

Argentina's Innovative Capacity – Which Direction?

Is the 21st century the time for Argentina to shine?

Much will depend on Argentina's capacity to innovate.

At the outset of the 20th century, economic pundits forecast a bright future for both Canada and Argentina¹, given each country's vast natural resources, literacy and education levels. Canada made good on the forecast but Argentina lags.

This Paper explores Argentina's innovative capacity at both the national and corporate levels and provides, for reference purposes, a comparison with Canada.

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Corporate
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¹ In addition to Canada, Australia was often compared to Argentina. According to one source, Australia and Argentina had, at the beginning of the 20th century, industries based on primary production with roughly similar levels of per capita output. Today, both Canada and Australia are firmly entrenched as first-world nations with a service-based economy while Argentina is clearly second world in economic terms. Reference: Australia and Argentina Cultural Comparison, <http://convictcreations.com/culture/argentina.html>.

1. Executive Overview

Argentina and Canada have many similarities but not when it comes to economic performance and innovation. According to the latest Competitiveness Report² Argentina ranks 87th overall and 62nd in terms of its innovative capacity when compared to 139 other countries. Canada, by comparison, ranks 10th and 19th respectively yet early in the 20th century both countries were seen to have a very bright economic future. Argentina is still struggling economically while Canada is a world leader.

This Paper explores national and corporate practices which have inhibited Argentina's progress. What are the factors, at both the national and corporate levels, which have forestalled the development of Argentina's innovative capacity? Why does a country with significant natural resources, high levels of education and literacy, similar to Canada's, have such a poor record of economic and innovative performance?

Observations are:

1. Argentina's national innovative capacity, for a variety of reasons, ranks low when compared to 139 other countries. Low spending on R&D by private sector corporations, the quality of its research institutions, the availability of scientists and engineers, and the non-use of government procurement to encourage innovation are the major contributing factors.
2. Cultural characteristics at the individual and corporate levels such as; the unwillingness to assume risk, the lack of informality within corporations to tolerate errors, the lack of formal projects of R&D or innovation, the emphasis on hierarchy and tradition, may inhibit Argentina's ability to develop its innovative capacity and stunt economic growth. Cultural characteristics are, however, in line with other Latin American countries.
3. Corporate management practices are, in many respects, not in line with those of internationally-recognized highly innovative companies in North America, Japan and Europe.
4. The economic and political institutions which are fundamental to understanding long-term evolution were, until recently, not pervasive with innovation as a recently-recognized important driver of development.

Now, with Argentina's proximity to the booming Latin American market, particularly Brasil, Argentina may have an opportunity, much like Canada's relationship with the U.S., to develop at a much faster pace than has been the case for the last century. Innovation in Argentina is part of the answer, but being innovative may not be easily obtainable.

Note however that Brazil, whose economy is growing at 7% this year, spends a paltry 1.1% of its GDP³ on research and development in some contrast to expenditures of 1.4% in China, 3.4% in Japan. There is some worry that Brazil may continue to rely on commodities for its growth and

² The Global Competitiveness Report 2010-2011. World Economic Forum

³ The Economist November 20th, 2010. Schumpeter.

not become innovative. Is Brazil's current lack of commitment to R&D an opportunity for Argentina? Does Argentina want to hitch its growth prospects solely to Brazil?

Argentina has several innovation successes namely in the nuclear industry, satellite manufacturing, and in some cases in software and bio-tech sectors, but these seem insufficient to produce a demonstration effect and trigger a new model of management for domestic firms and a new base for more pursuing more value-added products and services for the whole economy.

While initiatives such as:

- the creation of a Ministry of Science, Technology and Productive Innovation,
- a two-fold increase in public R&D expenses,
- improvements in structure of exports with predominance of industrial manufacturers, and
- the existence of some firms in high tech sectors,

are very promising, challenges remain at both the corporate and national levels.

The challenge for Argentina, based on the current lack of advanced technology firms in the country, is to first develop a position within one or two chosen sectors, establish a reputation for being competitive in these sectors and then address the 'frontiers'⁴ issue. Therefore, technological diffusion as a part of innovation is required to be strongly developed in parallel with the promotion of innovations. Canada's position is different since it has a well developed position in several advanced technology sectors. Canada, by contrast, needs to push the 'frontiers of knowledge' if it hopes to improve its standard of living.

Given the general consensus, the recipe for Argentina at the national policy level is clear. The country needs to improve;

- the quality of its research institutions,
- its use of government procurement as a lever to new innovative initiatives,
- the level of investment in R&D, particularly by the private sector,
- regional innovation schemes, to decrease territorial asymmetries,
- the incorporation of new models of innovation policies, not those just focused to finance development of intangibles and knowledge management practices,
- the development and diffusion of new instruments for planning and decision making, both at the policy and corporate levels, like technological forecasting and surveillance, and competitive intelligence,
- the research agenda, driven by market forces and national structural problems,
- effective collaboration between industry and universities and,
- resolve the issue of protection of intellectual property and put in place an effective patent administration system⁵ which in turn takes advantage of technological diffusion of patented matters.

Each of these recipe ingredients represents, in itself, a significant challenge for Argentina.

⁴ See note later in this paper.

⁵ In Canada, at Waterloo University, university researchers are allowed to retain the intellectual rights to their inventions. This, in the opinion of many, is one of the reasons for the rapid growth of the IT sector in this region. Instead, in Argentina, patents to the university or public research center, and there are important bureaucracy problems to commercialize patents from public institutions, particularly universities.

In summary, for Argentina to innovate in the broadest sense of the word, and in addition to more effective programs at national and provincial levels, the management style needs to change. More openness, transparency, collegiality, risk taking, informality, and a sense of team work are important ingredients in the change.

2. Argentina's Economic and Innovative Global Ranking

2.1 Economic Ranking

The Global Competitive Report⁶ states that 'Argentina is fairly stable at 87th overall [Canada ranks 10th] out of a total of 139 countries, but continues to feature in the bottom part of the rankings despite its many and diverse competitive advantages and the strong growth rates experienced by the country after its 2001 economic crisis.

Having presented the good news, the report then goes on to provide critical comment on many other features of Argentina's government, its institutions, and business practices. To quote:

On the political and economic fronts, the profile for Argentina is not favourable. Argentina ranks 106th out of 179 countries in the [Transparency International's](#) Corruption Perceptions Index for 2009.^[89] Reported problems include both government and private-sector corruption, the latter of which include money laundering, trafficking in narcotics and contraband, and tax evasion.^[90] The country faces slowing economic growth in light of an [international financial crisis](#). The Kirchner administration [but initiated by the new President, Cristina Fernandez⁷] responded at the end of 2008 with a record US\$32 billion public-works program for 2009–10 and a further US\$4 billion in new tax cuts and subsidies.^{[91][92]}

On the other hand, the report makes it clear that Argentina ranks well when compared to other countries in Latin America.

Argentina has, after its neighbour [Chile](#), the second-highest [Human Development Index](#) and [GDP per capita](#) in [purchasing power parity](#) in [Latin America](#). Argentina is one of the [G-20 major economies](#), with the world's 31st largest nominal GDP, and the 23rd largest by [purchasing power](#). The country is classified as [upper-middle income](#) or a secondary [emerging market](#) by the [World Bank](#).

The Gini coefficient, which measures income distribution, has been improved continuously over the last decade. The level of poverty has also been dramatically reduced in this period, from almost 54% of active persons in 2002 under the statistical line of poverty to 17% in 2010.

Argentina has shown high growth rates per year, around 8-9% from 2004 to 2008, and even in the last years, in spite of the world economic crisis, the annual growth rate was more than 7%. Such growth is highly correlated with the favorable international economic scenario, determined by the high prices of commodities caused by the demand from China and India and the exporting of industrial products to mainly Brazil.

⁶ The Global Competitiveness Report 2010-2011. World Economic Forum

⁷ Author's comment added in brackets.

The following table introduces the main economic indicators of the country⁸.

Table 2.1.1:
Main macroeconomic indicators for Argentina

Annual Variation in Percentage	2007	2008	2009	2010	2011 (Prev)
Real GDP	8.7	6.8	0.9	8.0	7.5
Private Consumption	9.0	6.5	0.5	8.2	4.5
Public Consumption	7.6	6.9	7.2	8.3	4.6
Nominal GDP (in billion U\$)	260.8	326.6	307.2	354.4	377.5
Fix Investment	13.6	9.1	-10.2	11.8	7.1
Export of Goods & Services	9.1	1.2	-6.4	12.8	5.5
Import of Goods & Services	20.5	14.1	-19.0	23.1	8.9
Rate of Exchange (\$/U\$)	3.1	3.2	3.7	3.8	4.2

As it could be observed, the growth of the Argentine GDP was 8% in 2010, driven essentially by the production of goods and services. In 2011 the trend is similar, with the building industry as the main dynamic sector. According to the Ministry of Economy and Public Finance, the growth rate in the second trimester of 2010 was 11.8%, lead by investments and exports and to a lesser extent by consumption.

The competitiveness of the Argentina exports has improved dramatically since the exit of the convertibility law. Devaluation was responsible for the restoration of price competitiveness and the strong growth of exports. However, there exists a current preoccupation with the structure of such exports. At the government level, there is an awareness of the relation between a more dynamic structure, one based on knowledge-based, value-added exports, and the sustainability of high rates of growth. There are some vulnerable aspects in the medium and long term.

Argentine exports are basically concentrated in low value-added products. In 2007 the ten main products represented 51% of total exports⁹. Today, this percentage has decreased in favor of manufacturing, both from agricultural and industrial origins. Sustainability and economic growth are obtained with the development of new high value-added products for internal consumption and for exports, as well as with the improvement of existing products¹⁰. Thus, innovation is an important path for the sustainable development of Argentine society and economy; and the trends show a positive trajectory in this direction. However, it is important to highlight that incremental innovation is overwhelmingly predominant in the Argentina model of innovation,

⁸ World Bank Data (2010).

⁹ See Guerson, Parks y Torrado (2007): "Export Structure and Growth. A detailed Analysis for Argentina", World Bank Policy Research Working Paper 4237.

¹⁰ The mix of goods that one country produces may have important effects on the long term economic growth. See to this respect, Hausmann, Hwang y Rodrik (2006): "What you Export Matters", in *Journal of Economic Growth*, 12, 1-25.

and that the technological trajectory of the country is an imitative one of the behavior of most developed countries¹¹.

2.2 Innovative Capacity

By comparison with several other countries, Argentina's innovative capacity (2004) shows that R&D spending, while on a par with Mexico, lags other countries noted, particularly in the R&D contributed by the private sector.

Table 2.2.1
R&D and Innovation indicators, for Argentina 2004

Country	R&D/GDP (%)	R&D per Capita (US\$/ppp)	Patent Applications of Domestic Citizens per million of inhabitants	R&D Contributed by Private Sector as % of the Total	Exports of High Tech Products as a % of the Total Exports of Manufactured Products	Royalties per Licenses Payment/PBI	Royalties per Licenses Collect/PBI
Argentina	0.44	48	25	28.4	6.8	0.0037	0.0003
Australia	1.77	487	432	48.8	12.3	0.0028	0.0007
Brasil	0.91	74	20	41.0	12.1	0.0016	0.0001
Canadá	1.95	605	123	50.0	15.2	0.0058	0.0026
Chile	0.68	62	23	35.7	6.5	0.0026	0.0004
China	1.34	79	71	60.0	30.3	0.0023	0.0001
India	0.85	20	6	23.0	4.8	0.0009	0.0001
México	0.41	35	5	30.9	18.9	0.0006	0.0002

Source: UNESCO (2007)

¹¹ See Arcienaga, A. (2005) "Modelo Argentino de Innovacion", Comision de Investigaciones Cientificas, La Plata, mimeo, pag. 17.

Since 2004, significant strides have been made in the allocation of resources to R&D, a key contributor to innovative capacity. Total human resources dedicated to R&D increased from 59,000 persons in 2004 to 79,000 in 2008.

Table 2.2.2
Human Resources devoted to R&D activities in Argentina, 2008¹².

R&D Personnel	2004	2005	2006	2007	2008
Researcher with FD	21,751	62,543	67,856	27,133	28,518
Researcher with PD	15,875	23,275	24,970	19,751	22,059
Scholarship holder FD	6,035	16,281	17,759	9,492	10,391
Scholarship holder PD	2,506	6,928	8,383	2,676	2,959
Technical Personnel of R&D	6,967	7,788	2,425	7,732	8,236
Support Personnel of R&D	6,016	5,705	8,151	6,774	7,228
TOTAL R&D RESOURCES	59,150	62,543	67,856	73,558	79,391

Similarly, expenditures on S&T have shown a sharp increase and in 2008 and accounted for .61% of GDP. Of course, these are rough numbers and it is necessary to analyze the quality of the expenditure.

Table 2.2.3
Total Science & Technology Expenditure Evolution in Argentina,
for the period 2004 to 2008¹³

Year	National Expenses on S&T (thousands of current pesos)	Increasing respect to the year before (%)	Expenditures in relation to GDP (%)
2004	2,194,544	+25.9	0.49
2005	2,796,379	+27.4	0.53
2006	3,768,725	+34.8	0.58
2007	4,934,164	+30.9	0.61
2008	6,275,970	+27.2	0.61

Regarding the total amount on Science and Technology Expenditure, which includes other spending like infrastructure, technical assistance, training, licensing, and so on, the effort in this period is quite important, particularly if one compares this evolution to the nineties. Particularly, it is important to remark the creation of the Ministry of Science, Technology and Productive Innovation during this period. More specifically, expenditures on R&D – nationally – rose from .44% of GDP in 2004 to .52% in 2008. It is interesting to underline the high increasing rate per year in R&D, with a mean of 28.56% yearly in this 5-year period.

¹² Source: MINCYT (2010): Indicadores de Ciencia y Tecnología Argentina 2008, Ministerio de Ciencia, Tecnología e Innovación Productiva, Buenos Aires, page. 54. Note: FD means full time dedication; and PD means part time dedication.

¹³ Source: MINCYT (2010): Indicadores de Ciencia y Tecnología Argentina 2008, Ministerio de Ciencia, Tecnología e Innovación Productiva, Buenos Aires, page 29.

Table 2.2.4
R&D Expenditure Evolution in Argentina
for the period 2004 to 2008¹⁴.

Year	National Expenses on R&D (thousands of current pesos)	Increasing in respect to the year before (%)	Expenditures in relation to GDP (%)
2004	1,958,675	+27.0	0.44
2005	2,450,987	+25.1	0.46
2006	3,237,042	+32.1	0.49
2007	4,126,734	+27.5	0.51
2008	5,409,669	+31.1	0.52

Both the public and private sector have contributed to the overall growth in expenditure over the period 2004 to 2008. However, while public spending in this matter is increased by a factor of three, private expenditures are just almost double. This means that the leveraging effects or mechanisms of public money are not functioning properly on private investments for innovation. There are of course other problems than just financial ones to explain the low level of investment on innovation by private firms, as we will see later when the expenditure composition and behaviours were analyzed.

Table 2.2.5
S&T Expenditure Evolution in Argentina,
for the period 2004 to 2008, according different contributors¹⁵

YEAR	Public Bodies (*)	Public University	Private University	Firms	Non Governmental Organizations	TOTAL
2004	845.5	462.7	52.8	767.0	66.5	2,194.5
2005	1,127.3	600.3	53.0	937.0	77.9	2,796.4
2006	1,616.6	815.4	62.9	1,168.2	105.6	3,768.7
2007	2,111.5	1,152.7	78.4	1,486.5	105.1	4,934.2
2008	2,775.8	1,503.1	100.4	1,762.0	134.7	6,276.0

¹⁴ Source: MINCYT (2010): Indicadores de Ciencia y Tecnología Argentina 2008, Ministerio de Ciencia, Tecnología e Innovación Productiva, Buenos Aires, page 39.

¹⁵ Source: MINCYT (2010): Indicadores de Ciencia y Tecnología Argentina 2008, Ministerio de Ciencia, Tecnología e Innovación Productiva, Buenos Aires, page 30. Note: figures are in thousands of current pesos.

Argentina groups its spending on R&D and S&T by the type of organization as shown below. Private firms account for 27% of R&D and 28% of S&T expenditures but the majority of both classes of expenditure is sourced from public organizations.

Table 2.2.6
R&D to S&T Expenditures in Argentina for the period 2008¹⁶

Expenditures per Type of Agents	R&D Expenditures (thousands of current pesos)	S&T Expenditures (thousands of current pesos)	Relation R&D/S&T (%)
CONICET	720,894	753,147	0.96
Other Public Organizations	1,540,075	2,022,638	0.76
Public University	1,476,407	1,503,055	0.98
Private University	93,904	100,366	0.94
Private Firms	1,484,544	1,762,059	0.84
Non Governmental Organizations	93,845	134,705	0.70
TOTAL	5,409,669	6,275,970	0.86

As might be expected, few private firms engage in basic research and the emphasis is on applied research and development.

Table 2.2.7
Percentage of R&D Expenditures Types in Argentina, for the period 2008¹⁷

Type of R&D	Public Bodies (*)	Public University	Private University	Firms	NGOs	TOTAL
Basic Research	37	39	21	2	36	28
Applied Research	43	54	71	34	62	44
Development	20	7	8	64	2	28
TOTAL	100	100	100	100	100	100

The low level of expenditures in developmental activities within public and private organizations, with exception of firms is highlighted. Such expenditures are closely related with innovation at market level. Apparently, increasing public R&D expenditures is not the solution for promoting innovation because the allocation of resources is primarily devoted to science (basic and applied), and marginally to innovation. The leveraging process for innovation and growth relies on development spending.

¹⁶ Source: MINCYT (2010): Indicadores de Ciencia y Tecnología Argentina 2008, Ministerio de Ciencia, Tecnología e Innovación Productiva, Buenos Aires, pag3. 40. Note: figures are in thousands of current pesos.

¹⁷ Source: MINCYT (2010): Indicadores de Ciencia y Tecnología Argentina 2008, Ministerio de Ciencia, Tecnología e Innovación Productiva, Buenos Aires, page 47.

In terms of evolution, the following table shows how each type of R&D expenditures has evolved in the last five years. Note that the activities related to innovation decrease their percentage systematically over the period 2004-2008, all the contrary for the participation of basic research.

Table 2.2.8
Percentage of R&D Expenditures Types in Argentina, for the period 2004-2008¹⁸

Type of R&D	2004	2005	2006	2007	2008
Basic Research	24.4	26.8	28.1	29.3	28.0
Applied Research	44.1	43.0	42.7	42.7	44.2
Development	31.5	30.2	29.2	28.0	27.8
TOTAL	100	100	100	100	100

A recent report¹⁹, which compares the innovative systems in Argentina with Brasil, provides additional insight into the state of Argentina's innovative capacity.

- Argentina lacks an industrial presence in the aerospace, information technology and fine chemicals sectors. This is one of the explanations for its low level of national spending on R&D.
- Private sector firms in general do not invest in R&D at the same level as many other nations and rank well below Canada's level of expenditure; which in itself is not high by comparison to highly developed nations.
- Large firms spent less than smaller or middle-sized firms on R&D in the two periods examined; 1992-1996 and 1998-2001.
- There is a significant reliance, by the private sector, on research institutions to undertake basic and applied research.
- There appears to be a discontinuity between the priorities and work of the public sector research institutions and the needs of the private sector, which has contributed to a lack of collaboration.
- Two research institutions; CNEA (nuclear), CONICET (water, environmental, and fishing), account for major expenditures on R&D.
- Patents²⁰ (per resident applicant), an often-used measure of innovation in any country, place Argentina well below – at 24th position – of the 25 countries noted in the report.

¹⁸ Source: MINCYT (2010): Indicadores de Ciencia y Tecnología Argentina 2008, Ministerio de Ciencia, Tecnología e Innovación Productiva, Buenos Aires, page. 48.

¹⁹ Pablo Bereciartua (Argentina) and Marcio de Miranda Santos (Brasil) (2006). Desafíos de los sistemas nacionales de innovación, published in 2006.

²⁰ Patents are not good indicators of innovation in less developed countries, above all after the change of industrial property laws as a condition to enter in the World Trade Organization. They required novelty at world level to be granted. Therefore, they are not a properly means to capture technological learning in countries which are not in the forefront of technology. I made a PhD thesis on this subject in Spain. In Latin America, there was an effort called the Bogotá Manual, to translated the OECD Oslo Manual to the reality of less developed countries. The problems, in terms of statistics, is that there are no suitable economic indicators to reflect a dynamic phenomena like learning. Besides, learning (not just based on R&D) is vital to characterize innovation culture in a country.

- Between 1997 and 2004, the number of people employed in research institutions which are dedicated to R&D rose from 48,368 to 59,150. More recently, at the end of 2008, the number has risen to 79,231, a significant increase of 34%.

With the exception of the increase in R&D personnel, Argentina's private sector, in contrast to the public sector, appears less committed to R&D. While investment has increased in the private sector it is not proportional to increases in the public sector. This may be due to a lack of liaison between public R&D centres and private firms or it could be that, due to the economic crisis, the private sector is unwilling to assume the risk attendant with new investment. This unwillingness comes at a bad time as, globally, countries are more dependent upon innovation than ever before and at a time when international competition for creating innovation is increasing. The situation is obviously serious and requires attention if Argentina is to improve its international ranking.

An exception, and an example, to this comment may well be the Tenaris Group; a publically-traded manufacturer of steel tubing. The Group is recognized as one of Argentina's leading innovative companies yet its expenditure on R&D amounted to less than 1% of sales in 2009, not untypical, however, for expenditures on R&D in the steel industry²¹. They point out that their 'global network collaborates with top universities and research institutions worldwide' to conduct basic and applied research.

2.3 The Next Decade

Standards of living can only be enhanced by technological innovation but, as the authors²² suggest, innovation per se is not the answer in itself. Innovation must take a particular form dependent upon the current state of economic and innovation development.

Adopting existing technology, while an important attribute of growing economies, begins to fade in importance as the economies approach the frontiers of knowledge at which time other factors become important.

Firms in these countries must design and develop cutting-edge products and processes to maintain a competitive edge. This requires an environment that is conducive to innovative activity, supported by both the public and the private sectors. In particular, it means sufficient investment in research and development (R&D), especially by the private sector; the presence of high quality scientific research institutions; extensive collaboration in research between universities and industry; and the protection of intellectual property. Amid the present economic uncertainty, it will be important to resist pressures to cut back on R&D spending—both at the private and public levels—that will be so critical for sustainable growth going into the future.

Much therefore depends on the state of innovation development in the country and in this respect, Argentina differs dramatically from Canada. Canada, at the forefront in terms of some sectors of the economy, must work at the frontiers of science to progress its economy. Argentina does not have the same starting point in most economic sectors.

²¹ For further information on innovation in the steel industry, visit www.corporateinnovationonline.com and download the Profile of Nucor. Note comments made on Nucor's spending on R&D.

²² World Competitiveness Report

There are global policies for innovation, which are not restricted to science and technology. They involve finance (risk capital), development of pilot markets, incentive systems, demonstration projects, cluster promotion, technological diffusion policies and measures, technology surveillance, social and education aspects, all of them trying to develop a general system that enables a knowledge society. Therefore, the need for coordination between different areas and ministries is very high. In contrast, Argentine policies for innovation are evolving very slowly from a market failure rationale (i.e. just financing R&D projects which is a neoclassical approach) to address a wider range of actions.

Recently, actions involve some instruments to promote clusters, a launching of risk capital experience, and the training of technology managers and scouts. However, they do not function in coordination with all the government areas, and are located in the recently created Ministry of Science, Technology and Productive Innovation. The coordination is very poor, particularly at the strategic level, the policy in the mentioned Ministry is focused mainly on research, and the public agenda is dominated almost solely by an emphasis on science. There are few activities, in terms of allocated funds, related to technological developments and innovation.

The opportunities presented by Argentina's resources, its proximity at this time to a rapidly developing market like Brazil for industrial products and China for agricultural commodities, and the results of the reforms that have been instituted to address major economic, social, political, and issues of innovation, represent progress but some questions remain? Is the current progress sufficient to move Argentina economically? Are structural changes toward a knowledge society actually addressed by the policies and instruments adopted? Are innovation policies actually evolving from the lineal model to a more interactive and systemic approach, with an effective focus on innovation? How effective are the impacts of these policies in changing the corporate practices of the firms and society toward innovation? Can Argentina become the nation which was envisaged by some at the beginning of the 20th century?

The World Economic Forum authors²³ point out that;

'it is important to keep in mind that they (the factors measured) are not independent: they tend to reinforce each other, and a weakness in one area often has a negative impact on other areas'.

Several initiatives, each acting to reinforce the general objective, need to be addressed if economic development success is to be achieved. Such interdependence applies not only to national and regional policies and programs but, as is set out later in this Paper, extend to management practice issues in the private sectors of the economy and the encouragement of collaboration among national interests and those of the private sector.

²³ The Global Competitiveness Report 2010-2011 © 2010 World Economic Forum.

3. Economics/Innovation; Argentina and Canada Compared

Argentina ranks 62nd and Canada ranks 19th in terms of innovative capacity²⁴. The summary for the 12th pillar²⁵ in the report, which relates to innovation, places Argentina well behind Canada overall and for each of the 7 factors measured by the report's authors.

<i>Factor Reviewed</i>	<i>Argentina</i>	<i>Canada</i>
<i>Capacity for innovation</i>	62 nd	19 th
<i>Quality of scientific research institutions</i>	46 th	8 th
<i>Company spending on R&D</i>	72 nd	20 th
<i>University-industry collaboration</i>	53 rd	7 th
<i>Government procurement</i>	130 th	26 th
<i>Availability of scientists and engineers</i>	76 th	6 th
<i>Patent (utility) per million population</i>	52 nd	10 th

The similarities and differences between the two countries are apparent²⁶. Major differences are highlighted.

	Argentina	Canada	
General Economic Information			
Population	39.5 million	32.7 million	
Arable as a % of land	10%	5%	
Adult literacy	97.6%	100%*	
Urban population	91.8%	80.3%	
GDP per head	\$6640	\$40,330	
Economic freedom index	52.3	80.5	
Innovation Indicators & Influencers			
Structure of Employment	Industry	23%	21%
	Services	76%	76%
Origins of GDP	Agriculture	9.5%	2.6%
	Industry (34%) of which manufacturing is	21.5%	31.5%
Principal Exports	Services	56.5%	69%
	Manufactures	17.4%	
Export Destination – major markets.	Primary Products	12.5%	
	Brazil	17.4%	U.S.A.
	China	9.6%	
	United States	11.4%	79.9%
Education Spending	% of GDP	4.5	4.9%
Computers	Per pop.	9.0	94.3
Average annual inflation rate; 2003 – 2008		8.4%	2.1%
Money market rate: 2008		10.07%	2.96%

²⁴ The Global Competitiveness Report 2010-2011 © 2010 World Economic Forum.

²⁵ The Global Competitiveness Report 2010-2011 © 2010 World Economic Forum. The final pillar of competitiveness is technological innovation.

²⁶ The Economist. Pocket World in Figures. 2010 Edition

Canada's economic growth has been closely tied to U.S. economic growth and the country has benefited immensely from trade and cultural linkage with the U.S. There have, however, been some negative aspects of this relationship. For example, the Free Trade Agreement, coming on top of the Auto Pact (a trade agreement focussed on the auto sector), has led to little or no research and development work in the Canadian auto sector by the major auto O.E.M.s even though the agreements implementation overall has been positive for Canada's economy.

Canada's manufacturing sector, to a great extent, has become a branch-plant economy. Canada's innovative capacity has, as a result, been negatively impacted due to the high level of foreign ownership - primarily from the U.S. - which has led to important research and development work gradually being consolidated to corporate facilities in the U.S.

In Canada, the national system of innovation (NSI) is a fact²⁷. In Argentina, NSI is an objective to be built. In Argentina there are many institutions and organizations, but they function in an uncoordinated form. There is a high level mechanism of coordination at inter-ministry level, called GACTEC, but it has not functioned in the last five years. Regarding this, and the absence of other specific policies, the allocation of funds primarily to basic research, and the lack of articulation of measures to improve innovation, the construction of the national system of innovation seems that is not a priority in national government policies.

In Canada, the liaison between scientific institutions and private firms is much closer than in Argentina. The agenda of research is fixed with consensus between these two partners and the State. In the past, the Canadian government has chosen high tech industries (such as software and biotechnology) to develop domestic firms that could compensate for the massive presence of multinational firms in its economy²⁸. In Argentina, historically, the technology liaison has been very weak, even though the efforts were made in the nineties with nationally specific programs to address this issue. Probably the key to understanding this disconnect is the incentive system for researchers. Paper publication is the main and outstanding measure to progressing researchers' careers. Therefore, the agenda is made mainly of topics that can be published in international journals and not by problems to be solved, particularly in the productive private sector. In connection with this fact, Argentine scientists call for excellence as the main argument for developing the agenda, but drop pertinence as another important parameter to design the research agenda of the country²⁹. This produces a very high geographically concentration of scientist and expenses in R&D, which is also a very important perturbation in the efforts to build a NSI and a sustainable national development.

²⁷ See Jorge Niosi (2000): Canada's National System of Innovation, McGill-Queen's University Press, Montreal.

²⁸ See Chudnovsky, D., Niosi, J. and Bercovich, J. (2000): "Sistemas Nacional de Innovación, Procesos de Aprendizaje y Política Tecnológica: una Comparación de Canadá y la Argentina", pag. 289; included in SECYT (2000): Seminario Internacional de Políticas para Fortalecer el Sistema Nacional de Ciencia, Tecnología e Innovación", SECYT, Buenos Aires.

²⁹ Until 2001, the science policy in Argentina can be characterized like a laissez-faire one (cfr. Chudnovsky et al, 2000 : 319), op cit., in clear contrast with a more focused R&D and innovation policies in Canada.

The significant differences between Canada and Argentina are as follows.

- Canada participated actively in World War II, particularly in investigations on radar, atomic energy, avionics, synthetic rubber, and electronics. Argentina was neutral almost until the end of the confrontation. As a consequence, Canada had even access from the very beginning to US sensitive technologies while Argentina is still considered a backyard (like all Latin American countries) by USA foreign policy³⁰.
- Canadian experience in promoting innovation has existed for a very long in time. It started in 1944 with a tax reduction for those firms that carried out R&D. Then, there were several policies to promote innovation: the Defence Industry Productivity Program of 1959, that promote electronics and avionics industries, the Industrial Research Assistance Program (IRAP) in 1962 to support SMEs, the Program for Advancement of Industrial Technology (PAIT) in 1965, the Industrial R&D Incentive Act of 1967, the Scientific and Technological Supply Service of 1969, Foreign Investment Review Agency (FIRA) in 1973, the Program for the Expansion of Enterprises and the Investment Tax Credit launched both in 1977, the Strategic Technologies Program in 1980 that promoted high tech sectors, the risk capital schemes of the Federal Development Bank in 1985, and the Technology Partnership Canada in the '90, among the most important experience. In 1993 there were more than 400 federal and provincial programs to promote technological innovation in Canada. By contrast, Argentina approved her first law to promote innovation in 1991. The laissez faire attitude in the innovation policy characterized Argentina, and therefore the institutional learning is still a pending issue for the country³¹.
- Canada has made an explicit effort to balance the technological and institutional capacities throughout her territory. Just in 1970 there were 47 public provincial laboratories, to address the problems of the different regions. Right now, in Argentina there are around 30 labs financed by provincial governments (and sometimes with other national institutions like CONICET), almost 90% in Buenos Aires Province³².
- Canadian universities are; very dependent upon on the provinces, execute R&D projects attracting brains from all over the world, and are willing to promote spin-offs. In contrast, Argentine universities belong to the national state, act upon the territory where they are located with low commitment with local issues, and until recently the budgets and political constraints increased the brain drain from them.
- Canada has a higher proportion of its economy in the services sector. This was not always the case. Agriculture and manufacturing sectors were major features until very recently.
- GDP per head is dramatically different.

³⁰ For instance, as a result of the confrontation, USA never paid the war debt with Argentina (for food and other stuffs), around three billion dollars of 1945. The United Kingdom did the same with her debt with Argentina, that amounted more than five billion dollars after WW II. See Galasso, N. & Calcagno, E. (2003): De la Banca Baring al FMI : Historia de la Deuda Externa Argentina, Editorial Colihue, Buenos Aires, pag 42. The Monroe doctrine of 1823 (America for Americans) was the base for the US backyard policy for Latin America.

³¹ See Chudnosvsky et al (2000), op. cit., pp. 303-305.

³² See Chudnosvsky et al (2000), op cit., pag. 295. See distribution along Canadian regions in Niosi (2000), pag. 78.

- Economic freedom index³³ is significantly different.
- Multinationals that operate in Canada carry out R&D activities in this country. In contrast, multinationals that operate in Argentina do not perform any research activity in the subsidiary located in the country.
- Canada's industrial (manufacturing) economy is almost wholly dependent upon exports to the U.S.A. This situation has not changed over decades in spite of numerous initiatives to diversify its markets to Europe and Asia. Currently, due to this dependency, there is a growing concern in Canada with the future of the U.S. market and therefore Canada's economic growth. In parallel, Argentina is increasingly dependent upon Brazil's economy, but has a more diversified external market in terms of countries.
- Computer literacy, as measured by the ownership of computers, is substantially higher in Canada.
- High interest rates in Argentina make bank borrowing, and venture capital, less accessible than in Canada.
- Argentina has improved its allocation and resources to R&D and to S&T but the resource allocation is heavily weighted to public institutions (two thirds) and to basic science as contrasted to applied science and development. In Canada, two thirds of the R&D expenditures are made by the private sector.

³³ Certainly, this is a very subjective index. RWB compiles and publishes an annual ranking of countries based upon the organization's assessment of their press freedom records. The report is based on a questionnaire sent to partner organizations of Reporters Without Borders (14 freedom of expression groups in five continents) and its 130 correspondents around the world, as well as to journalists, researchers, jurists and human rights activists. The survey asks questions about direct attacks on journalists and the media as well as other indirect sources of pressure against the free press. RWB is careful to note that the index only deals with press freedom, and does not measure the quality of journalism. Due to the nature of the survey's methodology based on individual perceptions, there are often wide contrasts in a country's ranking from year to year. In Argentina, the concentrated mass media are related to the economic interests of the establishment and in the past with dictatorship and the lack of human rights. Therefore, even though this index is taken in this work, the authors are aware that in Argentine case it is not a proper measure given the confrontation of the national government with the concentrated mass media.

4. Management Practices and Innovation

A Corporate Framework for Managing Innovation

Management styles have an impact on the ability of a corporation and therefore a country to innovate – i.e. to take advantage of inventiveness and realize commercial gain for the corporation and for the country.

In our research on innovation in the corporate world outside of Latin America [i.e. encompassing Europe, the United States, Canada, and Japan], the important management practices which contribute to, or if they are not in place, inhibit innovation in the corporate sector, can be grouped under three major headings;

- leadership,
- the approach taken in organizing and managing day-to-day activities and,
- idea generation and realization.

Leadership in so far as this relates to innovativeness, can be viewed as comprising four³⁴ Factors most of which relate to the actions of senior management and the Board. Leadership sets the tone within any organization. Without leadership and support from the top, innovation is unlikely to take place over the longer term.

Leadership

- Management (including the Board) explicitly look for innovation; the subject is high on the agenda for Board meetings, management meetings, conferences, (F#2).
- The emphasis by senior management is on the need to achieve a balance between short-term profit and investing to meet priority long-term goals (F#1).
- Planning; business/strategic/planning/budgeting initiatives all emphasize finding opportunities rather than focussing on cost cutting or rationing of resources (F#4).
- Management exhibits a tolerance for taking risk in the planning process (F#9).

The approach taken to organizing and managing day-to-day activities is critical to setting the climate for encouraging and facilitating innovation. Seven Factors have an impact.

The Organization and management of day-to-day affairs

- Management emphasises people management and places a high importance on human resources and interaction (F#6).
- There is a high degree of informal communication in the company (F#10).
- The use of independent (groups with authority to make changes) work groups is encouraged to accomplish projects and special tasks (F#11).
- Key decisions are made with input from several sources in the company as opposed to a top-down arbitrary approach (F#12).
- The decision process is relatively informal (F#13).
- Decision making is decentralized (F#18).
- The organization is more action oriented than mired in the planning processes (F#15).

³⁴ For further explanation of each F#, go to <http://www.corporateinnovationonline.com>

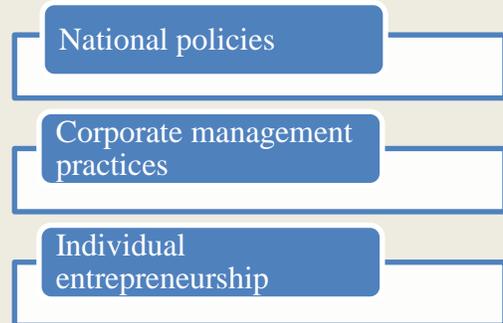
Idea generation is encouraged when incentives are in place to reward those who innovate. Tolerance is a major attribute associated with innovative and is especially important success is dependent upon 'open collaboration' which is in itself dependent upon the existence of a sense of trust within – and without - the organization. Innovation, while broader than just R&D spending, is heavily dependent upon investment and the assumption of risk at all levels.

3. Corporate approach to idea generation and realization

- Management has a high tolerance for mavericks (F#3), a tolerance for failure (F#5), and a tolerance for variances from a defined or even undefined corporate norm (F#8).
- Reward mechanisms for innovators/innovations are frequently in use (F#14).
- Employees have a sense that resources are available should attractive ideas/projects be identified (F#19).
- R&D spending levels are relatively high when compared to the competition (F#23).

Innovation is also dependent upon not only good corporate management practices but also on the overarching policies of government, the use of public sector institutions and infrastructure, and collaboration amongst all parties.

- R&D spending is typically encouraged by government through tax credits or allowances.
- Idea generation is a function of the application of knowledge in a corporation – most often scientific and technical – and is therefore a product of the nation's education system.
- Government procurement can be a lever for encouraging private sector initiatives where domestic markets are limited in size and support for export initiatives is beneficial.
- Public and private sector funding by government of research institutions is becoming an even more important contributor to the economic development and innovative capacity of a region or country.



The need for a cooperative approach between the public and the private sector is evident from the reading of Peter M. Senge's book, *The Fifth Discipline*. He points out that³⁵ one of the distinguishing differences between the public and the private sector is that the latter, 'is the locus of innovation in an open society'. It is the private sector which represents the major source of new ideas and products which move into commercialization and provide the economic growth leading to jobs and an increase in standard of living. To a large extent, research institutions focus on invention while corporations focus on innovation and the commercialisation of inventions³⁶.

³⁵ Senge, P. (1990): *The Fifth Discipline. The Art and Practice of the Learning Organization*, Current Doubleday, New York, page, 15.

³⁶ As an aside to his book, Senge (1990) also notes the difference in the terms used; "invented" - when it works in the laboratory, an "innovation" when it can be practically replicated and if it is sufficiently important it becomes known as "basic innovation" and a new industry is created or an industry is transformed dramatically. His reason for so stating is to make the point that 'learning organizations' have been invented but 'have yet to be innovated'. So it

While Senge's position is appropriate for highly-developed countries there are differences when considering lesser-developed economies. The state has also a strategic role, and can enable new entrepreneurial developments with a suitable selection of innovative opportunities which lead to development and commercial-realization from value-added chains.

The Canadian government did so and was successful in software and biotechnology. Argentina has succeeded partially in nuclear and satellite industries, where public spending was crucial for innovations in these fields. The Japanese government selection of different sectors over time, picking up industrial opportunities seen to be the motors of the economy, is also well known. The pro-active behavior of the government does by no means replace the propensity for firms to innovate. On the contrary, it needs to promote the firms' innovativeness to be really successful in terms of policy and strategy.

What does cooperation between public and private organizations actually mean? The relationship is complex and means having in place a wide range of different instruments and policies, functioning in a coordinated manner, with the overall objective of improving innovation. Among the most important issues which need to be addressed are:

- regulations or deregulation,
- stable rules,
- institutional accumulation of experiences,
- learning from the implementation of rules,
- horizontal supports,
- vertical specific promoting instruments,
- creation of knowledge externalities,
- support of pilot marketing at the beginning of an innovation,
- promotion of standards for products diffusion,
- diffusion of information to reduce uncertainties,
- different support for the whole innovation chain, including technological surveillance and,
- a variety of different incentives available to encourage and sustain entrepreneurial initiatives.

is with regard to understanding why some companies are innovative and others are not. One-offs are often found but hard to replicate. By parsing successful organizations, such as evidenced in this and other Profiles, it is hoped that replication may be encouraged.

5. Argentina's Management Practices and Innovation

Argentina's management practices³⁷, at least those which impact innovativeness, are set out below and organized under the three main headings; 1- leadership, 2 - organization and management of day-to-day activities, and 3 - idea generation and realization.

5.1 Leadership

Innovation cannot proceed without some assumption of risk on the part of senior management and the Board. The fundamental risk-avoidance culture of Argentina, however, may act to dissuade management from assuming the risk inherent in innovation.

Dimensions of national culture

It is instructive to compare the culture of Argentina with that of Canada. Hofstede³⁸ Dimensions' provides one viewpoint on the differences between the two countries. While similar to other Latin American countries, Argentina exhibits dramatically different characteristics than Canada on several dimensions. In Argentina, risk is to be avoided. Hostede's comment is:

'The high Uncertainty Avoidance Index (UAI) ranking of 86 indicates the society's (Argentina's) low level of tolerance for uncertainty. In an effort to minimize or reduce this level of uncertainty, strict rules, laws, policies, and regulations are adopted and implemented. The ultimate goal of this population is to control everything in order to eliminate or avoid the unexpected. As a result of this high Uncertainty Avoidance characteristic, the society does not readily accept change and is very risk adverse.'

Innovative company characteristics

Leadership

- Management (including the Board) explicitly look for innovation; the subject is high on the agenda for Board meetings, management meetings, conferences, (F#2).
- The emphasis by senior management is on achieving a balance between short-term profits and investing to meet priority long-term goals (F#1).
- Planning; business/strategic/planning/budgeting all emphasize finding opportunities rather than focussed on cost cutting or rationing of resources (F#4).
- Management exhibits a tolerance for taking risk in the planning process (F#9).

Cultural Dimension	Argentina	Canada
Power Distance Index (PDI)	63	35
Individualism (IDV)	15	76
Masculinity (MAS)	42	48
Uncertainty Avoidance Index (UAI)	86	20

Further it is pointed out that 'the large majority of predominantly Catholic countries (those with Uncertainty Avoidance as their highest ranking Dimension) have a low tolerance for ambiguity. This creates a highly rule-oriented society that institutes laws, rules, regulations, and controls in order to reduce the amount of uncertainty within the population.

³⁷ For an explanation of the factors (F#) please go to www.corporateinnovationonline.com.

³⁸ Geert Hofstede Cultural Dimensions. http://www.geert-hofstede.com/hofstede_canada.shtml

Canada's Power Distance (PDI) is relatively low, with an index of 35, compared to a world average of 55. This is indicative of a greater equality between societal levels, including government, organizations, and even within families. This orientation reinforces a cooperative interaction across power levels and creates a more stable cultural environment.

Among high IDV countries, success is measured by personal achievement. Canadians tend to be self-confident and open to discussions on general topics; however, they hold their personal privacy off limits to all but the closest friends. This has an impact on the manager-subordinate relationship affecting communications, openness, and acceptance of change.

In short, Argentina's management style, with respect to risk assumption, personal relationships in the work setting, and observance of rules is different than Canada's and different than the characteristics associated with highly innovative companies in our research sample – outside Latin America.

The recent economic crisis in Argentina has no doubt contributed further to an emphasis on the need to achieve results in the short term. The crisis was so severe that many companies have adopted a survival mode. Only recently has this attitude begun to change.

Innovation, while not limited to the consequences of R&D spending, is however dependent upon risk investments, particularly in those companies striving to invent new products, processes, and business models. Argentina's level of company spending on R&D, as noted earlier, ranks 72nd, far below the level found in innovative countries.

The need for innovation is not always at the top of the business agenda. With the vast majority of the over 400,000 firms which make up the private sector in Argentina being privately-held organizations and therefore limited information is available through public sources, it is not clear where or whether innovation plays a key role.

Some authors add another very interesting explaining factor, that affect the leading profile of corporations in Argentina. In particular, those who review the economic Argentina history³⁹ mentioned that the great failure of Argentina in relation to entrepreneurial leadership was the lack of creation of a national sense or consciousness in her national bourgeois. The majority of the big firms, which grew and accumulated their initial capital in Argentina, delocalized their headquarters to other countries. For instance, Tenaris Group headquarters is located in Milan, IMPSA in Pittsburgh, Bunge & Born in San Pablo, among others. This situation does not happen in Brazil and less so in Canada. This behavior is also correlated with the unusual flight of capitals from the country⁴⁰. The reasons for the latter are not only the instabilities of the economy or the political rules. Most of the big firms were involved in the nationalization of the international private debt, with the complicity of the last dictatorship (1976-1983). Therefore, the opportunistic behavior and the lack of a national consciousness need to be added to the short

³⁹ See Rapoport, Mario (2005): Historia Económica, Política y Social de la Argentina (1880-2003), Editorial Ariel, Buenos Aires. See also Galasso, N. & Calcagno, E. (2003): De la Banca Baring al FMI : Historia de la Deuda Externa Argentina, Editorial Colihue, Buenos Aires.

⁴⁰ Curiously, this economic situation is not an issue for the multilateral financial organizations; maybe because the flight of capital goes usually to central countries.

term logic in the case of big Argentine firms. Such firms are also very important in terms of the demonstration effect on the rest of the productive tissue, in particular SMEs.

In summary, with respect to **leadership**;

- With the lack of transparency about privately-held companies and information about publically-traded companies, it is not clear that management (including the Board) explicitly look for innovation or that the subject is given a high importance (F#2).
- Following on the economic crisis, there has evidently been a shift towards more short-term profit maximization with the emphasis on returning the companies to financial stability, so severely undermined during the 2001-2003 crisis (F#1).
- Planning, the development of business strategy, and budgeting, are focussed on cost cutting or rationing of resources rather than seeking longer-term initiatives (F#4).
- Largely influenced by a fundamental culture in Latin American countries, management does not exhibit a high tolerance for risk taking in the planning process (F#9).

5.2 Organization and management of day-to-day affairs

Management practices in Argentina are often quite different from those of highly-innovative companies.

Human resources and people interaction

Management style in Argentina is very different to that of Canada. In Argentina, hierarchy is very important, a boss is a boss⁴¹, and the relationship between manager and subordinate has derived from the Fayolian authority chain to an also hierarchical link, but most analogous to a parent-child relationship.

Position⁴², dignity, personal style, these are all key factors in Argentine management approach. It is important that the boss acts like a boss and does not try too hard to be seen as 'just one of the guys'. This does not mean that the interpersonal relationship between a manager and his subordinates is not of critical importance – it merely reflects that in such a hierarchical culture, managers are to be respected and obeyed.

Communication; informal or formal

Top-down would seem to be the best way to describe the process by which decisions are made.

Innovative company characteristics

Organization and management of day-to-day affairs

- Management emphasises people management and places a high importance on human resources and interaction (F#6).
- There is a high degree of informal communication in the company (F#10).
- The use of independent (groups with authority to make changes) work groups is encouraged to accomplish projects and special tasks (F#11).
- Key decisions are made with input from several sources in the company as opposed to a top-down arbitrary approach (F#12).
- The decision process is relatively informal (F#13).
- Decision making is decentralized (F#18).
- The organization is more action oriented than mired in the planning processes (F#15).

⁴¹ The local slogan is “the boss is always right”.

⁴² World Business Culture.com Argentine Management Style

As you would expect in such a hierarchically driven culture, it is important that you are dealing with the right person within an organisation as relatively less power will have been devolved than might be expected in a more matrix organisation. Don't waste time negotiating with the wrong people. Do some homework in advance on the hierarchy and structure you are likely to encounter.

The level of formality in business would suggest that communications within an organization are bound by rules and that a degree of formality, rather than informality, is the accepted style.

A great deal of respect is given to people who speak freely and express themselves forcefully. It is possible to disagree with people and even criticize their opinions and yet remain on friendly terms. Indeed by remaining uninvolved and aloof, you may be viewed as disengaged and disinterested. Meetings can, therefore, appear to be quite noisy boisterous affairs with people frequently interrupting each other to add points or disagree with what is being said. Again this liveliness is viewed as a positive as it shows engagement and interest.

Use of independent work groups

According to the National Innovation Survey⁴³, for the majority of Argentine firms (almost 95%), innovation is carried out on the base of informal projects. This means that⁴⁴:

- There is no R&D department. The lack of specific structures is correlated with a minor level of accumulation of learning on technology and innovation management and learning.
- Groups for carrying out R&D projects involve people from different areas or department.
- These personnel usually develop other duties, in parallel with those related to the R&D project.
- The leaders are not usually researchers, and many times skilled workers can participate.
- There is usually no infrastructure or labs for performing such activities.
- In this context, innovation takes the form of incremental changes, either for products, for processes or for organizational changes.
- Innovation, particularly in SMEs, adopts an imitative character. Therefore, the networks, that firms belong, play a major role in SMEs innovation. These networks also involve the relationships between suppliers and customers, and they could be very dynamics if they can capture the learning by using of the clients and feedback this knowledge through the net.

In a recent study carried out in an industrial park⁴⁵, in Buenos Aires Province, the role of workers were of utmost importance, particularly in innovative informal projects originated by a problem solving rationale. In SMEs, problem solving activities were the basic cell for learning, and in turn learning was the backbone for innovation behaviors. Therefore, problem solving capabilities

⁴³ INDEC (2008): Encuesta Nacional sobre Innovación y Conducta Tecnológica, INDEC, Buenos Aires, 2008.

⁴⁴ See Arciénaga, A. (2005): “Modelo Argentino de Innovación”, Comisión de Investigaciones Científica, La Plata, pag. 20.

⁴⁵ Pavlicevic, J., Arciénaga, A., Rolón, H., Villanueva, and M., Massaro, R. (2010): “Sistemas locales de innovación, aprendizaje organizacionales y factores logísticos en la mejora competitiva y posicionamiento de las empresas PyMES en el mercado argentino: el caso del Parque Industrial Burzaco”, Final Report, Institute for Knowledge and Innovation Management, National University of Lomas de Zamora.

are at the bottom of innovative propensity in SMEs firms, and are also related with the creation of communities of practices.

Decision making input

Seeking input from subordinates is not the style in Argentina for bosses, unless issues were very operational ones.

The business set up in Argentina⁴⁶ is hierarchical and, as such, clearly defined roles exist. To ensure successful cross cultural management it is important to remember this. People believe their supervisors have been chosen for their greater experience and it would be inappropriate for managers to consult with lower-ranking individuals when decision-making.

Decision process; formal or informal

Formality is recognized by the common practice of referring to people by their surnames rather than their first names; ‘titles are also often used such as Ingeniero (engineer) or Abogado (lawyer)’.

Decision making is centralized or decentralized

Hierarchy is important in Argentina. A guide book on doing business in Argentina offers the following advice.

The business set up in Argentina⁴⁷ is hierarchical and, as such, clearly defined roles exist. To ensure successful cross cultural management it is important to remember this. People believe their supervisors have been chosen for their greater experience and it would be inappropriate for managers to consult with lower-ranking individuals when decision-making.

Argentine society⁴⁸ in general is very status conscious. Great emphasis is placed on what social class you belong to, which university you went to, where you are from and where you live now. In such a class conscious society, it is hardly surprising that all local business structures would tend to be extremely hierarchical.

Argentine companies are often what are usually referred to as relationship driven hierarchies which means that the chain of command as outlined in a published organisation chart will not necessarily correspond exactly to the actual internal structure of the business. Who reports to whom and at which point in the chain the decisions are made could depend as much on a complex web of relationships and obligations as it might on the title of an individual. It is usually a very good idea to have a local guide to help you through this complexity - if you haven't got that local guide, be very observant.

If you are working with people from Argentina, it is important to remember the role that hierarchy plays in teamwork and collaboration. Cross cultural communication needs to take into account that traditionally it would have been unthinkable for someone of a higher position to collaborate with, or ask ideas of one of a lower status.

⁴⁶ <http://www.kwintessential.co.uk/intercultural/management/argentina.html>. A guide to intercultural management

⁴⁷ <http://www.kwintessential.co.uk/intercultural/management/argentina.html>. A guide to intercultural management

⁴⁸ World Business Culture.com. Argentine Business Structures.

The guide acknowledges that this practice is changing but that one should, if participation is desired, ‘need to make it clear this is welcome and ensure you establish a non-threatening environment. Any ideas that are raised need to be treated gently so as to protect the reputation of the participant’.

Action orientation or planning (Emphasis placed on taking action or planning)

In informal innovation projects, the level of planning of activities is very low. Emphasis is placed on taking action rather than planning.

Manager-subordinate relationships

At the core of the issues of hierarchy and communications is the relationship between a manager and his or her subordinate. In European organizations as well as those in Canada and the U.S., there is a degree of distance maintained between each party and, while business relationships are very close, often these do not extend to a personal relationship. This linkage is exacerbated in family organizations where links between the two levels can be further complicated by the influence of familial ties. Nepotism is avoided in innovative companies and not a common practice. The guide further comments;

Managers in Argentina are often paternalistic and relationships with their employees usually overlap into personal areas. Because of the paternalistic attitude of managers, the role often extends into one of giving advice on personal matters.

In fact the close bonds between manager and subordinate will often run deep but can be more easily compared to the parent-child relationship than the best friend's relationship. Managers expect to be shown respect at all times, in return for which they offer help, protection and future prospects.

Perhaps a good example of the business relationship between manager and subordinate is seen in the recent Oscar-winning Argentine movie, *The Secret in Their Eyes*. The relationship between Espósito and his alcoholic friend and assistant Pablo Sandoval (Francella) is very close having strong business and personal characteristics.

In summary, with respect to the **organization and management of day-to-day affairs;**

- Key decisions are made without a broad range of input from people in the organization (F#12).
- Formal communication in the organization is the norm rather informal communication (F#10).
- The decision process is highly formal rather than relatively informal (F#13).
- Decision making is highly centralized rather than decentralized (F#18) and this may be even more present in family organizations which make up the vast majority of Argentine business.

5.3 Corporate approach to idea generation and realization.

Idea generation and realization is dependent upon a corporate culture which encourages individuals and groups to come forward with ideas for products, services, or new business models and to not feel that they are at risk of losing their position or reputation should the idea not work out. A sense of trust in the corporation is fundamentally important and a major contributor to trust is the tolerance exhibited by the leadership. Further, the practise of recognizing innovators for their contribution, whether individuals or in groups, is an established practice in innovative companies. Management's decisions respecting spending on R&D and budgeting annual provisions for investment in general sends a message to all employees that their company plans on being a successful survivor and is in business for the long term. In all aspects, ideas are encouraged.

Innovative company characteristics Corporate approach to idea generation and realization

- Management has a high tolerance for mavericks (F#3), a tolerance for failure (F#5), and a tolerance for variances from a defined or even undefined corporation norm (F#8).
- Reward mechanisms for innovators/innovations are frequently in use (F#14).
- Employees have a sense that resources are available should attractive ideas/projects be identified (F#19).
- R&D spending levels as relatively high compared to the competition (F#23).

Tolerance; mavericks, failure, a corporate norm

Tolerance for failure is a cornerstone of innovative companies. There is recognition by management that advancement will not take place without risk and that failure is an inevitable result in a percentage of cases. Failure is viewed positively in many cases and is seen as a learning experience.

Failure in Argentina culture creates long term loss of confidence by the individual as well as by others and is not viewed positively.

Reward Mechanisms

Reward system is recognised as a key driver of innovation, both inside and outside the boundaries of the firm. For neoclassical economists, the change of the incentive system is enough to change the firm as well. But change is something more complex than that. Incentives are generally defined as "what managers put in place to get people to do their jobs."⁴⁹ Rewards mechanisms can be pecuniary (salaries, stock options, bonuses, etc.) and non-pecuniary ones (better place for work, a plaque, better profile for the job, social recognition, etc.).

In the case of organizational innovation, as a response to a new technology or a market shift or an internal desire to revolutionize the organization, there are additional considerations to make in relation to change the existing incentive system: identification of new workers needs, different cognitive frames involved, difficulty of using performance measures (because of uncertainties in the processes), lack of clear view of what to change at the beginning, an established incentive

⁴⁹ See Kaplan, Sarah (2006): "Employee Incentive Systems: Why, and When, They Are So Hard to Change", in <http://knowledge.wharton.upenn.edu/article.cfm?articleid=1490>, access in 24/07/2011.

structure with long history, the manager and workers' interpretation of the new reward system, aligning reward system with motivational tools, among the most important.

In Argentina, with a very deep vertical Taylorist tradition and a conservative culture within corporate management practices, firms of all sizes usually have a reward system centered on paying for jobs, instead of paying the person. At the bottom of this rationale is the idea that workers (of all levels) are a cost and not a critical resource for the firm. In this framework, Argentine reward systems are seldom aligned with motivational tools⁵⁰. On the other hand, rewards in Argentina rarely use variable pay and stock options, as a tool for moving its reward system toward one that supports performance and change, as it is recognised in international studies⁵¹.

In the public arena, there is now in Argentine Parliament an initiative to rule the participation of the workers in the benefits of the firms, using for example stock options, in parallel to similar measures in Germany for instance. But entrepreneurial unions, particularly those related with big firms and agricultural sectors, are the most aggressive against this measure. Therefore, Argentine corporate practices on rewards systems are very reluctant to use incentives that rely much more on measures of performance than on fix costs for human resources.

Resource availability

The key determinant for investing in research and development in a region is the availability of talent and financial resources. Both are also very important to keep the innovation machine functioning. With regards to the first, some comments were made in the point 2 (Table 2.2.2).

In relation to financing schemes, they are clearly underdeveloped in Argentina, particularly risk capital for innovative projects. It is a critical limiting aspect. Innovation implies certain asymmetry of information between the firm that seek to innovate, with a very specific knowledge of the project, and financial agents that usually lack of technological capabilities to assess the project. Therefore, they are very skeptical about the profitability of such initiative. This bottleneck can be overcome partially when innovation encompass a capital goods, that could offer some warranty to the financial agents. However, when projects are based on the development of intangible assets, there are too much barriers for them in the traditional banking systems.

Risk capital is the solution developed in central economies for financing innovations, particularly in the phase of idea generation. In Argentina, risk capital industry is estimated in US\$ 45 millions, which are contributed mainly by the EMPRETECNO Program from the Ministry of Science, Technology and Productive Innovation. Thus, private financing is almost non-existent, and the total amount is very low compared to Canada. According to data compiled by the Canadian Venture Capital and Private Equity Association (CVCA), \$1.1billion of venture capital

⁵⁰ See Pavlicevic et al (2010), op. cit., pag. 25.

⁵¹ See Lawler, E.E. & Worley, C.G. (2006): "Winning Support for Organizational Change: Designing Employee Reward Systems that Keep on Working", in IVEY Business Journal On Line, March/April, www.iveybusinessjournal.com, pag. 2.

was invested in 354 companies during 2010, which is 5% more than in the previous year⁵². Therefore, the difference is so big that it is a self-explained argument of the different positions of the two countries in relation to innovation.

Spending on R&D

Spending levels on R&D by companies in Argentina is viewed as being low when compared to other nations; Argentina ranks 72nd but a fuller understanding of spending is provided by an examination of the following table.

Type of R&D	Public Bodies (*)	Public University	Private University	Firms	NGOs	TOTAL
Basic Research	37	39	21	2	36	28
Applied Research	43	54	71	34	62	44
Development	20	7	8	64	2	28
TOTAL	100	100	100	100	100	100

As one might expect, expenditure by Firms on Basic Research is almost non-existent, with reliance being placed on Public Institutions.

In summary with respect to **idea generation and realization**

- R&D spending is insufficient relative to normal standards of innovative companies
- Failure is not accepted, little tolerated and apparently not encouraged
- With the emphasis on cost reduction and the need to achieve short-term profits, there is a sense within organizations that funds are not generally available even for what might turn out to be good projects
- The provision of risk capital is in its beginnings and it would be important to develop capabilities at corporate level, managers and also with banking officials.

Overall it **appears that a number of management practices associated with the innovative companies and used here for comparative purposes, are not present in Argentine companies.** National cultural aspects may inhibit certain management practices, but this is probably not the full explanation. Leadership, the organization and management of day-to-day affairs can be exhibited even within a different cultural setting.

⁵² See Financial Post (2011). "Venture Capital Deals Rose 10% in 2010", February 16. The information is gathered in <http://www.financialpost.com/Venture+capital+deals+rose+2010/4294968/story.html>, access 26/07/2011.

6. Profile of Argentina's Innovative Corporate Culture, 25 Factors⁵³ Impacting Innovative Capacity

As a form of conclusion, the following table summarize the findings of this paper according to 25 Factors which have a high correlation with corporate innovative capacity. Red boxes indicate areas of concern for Argentina's corporate capacity to improve innovation. Comments are derived from survey results available at; <http://www.corporateinnovationonline.com>

Factor #.	Innovative culture issues addressed	Ideal range. <i>See notes below.</i>	Management practices of the most innovative companies	Where do Argentina's management practices fit?
1	Management's view on profits.	1 to 2	Management is prepared to wait a reasonable time for a payout from innovation, but not for too long, Management is not looking for short-term profits.	With the shortage of credit, high interest rates, and the legacy of the recent economic crisis, the pressure on management is currently for profits and survival.
2	Management's view on the importance of innovation.	-(3 to 4)	Management explicitly and aggressively looks for innovation.	No evidence that innovation is high on the agenda of corporate Argentina.
3	Tolerance of mavericks.	-(2 to 3)	Management really does have a high tolerance for mavericks in the organization.	Conformity is valued.
4	Planning emphasis.	2 to 3	Management, when planning, put a strong emphasis on looking for opportunities and is less focused on rationing resources.	Some evidence that corporate Argentina is more focussed on cost reduction – for survival – less on looking for opportunities.
5	Tolerance for failure.	-(2 to 3)	Management has a reasonably high tolerance for failure.	Unclear but could be a problem in a culture which values 'face-saving'.
6	People and their interactions	3 to 4	Leaders, by way of their management practices, put a great deal of emphasis on the management of people and their interactions.	Familial and school ties are important and may take precedence over competence.
7	Career for and recognition of innovators.	1 to 2	It is important to place some emphasis on recognizing innovators, but overall opinion is very mixed.	No evidence.
8	Tolerance to a corporate norm.	0 to -1	Opinions are on both sides of this Factor and not very strong either way. Perhaps not an important Factor!	Suspect that there is a set norm in most companies and that this is observed.
9	Tolerance for risk in the planning process.	0 to 1	Opinions are on both sides of this Factor and not very strong either way.	Unwillingness to take on risk seems the normal practice.
10	Intra-firm communications formality.	-(3 to 4)	The emphasis in an innovative culture is on a minimum of formal communication and an encouragement of openness through less formality.	Communications are highly formalized.

⁵³ For background on the Factors which impact innovation, visit <http://www.corporateinnovationonline.com>

11	Use of work independent work groups.	- (2 to 3)	Viewed as an important management practice in a culture which supports innovativeness.	Some evidence of use of independent work groups.
12	Decision making is broadly based.	2 to 3	Input from the whole corporation is a value associated with innovative companies; less autocracy and more participation.	Decision making is highly centralized, limited in breadth.
13	Formality of decision process.	2 to 3	More informal or less formal is the view of respondents and a characteristic of innovative companies.	Very formal decision processes.
14	Rewards for innovation.	- (3 to 4)	Respondents advocate the use of specific rewards for innovation.	Different practices than for innovative companies..
15	Planning or action orientation.	- (0 to -1)	Results were not significant with no definite viewpoint.	Some evidence to suggest corporate Argentina is more action oriented.
16	Attitudes towards mergers etc.	- (1 to 2)	It did not seem to matter much whether there was an open or closed attitude to major structural changes at the corporate level.	No evidence.
17	Company versus personal loyalty.	0 to 1	Divided opinion – with a slight view that there should be some encouragement for personnel working towards personal development.	No evidence.
18	Hierarchy; centralized or decentralized.	- (2 to 3)	Definite desire for a decentralized organization with little hierarchy in most innovative companies.	Highly centralized.
19	Availability of resources.	2 to 3	The indication, or past evidence, of resources being available for innovation is a definite incentive to be innovative.	Little evidence.
20	Staff versus line involvements.	0 to 1	Divided opinion – but could be a significant Factor. Some argue for lots of staff involvement; others are opposed.	No evidence.
21	Retention of innovators.	- (1 to 2)	In the ideal culture for innovation, innovators should stay with the corporation but respondent's reality seems to be that innovators leave.	No evidence.
22	Innovative tradition.	2 to 3	Quite important to be seen to have a tradition of innovation. Hard to get, perhaps easy to lose.	Little evidence of a tradition.
23	R&D budget levels.	1 to 2	Should be better than the competition but not over the top either.	R&D budget levels in private sector not up to competition. Argentina ranks 72 nd
24	Perception of innovation trend.	2	Somewhat similar to responses to Factor #22. Perceptions in themselves act to encourage a culture for innovation.	Trend seems to be downward but recent data on spending in the public sector could indicate a change in attitude.
25	Role of employee groups.	- (1 to 2)	Not a hugely important Factor since opinions were divided and not given a heavy emphasis on either side.	No evidence.

1. Survey results may differ somewhat from those received on-line as the results noted above are based on a statistical analysis of the on-line results and extremes have been removed.
2. For further information on a corporate culture for innovation, please visit:
<http://www.corporateinnovationonline.com>