing in Europe's infrastructure policy, particularly with Africa but of course, also with many other regions around the world and we should continue to do so.

Moderator: So, two minutes each. Do you have a challenge for the people who attended the conference and the heads of research infrastructures and a hope for them? And we got one in the question period: Could we please predict and prevent pandemics rather than treating them like crises that they are right now?

Simon Kennedy: Maybe to answer the question from the floor first. I don't know kind of what will come out of the scientific work around pandemic preparedness, but I do think there is certainly an interest and focus on, are we going to be able to find ways to head these off before they arrive? So better surveillance, better development of therapies and send prophylactic type therapies, universal

vaccines, these sorts of things. I'm not a bench scientist. I'm not a scientist by training so I can't give you a definitive answer, but I do know these are the sorts of things we're talking about with the scientific community. As we work on pandemic readiness, we don't just want to be able to pivot when there's a crisis and manufacture vaccines. Ideally, we want to be in a position to be trying to contain some of these crises before they arrive and so that will be a feature, I think, of our policy work. It's an analogy that's not maybe great, but if you think of the way in which now security is embedded into the fabric of our international transport systems, for example, you can't fly from one of the of the world to the other without providing your passport. You get screened. Your data gets screened to see whether you're on a watch list. You go through a metal detector. Like it's just normal in a way that it wasn't in the 1960s that if you're taking an international journey and you're on an airplane, we know that there are a small number of bad actors out there and there's a system that just tries to weed that out. And everybody accepts it and it's pretty seamless. And prior to the pandemic, big airports processed millions of passengers a year. We may wind up with a similar system but around disease surveillance and pandemic readiness because we now have had a real lesson that a little microbe, you know a little virus can like decimate the world economy pretty easily. We sort of forgot that lesson. Last time we had that lesson was 100 years ago. And the scientists say this will happen potentially with more frequency, so we will need systems a little bit like transport security to actually prevent hijacking. So rather than having the hijackers get on the plane and then overpower them, we want systems to prevent that from happening. So I think that's not a bad analogy.

Moderator: Let's give the last minute to Jean-Eric.

Jean-Eric Paquet: Hope and the challenge will be the same. I think what we learned from this pandemic is that we need to look at human health and the health of the planet at the same time. We can't distinguish the two and this will increasingly be visible, I'm afraid, as we move forward as long as we have not addressed the loss in biodiversity particularly. So this one health approach, I think, is a hope for the future and a challenge for scientists to address impact fully and largely and urgently. And I think research infrastructures will play a key role in providing the knowledge to do that.

Moderator: On behalf of the people listening around the world, I applaud you and thank you both for this wonderful session the wonderful conclusion to the program.