

The Challenge Faced by Argentinean Leaders Today: To Buy or to Develop Technology

Shashank Nigam, Singapore Management University

1. Sustainable Growth

Argentina's real GDP grew 9 percent in 2004, following growth of 8.8 percent in 2003 and reserves have grown \$11.5 billion since the end of 2002.¹ After the strong recovery from its recent financial crisis, Argentina needs policies that support sustained growth so that it can continue to raise living standards and meet its financial obligations. For long-term sustainable growth, enabling the use of latest technologies in Argentina should be one of the highest priorities of its leaders. To do this, they currently have two options – to buy technology from countries that have already developed them and used them successfully, or to develop new technologies themselves.

2. Buying off the shelf: The way to go?

Just like the famous saying goes: there is no use re-inventing the wheel, it is also of no particular benefit for a country to redo the efforts another and re-develop previously developed technologies. For Argentina, buying technology from a foreign country like the United States (US) has its own advantages. The technology can be used to provide solutions instantly to Argentineans and they can concentrate on other pressing issues that need urgent attention. Moreover, educational levels in some areas of Argentina tend to be low and this can often be a significant barrier to the development and diffusion of new technologies. Often, lack of infrastructure² and excess red-tape in the government can cause the quality of the business environment to decrease drastically. Buying of technologies only enables instant solutions, but also speedy adoption. However, a quick solution to a country's problems is not always the best solution.

Buying of technologies from a foreign country has its own costs for Argentina.

¹ <http://www.harolddoan.com/>

² Refer to Graph 1, Appendix A

Ever since the devaluation of the Peso in 2002, costs of imports have risen drastically. Buying a technology from the US or another developed country would drain Argentina of its hard earned foreign reserves. These funds can sometimes be put to better use for addressing urgent needs, or even to pay of its debt to the IMF, which runs into the billions. Another reason for not buying technologies is that often such advanced technologies have only been tested and used in the country in which they were developed in, and are catered for that specific market. If these technologies are brought into Argentina wholesale, then they may not suit the local needs very well. This may not only turn out to be a waste of money, but end up being detrimental to Argentinians. Moreover, if the technology is being used to develop a niche for Argentina, it will be very difficult to accomplish that since the uniqueness of the technology has been lost.

3. Developing in-house: The Real answer?

It will be a much better decision for Argentina's future to develop technologies on its own. The very fact that the currency was devalued means that the costs of in-house development have also dropped substantially. Research and development (R & D) done in Argentina will be very cost effective as compared to that done in the more developed countries. Naturally, for large scale R & D to be done in Argentina, more funds have to be directed towards this aspect. The current level of expenditures towards R & D³ is insufficient to turn Argentina into a technological leader regionally or globally.

The natural advantage that Argentina has over its neighbors like Chile or Bolivia is that it has a sizeable domestic market in which the newly developed technologies can be tested, and there are no undue pressures to take the technology global. The domestic market can itself be the reason for the industry's sustainability. Another innate advantage that Argentina has is that it is culturally closer to its Latin neighbors than the US and other developed nations. It preserves at least some of its old cultural influence on the rest of the Spanish-speaking Latin America, a factor that could help Argentine firms penetrate those markets, taking advantage not only of the geographical but also of the cultural proximity to them. In addition, developing countries have a specific asset in the form of indigenous knowledge deriving from peoples'

³ Refer to Graph 2, Appendix A

experience, accumulated and transmitted over generations. This knowledge concerns many walks of life and is a very valuable asset as a source of innovation, both technological and organizational. This would help Argentinean firms sustain long term growth. Moreover, Argentina has more scientists than any other country in the region⁴, and this can give it a head start in the R & D of technologies regionally.

The greatest advantage of adopting a bottom-up approach of developing technologies in-house is that we not only train the talent pool of our country, but as they work towards finding the solution to a given problem through research, they also find solutions to many other unforeseen problems in the process. These solutions found 'on the way' are often more useful than the original goal itself. Not only can Argentines invent more and have more patents of their names, but they can also eventually help to develop full scale industries and benefit the nation and the region. The success of this phenomenon is already visible to the world in Silicon Valley, where a large majority of the new inventions are fuelled by the research done at Stanford University.

4. The Optimal Solution

Often, poor R & D infrastructure⁵ dampens the enthusiasm and spirit of the scientists, and poor info-comm technologies (ICT) facilities⁶, in comparison to other countries, further lowers productivity. This is a problem for Argentina. There also the problem of the lack of funding for research institutes in Argentina. Currently, a large majority of the funding comes from the government⁷, which is inadequate. There is an urgent need for the development of autonomous innovation promotion institutions, managed as private sector organizations, and focused on establishing sustainable clusters of innovative firms, along the lines of the Fundacion Chile⁸. Another major problem faced by Argentina is the resistance to reforms, and difficulties in transforming existing R & D organizations and revitalizing the entire R & D system which is in decay. Thus, there is a need for marshalling entrepreneurial capabilities around existing technological and scientific assets, and drawing on the support provided by bodies which are agile and not caught in the government machinery. Public

4 Refer to Graph 3, Appendix A

5 Refer to Graph 4, Appendix A

6 Refer to Graph 5, Appendix A

7 Refer to Graph 6, Appendix A

8 <http://www.fundacionchile.cl/>

investment can be recommended as a means to this end.

Moreover, to further strengthen the technological R & D, the intellectual property rights (IPR)- regimes should be strengthened further, but any effort to upgrade IPR-regimes should be coupled with efforts to consolidate the rule of law. The rule of law is still flawed in Argentina, which implies that the existence of formally strong IPR-regimes will remain de facto weak. The importance of establishing a competitive framework should also be stressed, seeing that this is one of the main ways to stimulate private sector participation in R&D. The bottom-up process leading to the emergence of Silicon Valley is only one example of the importance of a strong IPR regime, a highly developed financial system and an entrepreneurial business culture.

The Argentinean government should aim to strengthen the institutional framework and the economic incentives, which in turn will allow the private sector to take on a more active role in technology development system. As mentioned earlier, Argentina also need to expand the number of researchers, which lags far behind the levels of more developed countries. Carefully planned reform of current education systems and curricula is will go a long way in creating a highly trained workforce. Moreover, it is important to keep in mind that investments in human capital will help stimulate private investments and venture capital specifically. Costa Rica, for example, has succeeded in attracting substantial foreign investments because the workforce is highly skilled relative to other countries in the region.

5. Conclusion

The key to sustained growth lies in being able to develop technology in-house and at the same time skillfully tap on foreign technologies. The Argentinean government needs to create effective working-groups or agencies that organize themselves in consequence with the appropriate mechanisms for scouting, screening and transforming foreign technologies, including by reverse engineering. The past experience of Asian countries illustrates the advantages to be gained and progress which can be made by tapping into Western knowledge and technology and using this as a source of competitiveness.

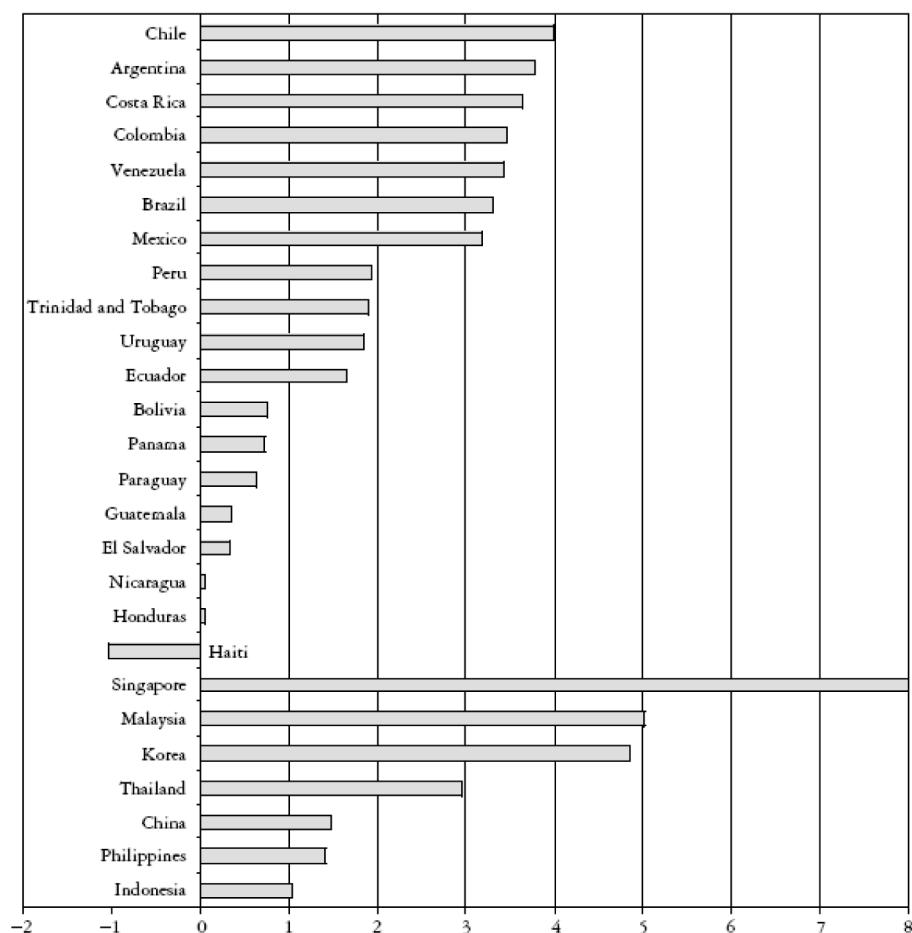
Technological innovation is often born out of the blending of indigenous knowledge with technological and organizational inputs from the developed world. The key is to facilitate the proper exploitation or integration of such in-

indigenous knowledge and know-how in projects relevant to Argentina. In conclusion, there is a need to first identify the urgent technological needs of Argentina, and fulfilling them by buying technology. However, all non-urgent technological needs should be fulfilled through in-house development. For this to sustain, there has to be a concerted effort by the government towards building a sort of national innovation system⁹ that encourages technological innovation and continuously forces the people to integrate themselves into the knowledge economy.

⁹ Refer to Diagram 1, Appendix A

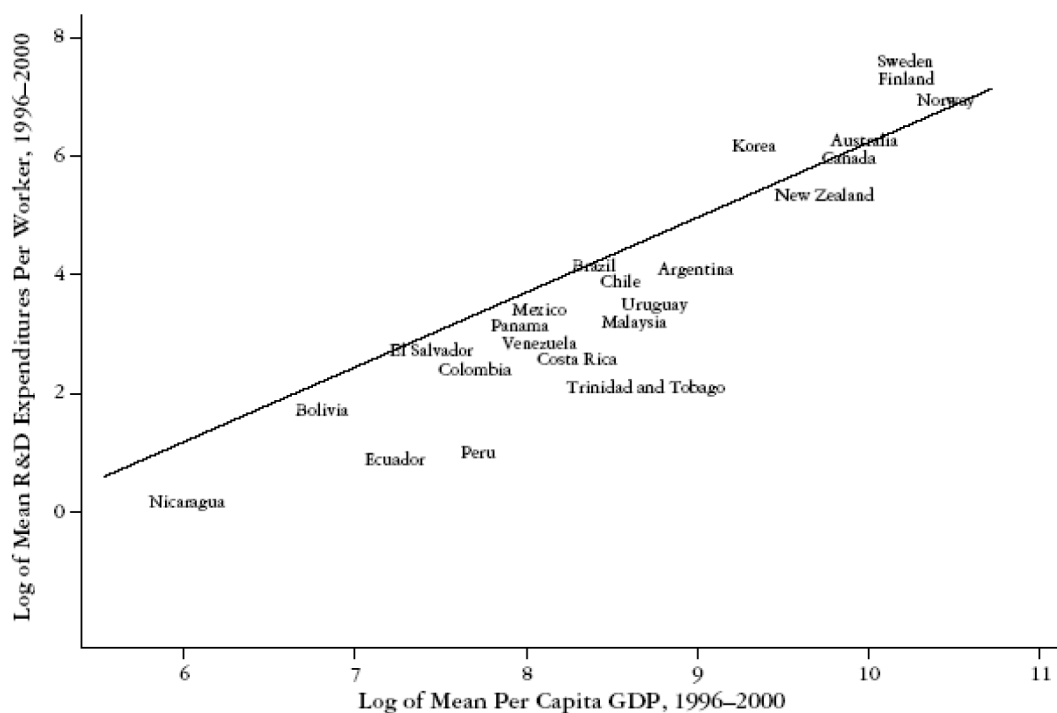
6. Appendix A: Graphs and Diagrams

Graph1: ICT Infrastructure Capabilities in various countries.



Source: Lederman and Xu (2001).

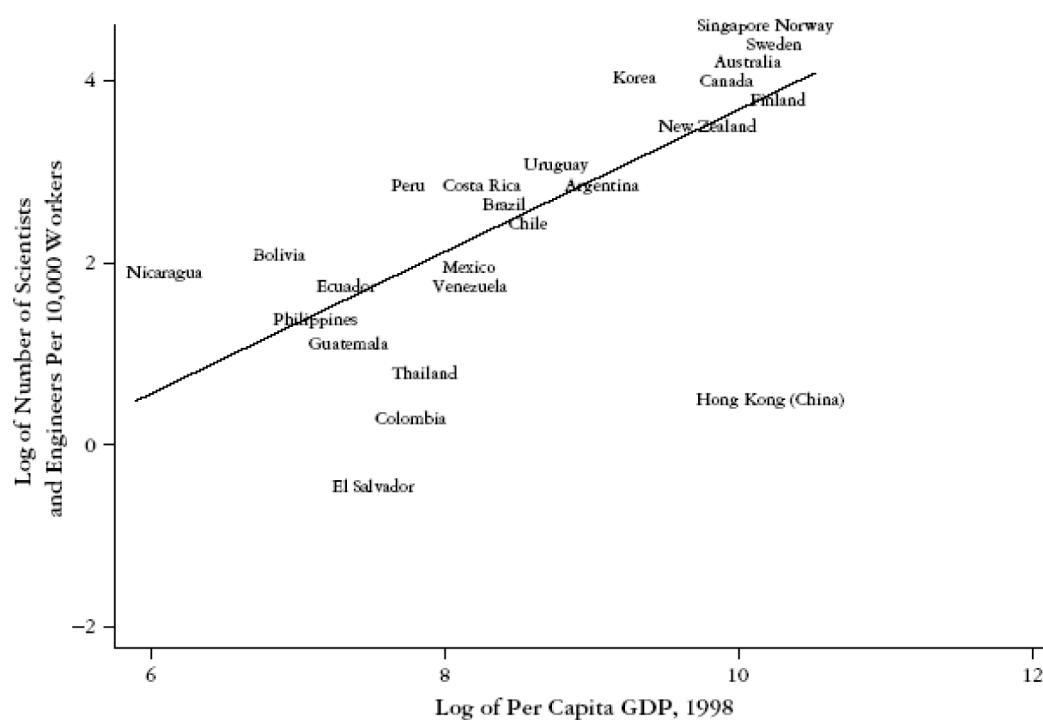
Graph 2: Mean R & D Expenditure per worker



Note: The line corresponds to the predicted log of the stock of domestic R&D in 1996–2000 from a weighted regression on the log of per capita GDP and a constant, with the weights given by the number of working-age adults in a country. The sample size for the regression is 73 countries. Some country names have been omitted to make the figure more legible.

Source: Authors' calculations based on data from Lederman and Saenz (2002).

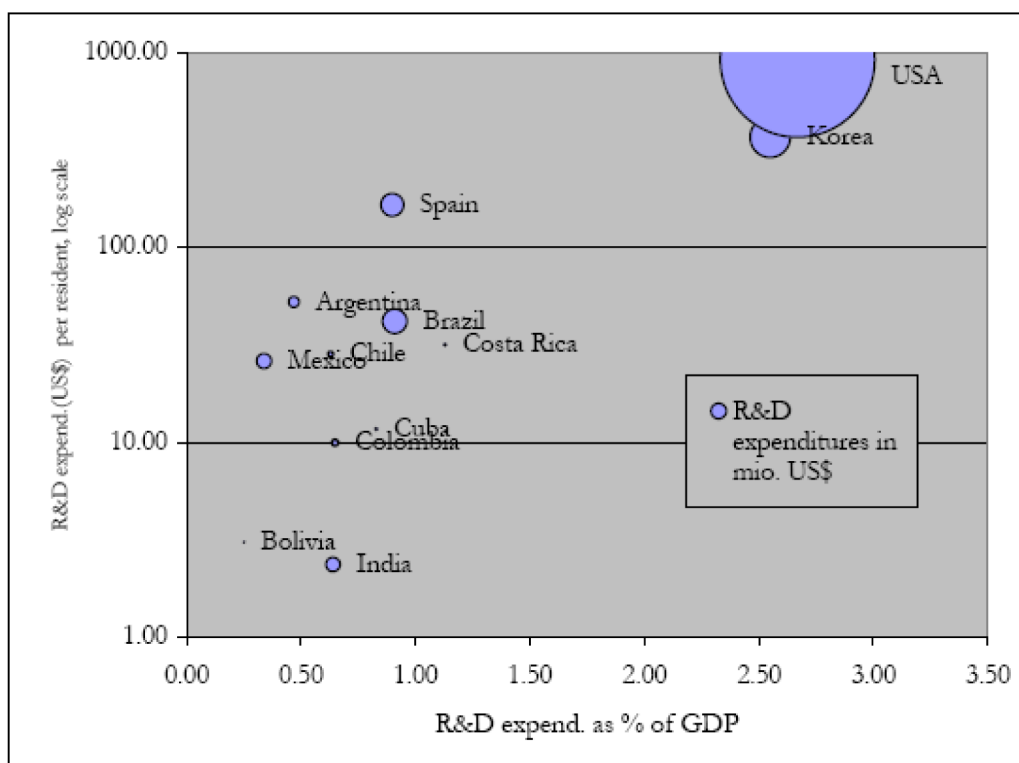
Graph 3: Number of Scientists in Argentina



Note: The line corresponds to the predicted number of scientists and engineers from a weighted regression on per capita GDP and a constant, with the weights given by the population aged 25 and older in a country. The sample size for the regression is 110 countries. Some country names have been omitted to make the figure more legible.

Source: Authors' calculations, based on data from Park (2002) for the number of scientists and engineers, and World Bank databases for per capita GDP levels.

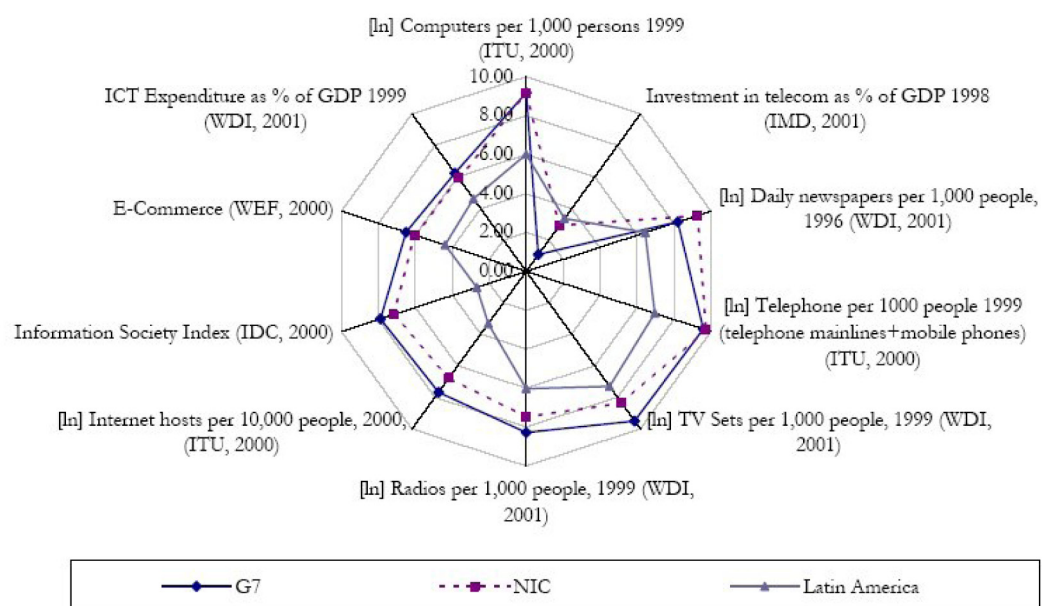
Graph 4: R & D Expenditures, 1999



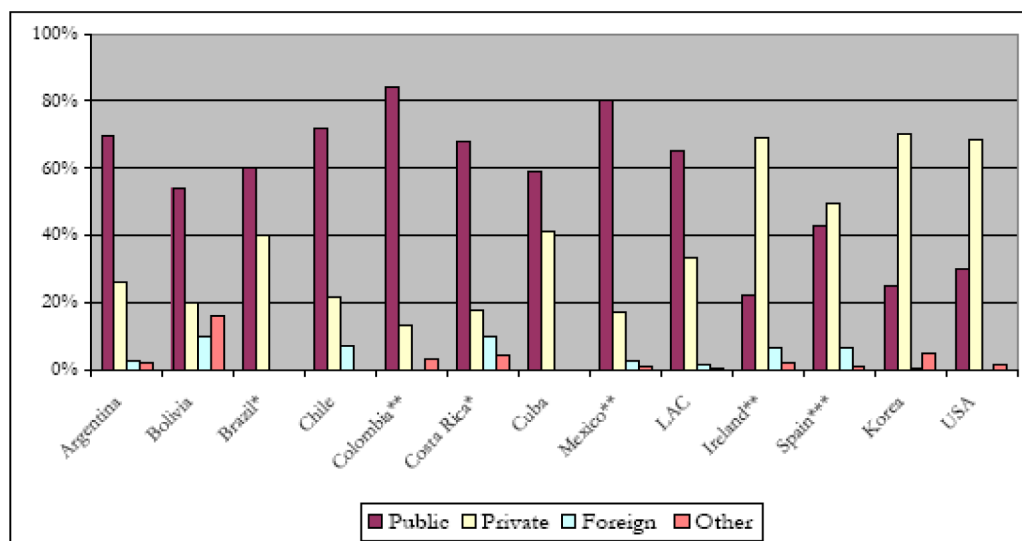
* Or closest year available

Source: RICyT, 2001 and WDI, 2001

Graph 5: Information and Communications Infrastructure



Graph 6: Origin of R & D Expenditures, 1999



*1996, ** 1997, ***1998

Note: For purpose of international comparison, public general university funds (GUF) are included under "public". They are the funds, which higher education establishments allocate to R&D from the general grant they receive from the Ministry of Education or from the corresponding provincial or local authorities in support of their overall research/teaching activities. "Other" includes funds from the private non-profit sector (PNP).

Source: RICYT, 2001; OECD, 2002

Diagram 1: A simple national innovation system (Source: The World Bank)

