It is a privilege to convene this panel of distinguished and experienced political leaders and academicians from five continents.

I note with interest and pleasure that the political leaders on the panel serve cities, regions, and nations. You are leaders in developing countries and in developed countries. I suspect that as you think about the role of science in your societies, you have many goals in common, but also some goals that are different because they are specific to your geographic, political, and economic context.

Each of you has thought deeply about how science, engineering, and innovation flourish and evolve.

Each of you has also thought deeply about how society supports science and technology, and for what purposes.

This dialog carries a particular urgency in this first decade of a new century, because the nature and purposes of science, engineering, and innovation are changing.

The culture of basic science has long been international and open. We have learned throughout history that science flourishes in environments that are open to the free flow of scientists and ideas across political boundaries. Science languishes in closed environments and societies.

But this is an age in which cities, regions, and nations must both cooperate and compete. This is because the advance of science -- and certainly the advances of engineering and innovation -- increasingly drives our economies, health, and security. We consider many of the results of scientific and engineering research to have economic value, and indeed refer to it as "intellectual property."

We cooperate across geographic and political boundaries because basic science can flourish only in that context, and because science and technology are essential to resolving the great challenges faced by the world as a whole – environment, energy, food, water, and heath.

We also cooperate – or should cooperate – across political boundaries for a very practical reason. Many areas of scientific research require very expensive equipment and support services. An important form of

cooperation is simply sharing the expense of large-scale, sophisticated research tools.

But we also compete, because competition drives excellence, efficiency, innovation, and economic gain.

In the 21st century, many jobs follow knowledge, expertise, and innovation wherever they are found.

So the **First Theme** I suggest for our dialog is how we balance cooperation and competition?

I hope that science will always be understood as a means of advancing the human spirit. It is an integral part of culture world wide – a manifestation of our awe of nature, our quest for discovery and understanding, and our eternal search for knowledge and truth.

But in this era, the power of science is extended through engineering and innovation to produce products, processes, and services. In this way it has immediacy as a means of creating wealth and providing for health and security. It is the basis of modern industry and commerce.

The late scholar Donald Stokes partitioned science into quadrants, three of which represent important styles of research and development. The Bohr Quadrant, named for Neils Bohr, contains science conducted for the sole purpose of understanding nature. The Edison Quadrant, named for Thomas Edison, contains invention that is motivated by the need to make something work and has no intent to advance our understanding of nature.

Pasteur's Quadrant, named for Louis Pasteur, contains science that is pursued with a practical goal in mind, but also for the simultaneous purpose of advancing our understanding of nature. A contemporary example would be research performed in order to cure or ameliorate HIV AIDS that also produces strong advances in our understanding of fundamental biology.

Much of the research performed in industry and an increasing portion of the research funded by governments in universities and institutes lies in Pasteur's Quadrant – advancing both practical applications and our understanding of nature.

Thus the **Second Theme** I suggest for our dialog is how we should balance government investments in the Bohr and Pasteur Quadrants, i.e. achieve an appropriate balance between so-called basic and applied science.

Finally, I would like to observe that the participants – the stakeholders – in the modern enterprise of science, technology, and innovation have fundamentally different goals and motivations.

Our traditional view is that **Young People** study, learn, and go off to work in companies, universities, or research institutes. **Researcher**s discover new facts about nature and develop new technologies. **Parliamentarians and other government officials** provide the funds required to educate the young people and to support the research. **Companies** use the graduates and the research results to produce products and services.

But today we must increasingly recognize that each of these stakeholders are motivated by different goals. **Young People** are drawn to science by curiosity, awe of nature, excitement of discovery and the mystery of the unknown. **Researchers** are driven by passion for science and obsessive concentration on solving challenging, complex puzzles. **Parliamentarians and other government officials** believe that Tax dollars should produce jobs. **Companies** want faster and faster innovation to win the competition of the marketplace and drive profits.

So the **Third Theme** I suggest for our dialog is how we should balance our resources to match the disparate motivations of the participants in the scientific enterprise.

In summary, I hope that we can bring our varied perspectives as political leaders and scientists to this dialog and try to find common ground. How should we strike the balance between global cooperation and competition? What should be the balance between public resources for basic research and for applied research and innovation? How should we establish a wise balance of resources to match the disparate motivations of the participants in the scientific enterprise?