

TOWARDS AN INNOVATIVE MEXICO

A VISION OF THE STATE OF SCIENCE AND TECHNOLOGY IN MEXICO

INTRODUCTION

On May 24 & 25, 2004 a group of scientists and scholars from Mexico, the United States and Canadaⁱ met with business and government leaders to analyze the state of innovation in Mexico.

The meeting, convened by José Sarukhánⁱⁱ, Tom Hexnerⁱⁱⁱ and Salvador Malo^{iv}, was held at the Universidad Autónoma de Nuevo León under the auspices of the Consejo Nacional de Ciencia y Tecnología and the Science Initiative Group with the support of the Rockefeller Foundation. Its main objective was to explore existing relationships in Mexico between business, the government, and the academic community with the primary goals of bridging these cultures and promoting innovation in Mexico.

The first day was dedicated to formal presentations on the importance of worldwide innovation and research and on the state of science, technology and higher education in Mexico. Delivered by specialists, business CEO's, and government officials, the presentations, and the very specific comments that followed each of them, sought to establish a common ground for the following day's discussions.

In an informal, candid, and direct tone, current conditions and perspectives for Mexico were analyzed. Particular attention was given to the current level of Mexico's scientific research and technological development, as well as the support that industry, government, and universities can provide to increase national capabilities for innovation.

Participants' contributions on the prevailing situation and their suggestions on how to proceed in the future were rich in number and diversity. While the meeting did not result in a formal joint statement, there was consensus about the **main conclusions of the meeting**. These were **the importance of innovation for Mexico; the huge gap that separates it from other countries of equal and even smaller size; and, consequently, the importance of immediate actions to turn Mexico into an innovative country**.

Considering the significance they may have for other groups concerned with the issue, and the development of Mexico, the three main conclusions of the meeting are presented for public knowledge:

CONCLUSIONS

1. *Innovation, taken as the set of factors and attitudes that determines that a business or industry masters or introduces new product designs or services and new production and generation processes, is a determinant factor in the economic growth of nations.*
 - Economic growth, measured in terms of Gross National Product (GNP), is the process nations undergo to increase their wealth. A nation's welfare is generally measured in

terms of *per capita* GNP. Innovation is a key factor for increasing productivity, the latter being what mostly accounts for differences in a nation's *per capita* gains.

- Every nation's innovation relies on an adequate interaction between the government, the scientific community, and businesses, corporations, and industries. The innovation capacity of a country is the aggregate composite of a society's shared prevailing conditions, visions and, policies, in particular by its governmental, business and academic sectors.
 - International and in some cases national experience, shows that it is possible to design and establish policies and guidelines that lead to developing innovative capability and to successful results for businesses, activity sectors, and whole countries.
2. *Mexico's innovative capability is very low; inferior to that of other countries it associates and competes with.*
- In spite of advances in education and efforts to improve scientific research and technological development, all indicators generally used to estimate a country's innovative capability (human resources, graduates in technology and engineering, doctorates, investment in science and technology, patent certificates, scientific production, high technology companies, and others), show that **Mexico is far behind world leaders and is even losing ground compared to the so-called emerging or transition economies.**
 - Mexico shows **organizational and technical capability problems** in the different levels and sectors of **government** that prevent it from focusing its own efforts and coordinating with other social actors in dealing with major national problems. The latter demand innovative ideas with the potential to spark innovation in very diverse fields. This problem **limits the country's capability to** establish procedures, regulations, and conditions that **promote** private investment in **innovation**, or at least in the creation of new businesses.
 - Notwithstanding these issues, Mexico has about a dozen great innovative corporations. However, the country's competitiveness is limited and the development of its national system of innovation is hindered because: 1) A large portion of the Mexican business sector is made up of small businesses without technical and professional capabilities or financial stability, 2) There are limited resources for technical assistance and inadequate standards of measurement and comparison and, 3) **Large national and international companies have shown little interest in promoting innovation.**
 - The universities and research centers have made the greatest efforts to create bridges between the academic community and industry. Nevertheless, they usually have very limited outreach capability, their training programs have a very strong academic orientation, and there is generally an insufficient appreciation of entrepreneurship. **There is a chasm between the cultures of government, academia and business**, which restricts the impact of the contributions of universities and research centers beyond the academic milieu. The orientation of their most qualified cadres does not appear to be directed towards the productive sectors that could better take advantage of their expertise and training to innovate. This is illustrated by the paucity of technological parks or business incubators.

- Combined with the above, the structural rigidity of educational institutions, insufficiently flexible curricula, reduced inclination towards applied research, and overall low efficiency discourage the enterprising spirit of faculty and students and inhibit academy-government and academy-industry interactions. In particular, the administrative structure of academic institutions inhibits effective competitive research. Similarly, the multidisciplinary nature of 21st century research remains constrained by the walls of the “traditional departments.”
 - Finally, the country is still undergoing political transition. The necessary conditions are not yet in place for the construction of national, regional or sector consensus., nor is the economy yet sufficiently stable to favor long-term investment, national agreements, nor the generation and acceptance of robust and trustworthy systems of indicators that provide direction for resource allocation and evaluation of technological research and development projects.
3. *Mexico urgently needs to establish policies and act to transform itself into an innovative country.*
- Demographic factors, years of schooling of the economically active population, low investment in the generation of new jobs, and training demands generated by new jobs, all indicate that if immediate measures are not undertaken, Mexico’s situation will not only worsen in economic terms and its innovative capability, but also in terms of jobs and social fabric: the country risks turning the so-called “demographic bonus” into a “demographic nightmare”.
 - Therefore, **it is necessary to initiate a movement in favor of the construction of a national innovation system in Mexico.** That is, **to work towards the construction of an innovative Mexico.** This will require the participation of the entire society, but, due to their importance and leadership, it will require the leadership of the university, government and business sectors. **The definition of a policy of innovation implies that the academic community, the government and private enterprises exhibit an attitude change and assume the responsibilities thereof.**

The following are a few examples mentioned in the meeting:

- To establish explicit industrial and sector policies, as well as long-term macro policies that have an immediate impact on the educational and science and technology systems as well as on the private enterprise investment and development plans.
- To strengthen and expand various CONACYT sector funding programs, fiscal incentives, and others that stimulate more interest and commitment for innovation.
- To take advantage of the Science and Technology Consulting Forum (*Foro Consultivo de Ciencia y Tecnología*) as a strategy to reach consensus within and among sectors, to promote lines and areas for innovation, and to develop appropriate indicator systems.
- To support and disseminate successful experiences such as the *Millennium Science Initiative* that have a great outreach potential with industry and in the training of researchers in potential areas of application, and prove to Mexico and its competitors and potential investors that Mexico has the capacity to execute world class science and technology.

- To induce government, governmental agencies, and state companies – that is, their requirements, interests, problems, plans, and purchasing power – to concentrate and attract resources towards innovation. The federal, state and municipal governments should be the main users of the research infrastructure and capacity in Mexico to solve numerous problems that affect society. This is not taking place currently, or happens only sporadically.
- To promote modifications of the steps and processes required for the creation of new companies so as to promote their multiplication.
- To foster the concept and availability of risk capital as an incentive for innovation.
- To bring the higher education system and the business world together, to ensure the flexibility of their programs and structures, and to introduce an entrepreneurship culture and a change of attitude towards research.

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