Ladies and Gentlemen:

Thank you for the opportunity to speak to you today. I am honored to be part of this conference.

I am joined on this panel by exceptional and accomplished policy professionals and scholars. Given my co-panelists' expertise, I will defer to them as to more technical policy matters. My remarks will be based on my thirty-plus years working internationally, principally in the life sciences, experiencing and observing different innovation systems. .

Peter F. Drucker, a great scholar of business, innovation and management, observed that "innovation is the specific instrument of entrepreneurship – the act that endows resources with a new capacity to create wealth." This wealth translates into jobs, economic growth, and ultimately improvements in human welfare -- widely-shared

goals, especially in today's economic environment. In fact, it is what has drawn many of us to this conference. While there is significant consensus around these goals, countries' policies towards innovation vary considerably.

Among the countries with different approaches are the United States, France, and Israel. I will begin by highlighting aspects of these approaches. I will illustrate these with examples based on my experiences and observations, as well as those of my business associates.

Entire volumes have been written on each of these national innovation systems. .My remarks will be more selective, personal and subjective. They will also highlight smaller companies, which are significant drivers of innovation. Through this, I hope to bring to life the more technical points that will be raised in the two days ahead.

The US, of course, is an innovation leader. It is vast and diverse, with the world's largest market-based economy. Its national innovation system is fairly decentralized. Other than government funding, mainly in basic research, there is no broad government policy on innovation. Rather, the innovation environment derives mostly from the overall business context. .

The US economy includes a handful of vibrant industry-specific innovation clusters. Silicon Valley is the archetype. But, there are others, including San Diego, the San Francisco Bay Area, and Boston in life sciences. These hubs have cultures embracing entrepreneurship, risk-taking and innovation. In Silicon Valley, for example, there is little stigma associated with business failure, provided the entrepreneur took on and thought through a challenging problem, used good judgment in tackling it, and learned from the failure. People there believe

that lessons learned in the failed effort can be applied to the next venture.

The US innovation environment benefits from many vibrant and diverse universities. There, research is conducted, often with government support. Under a 1980 law, universities own any resulting technology and may out-license it for commercial purposes, without government involvement in the transaction. Over the years, universities' technology transfer offices have become highly experienced and in some cases quite entrepreneurial in negotiating these arrangements. Notably, both the university and the academic investors share the resulting financial gain.

Another aspect of the US innovation system is its mechanisms for funding start ups. The US venture capital industry is the world's largest, though it has encountered difficulties in recent years. That said, in the last quarter,

US VC's raised approximately $1.7 billion and invested nearly $4 billion in approximately 600 companies. A vibrant VC sector requires exit opportunities – initial public offerings and merger and acquisitions– so the VC's and their investors can earn financial returns. In late 2008 and early 2009, economic conditions were unfavorable, and there were very few of these transactions. Over the past six months, however, there has been a steady rise in US IPO filings and merger and acquisitions, though the level is still below that of years past.

All of this occurs with the help of immigrants. For generations, American universities have attracted talented students worldwide, though other countries are increasingly competing. Newcomers to the US have long been well-represented among its science and engineering Ph.Ds, post-doc researchers, and high tech entrepreneurs.

The French innovation environment contrasts sharply.

For decades, innovation in France was dominated by large public research institutions, by large publicly-supported undertakings in fields such as aeronautics, defense and telecommunications, and by large companies. France also developed a reputation as having a difficult environment for smaller companies. However, recent French initiatives are intended to reduce barriers to, and to increase incentives for, small and medium sized entities as innovation drivers.

The French innovation system includes large public research institutions. Each is staffed by civil servants, with no financial stake in the outcome of their efforts. The largest is the Centre National de la Recherche Scientifique -- the largest public research institution in Europe, with nearly 12,000 tenured researchers. The Institut National de la Santé et de la Recherche Médicale or INSERM employs 6,000 researchers in the life sciences. And, the Institut National de Recherche en Informatique et Automatique, focuses on information and

communications. Most of the publicly-funded research in France takes place within these organizations. Even university research is often done with funding from, or in collaboration with, these organizations,

Recently, France has implemented tax changes to foster innovation. The Jeune Entreprise Innovante, or Young Innovator Firm status, exempts small firms from significant social security contributions. French companies can also apply for tax reductions or refunds based on their R&D expenditures. And, to stimulate “angel” investments, certain start ups investments can reduce one’s wealth tax.

France’s also recently launched programs to foster collaboration across institutions and sectors. These include competitiveness clusters -- regional networks among businesses, higher education organizations and research units to foster partnerships and R&D. Approximately seventy were created from over 100 applications. The clusters are self-governing and partially

government funded, with their members eligible for various financial benefits.

Israel's innovation system shares features with both the US and with France: a favorable business environment, like the US; and public support like France.

I will start with the Israeli military, which many credit with founding Israel's high technology sector, especially in fields with both military and civilian applications, such as telecommunications and security.

On the civilian side, the Israeli government decided, in the 1970s, to develop a science sector. It has since implemented policies specifically intended to encourage R&D leading to manufacturing, employment and exports. Innovation often results, as a company's success generally requires improvement over existing solutions. Exports are

critical, because Israel – with only 7 million people – is a small market.

Israel's government includes an Office of Chief Scientist, as well as chief scientist offices within its various ministries. These offices operate government programs providing start ups with funding and other support.

The private sector, too, invests in innovative enterprises. It is estimated that, as of 2000, nearly one in 30 Israeli adults had invested in a start up. Israel also has a vibrant VC sector, initially fostered by the government. In 1993, the Israeli government formed 10 VC funds, taking a 40% investment in each, giving the investors holding the remaining 60% an option to buy out the government. Nine of the ten funds bought out the government, thus establishing the Israeli VC sector. Israel's VC industry has since

grown significantly and is second in size only to that of the US.

Israel also a highly-educated work force, twenty-four percent of which holds university degrees. There are roughly 135 scientists and engineers per 10,000 people in Israel, compared to 83 in the US and 60 in Germany. This is attributable to Israel's strong education system and the 1990s influx of immigrants from the former Soviet Union, nearly 40% of whom had academic degrees. This nearly doubled Israel's skilled workforce.

Now that I have described these national innovation systems, I will turn to my personal experiences and observations, and those of my colleagues and friends. I will begin with the US.

In 1996, Ferring established a research facility in San Diego, California, where a biotech cluster began in 1981.

Over the years, we have had a great opportunity to experience and observe this vibrant industry hub.

It is often noted that only one in ten new human therapeutics entering the development phase survives the long, difficult and highly-regulated path to reach the market. The failure rate is even higher if you begin measuring with the earlier, research phase. This path and these odds are daunting. This is especially true for small companies that lack the means to diversify their risk and can only afford to develop a single product. The combination of participants within this cluster and the ways in which they interact helps to make success possible in the face of such unlikely odds.

San Diego is home to several world-class life sciences research institutes. They attract top talent from around the globe, obtain more than their share of Federal research grants, and have experienced and effective technology transfer offices.

A great deal of basic research is conducted there, much of it with government support, through agencies such as the National Institutes of Health. Without this government funding at the earliest and most difficult stage, the overall odds for the entire project – from basic research through development to product approval and marketing – might be prohibitively high for companies to take on.

Technologies that survive basic research can form the basis of new development products. Effective technology transfer offices out-license these discoveries to companies, large or small, locally or around the world. Some of the small, local companies are founded by academic researchers to further develop technology discovered in their own labs. Others are founded by business people, including former employees of larger San Diego life sciences companies.

Large multi-national pharmaceuticals have been attracted to San Diego because of its small companies. The large

companies' development pipelines are insufficient to replace the revenues they expect to lose when the patents on their older products expire. They try to work with smaller companies to replenish their product portfolios, acquiring some and partnering with others. The acquired San Diego companies serve as the large companies' initial base in San Diego. Others, which have not acquired San Diego companies, have established business development offices, to facilitate access to San Diego's innovators.

Over time, an experienced talent pool has been nurtured to fill the increasing staffing needs of local businesses. In small companies, employees develop both scientific and business skills, creating a cadre of people with the combination of skills needed to start and staff subsequent generations of companies. Others around the world appear to be willing to relocate to San Diego. From the candidate's perspective, the personal risks of relocation are mitigated; if the initial position isn't as expected, there

are other potential employers nearby. In addition, it is not uncommon for senior managers to leave larger companies to form new start ups, often funded by investors who accumulated wealth in the success or acquisition of their previous San Diego employers.

I want to be careful not to mislead you. This growth and innovation are neither linear or easy. This dynamic hub of life sciences industries has taken decades to develop. And, the industry is characterized by significant regulation, high risks and long and difficult product development paths. Given this, there have been many times, including today, when companies, especially early stage ones, have difficulty obtaining funding. Today, as at other times, many San Diego companies have less than a year's funding remaining. This will likely lead to contraction, or further acquisition by, or partnering with, larger companies. It may also force companies to creatively think of ways to bring human therapeutics to market more efficiently with less risk. Some of these are already

occurring. Some pharmaceutical and large biotech companies have formed incubators or their own investment funds, which may be willing to funding earlier stage companies than VCs typically invest in. And, companies may rely, more and more, on academic researchers, funded in part by government grants, to share the risk associated with developing human therapeutics.

The small company life sciences sector in France, by contrast, is not yet large enough to sustain a similar dynamic. My experience suggests it will take time for the full impact of France's recent changes to be achieved.

In my experience, the challenges for those working in life sciences innovation in France begin with the technology transfer process, which can be lengthy, in part due to the number of parties involved. Because the French collaboration and funding structures crosses multiple

organizations, it is not uncommon for two or three organizations to share rights in technology, increasing the complexity of any related transaction.

In 2006, we invested in a company that licensed technology shared by three academic and research organizations. We completed the license in 18 months. Other investors may have lacked the patience for such a long transaction and given up, choosing to invest their money elsewhere. Commercialization of this technology, then, would have been delayed until a new partner could be located and a new transaction negotiated.

I expect that, over time, as French technology transfer offices handle more transactions and gain more experience working with one another, the ease and speed of completing these transactions will increase.

Life sciences start ups require CEOs and other employees with a combination of disparate skills -- expertise in entrepreneurial business matters and life sciences. This

combination is difficult to find in many places, including France. With few French life sciences start ups, French scientists tend to begin their careers in academia, public research institutions or large companies. There, they do not have the opportunity to learn – through their own job responsibilities or the examples of their colleagues and mentors– the skills to take on leadership roles in entrepreneurial start ups.

Early-state French start-ups, like their counterparts in other countries, also have difficulty obtaining funding. As noted, Young Innovator Firm status provides significant savings on headcount costs. But, in our 2006 experience, it took 6 months to obtain this status. It also took great effort and approximately a year to obtain various government grants. While both were helpful, the uncertainty during these waiting periods made it difficult for the company to understand the resources it had available to allocate toward accomplishing the required tasks.

Thus, while the French government is taking steps to improve the innovation environment, its biopharma industry remains small and its environment challenging. However, with time, and growth, I am hopeful that this will improve.

When it comes to Israel, I am struck by the global nature of innovation.

These features are highly evident in the life sciences sector. Israel is among the world's leaders in patents granted per capita in both the medical devices and biopharma fields. Many of its companies are small. Of the approximately 900 companies noted by an Israeli trade group, only a small fraction focus on human therapeutics; the remainder work in areas such as medical devices, diagnostics, and imaging. Such fields also predominate in the portfolios of Israel's life science VCs. As a result, the Israeli life sciences sector lacks both the sustained investment and the experienced drug development teams

required to take promising therapeutic discoveries through to commercialization.

Small Israeli biopharma companies seek to overcome these obstacles through collaborations with larger companies, many of which are located abroad. This benefits the large companies, as well. Just recently, Roche, entered into an arrangement to build relationships with Israeli companies and strengthen its product pipeline. Roche and an Israeli VC firm will invest in promising companies, leveraging discoveries that make their way from Israel's universities to small start-ups, the local VC's local experience information, and Roche's industry knowledge.

Other international ties abound. Many large multinational pharmaceutical companies have research and development facilities in Israel. In addition, there are relationships between many US states and the Israel biotech industry.

These examples illustrate how Israel's biopharma sector fills its gaps through collaborations that extend beyond its borders. The global nature of innovation is also evident in Israeli high tech start ups.

As I noted earlier, Israel is a small country, with a large number of scientists, engineers and startups. Many Israeli high tech entrepreneurs start their companies in Israel. As the R&D phase nears completion, some move the headquarters to the US, usually in or near California's Silicon Valley. Their US presence enhances their credibility with, and improves their access to, US VC's, partners and customers. It also gives them to access Silicon Valley's high tech sales and marketing expertise, something that is not as well developed in Israel. At the same time, these companies keep their R&D and manufacturing operations in Israel – with its abundant engineering resources.

A similar pattern occurs over and over again throughout the Israeli high tech sector. As a result, each start up can consider the examples of its predecessors, rather than starting anew when determining the best structure for commercializing its products. Because so many companies have done this, expertise has developed in handling the myriad of logistical matters – leasing office space, obtaining US work authorizations and the like. As these matters become more routine, tntrepreneurs can focus on running their innovation-creating businesses.

As I mentioned earlier, my goals today were two-fold. I wanted to provide a window into the national innovation systems of three countries – three very different paths toward innovation. I also wanted to share some personal examples and observations to flesh out our discussions in the coming days.

I will leave grand conclusions for the two days ahead. However, I will draw a few generalizations.

The first is simple, but not necessarily easy. To stimulate economic growth it is important to reduce or work around the barriers to innovation. These barriers are often unintended. They may be the risk involved in a particular undertaking, such as developing human therapeutics. Or, they may be an unintended consequence of well-funded large-scale efforts to further basic research. They may also be inherent in a country's geography, such as Israel's lack of internal markets. Whatever their source, these barriers need to be reduced or overcome to create a path to greater innovation. Creatively addressing these obstacles, across sectors, small and large companies, and international boundaries can improve innovators' chances of success.

The second is that it takes time – many years -- for a highly favorable innovation environment to develop. Not only do all components need to be in place, but they need to have been in place for a long enough time for experience and patterns of doing business to be

established. Then, researchers and entrepreneurs can focus on innovation – a more productive use of their time

The third lesson is that each country's path must be uniquely its own. Countries can learn from – and adapt – lessons from one another. But, ultimately, each country must determine its own path to foster innovation, create wealth, and ultimately improve the welfare of its people.

THANK YOU