The Soy Cluster in Argentina

Microeconomics of Competitiveness
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1. Country Profile and Performance

“[Being Argentine] is that thing that cannot be defined.”
-- Jorge Luis Borges (1899-1986)

Overview and Endowments

Independent since 1816, Argentina is a relatively young country that has been blessed with many advantageous endowments. First, in terms of land, Argentina is the eighth largest country in the world. The vast area includes four major regions with very diverse natural resources: (i) The Andean and Sub-Andean region along the western border have from arid basins to glacial mountains to lakes, and irrigated enclaves suitable for sugarcane, citrus fruits, and grapes; (ii) the Chaco plain, a fertile subtropical rainforest where cotton can be grown; (iii) the central Pampas, a mix of plain humid and semi-arid areas ideal for most agriculture and livestock; and (iv) the Patagonian plateau, a combination of pastoral steppes and glacial regions, which contains about 1.5% of the world’s water reservoirs. Overall, the Southern location of the country allows for very marked seasons, a key asset for many primary activities.

Second, Argentina shares its borders with countries with relatively stable political systems and low relative levels of social unrest: Chile, Brazil, Uruguay, Bolivia and Paraguay. This factor is important for the region overall, as there have not been armed border conflicts in decades.

The country inherited many European political institutions, but at the same time replicated many aspects of the American democratic system. The government is ruled by a federal system with a presidential representative democratically elected by majority vote. The President is both the Head of State and the Head of Government, and is in charge of the Executive Power. The Legislative Power is vested in both the Executive and the National Congress; and there is an independent Judiciary Power. After the fall of Latin American dictatorships in the early eighties, Argentina has had more than thirty years of continued democracy.

A forth advantage of the country is its population. Besides having a low density of 15 persons per square kilometer, it is estimated that 97% of Argentineans are mostly Spanish and Italian descent, a factor that minimizes conflicts arising from ethnocultural conflicts or unrest. Moreover, pushed by National Laws that make primary and secondary education
free and compulsory, the literacy rate is above 99%, even when the most recent PISA scores suggest that quality of education is in decay.  

**Economic performance**

Even with all of these advantages, Argentina remains a middle-income country, as defined by World Bank standards. Since the end of the Second World War, the country grew at an annual average rate of 3%\(^8\), but experienced multiple economic crises that led to a high volatility of growth (exhibit 1.1). Moreover, productivity growth has been disappointing: in 1960-2015 the US and Brazil tripled their productivity as measured by output per person employed, while Argentina improved it by 50% only (exhibit 1.2).\(^9\)

After the last big crisis in 2001, Argentina recovered quickly. Since then, GDP per capita increased at an average rate of almost 5%, reaching about $13,000 in 2015 (exhibit 1.3).\(^10\) This came together with many important improvements that had a large impact in the economy and in the life quality of Argentineans. As for the former, productivity as measured by output per person employed increased by almost 20% in 2002-2015, mainly driven by the services sector (exhibit 1.4).\(^11\) In this context, even when innovation as measured by patent applications by residents has been stable, Argentina is still ahead other countries in the region, including Chile, Uruguay, Colombia and Peru (exhibit 1.5).\(^12\) Regarding the latter, inequality kept falling, reaching a GINI coefficient of 0.42 in 2013, one of the best in the region (exhibit 1.6).\(^13\) This is explained by improvements in the labor market driven by growth, but also by specific fiscal policies, such as conditional cash transfers, supported by the World Bank and other international organizations.\(^14\)

**Composition of the economy**

Given its comparative advantage in agriculture and livestock, Argentina has traditionally been known as the world’s “breadbasket.” While it is true that in the past decades GDP growth has mainly been driven by the services sector, agricultural products still remain the most important export for Argentina, representing almost $20 billion in 2014, or 27% of exports (exhibit 1.7). In this sense, two facts are noteworthy. First, there has been a shift from primary exports towards industrialized agricultural products with higher value added, such as foodstuffs, which went from representing 17% of exports in 2002 to 26% in 2014 (exhibit 1.8). A clear example of this is the soy cluster, as there has been a shift from exporting soybeans with little value added in the 1990s, towards exporting processed soy derivatives such as soymeal and soy-oils.\(^15\)
Second, other important clusters that exhibited significant growth in the past decade are closely connected to growth in the foodstuff cluster. This includes business services, downstream chemical products, the automotive industry, and technology and machinery.\(^\text{16}\)

### 2. Country Competitiveness Analysis

“There are four kinds of countries in the world: developed countries, undeveloped countries, Japan and Argentina.”

-- Nobel Laureate Simon Kuznets (1901-1985)\(^\text{17}\)

#### 2.1. Macroeconomic Competitiveness

Historically, Argentina has exhibited weak macroeconomic conditions that have constrained investment and growth. After the 2001 crisis that led to the default over $82 billion in bonded debt, Argentina had no access to international markets for 15 years.\(^\text{18}\)

When this combined with high fiscal deficits that were financed with loans from the Central Bank, inflationary pressures increased, leading to a period of high inflation and uncertainty in 2007-2015.\(^\text{19}\) The counterpart of inflation has been a sustained devaluation of the Argentine peso, which accompanied with strict controls to the access to foreign currency, led to multiple foreign exchange markets.\(^\text{20}\)

The effectiveness of public institutions has eroded significantly, especially since 2007. World Bank Data shows that the quality of rule of law and of property rights in Argentina collapsed after the 2001 crisis and never recovered.\(^\text{21}\) With a recent history of intervention of the National Statistics Institute in 2007, and nationalizations and expropriations, including the Private Pension System in 2008 and the oil company YPF in 2012, it is hard for domestic and international businessmen to invest in the country.\(^\text{22}\) Moreover, Argentina has a very high reported level of corruption for its income level.\(^\text{23}\)

Overall, this macroeconomic context with lax monetary and fiscal policies, together with ineffective public institutions, has created obstacles for long-term investments in key areas for competitiveness, such as infrastructure, communications, and energy, which are very important for many export-oriented clusters, including soy.\(^\text{24}\)

However, it is important to note that investors and the international community expect a significant improvement in all of these indicators starting in 2016. The new government from ‘Cambiemos,’ that took office in December 2015, has started a process of
economic normalization, which included the unification of the foreign exchange markets, and a reduction of the budget gap and of inflation. Moreover, in April 2016 the Government finally ended the ‘technical’ debt default, regaining access to international markets.  

2.2. Microeconomic Competitiveness

Microeconomic competitiveness has also been constrained by the general macroeconomic institutional weaknesses of the country, which led to a relatively hostile environment for business (exhibit 2.1). In fact, according to the ‘Ease of Doing Business’ Ranking by the World Bank, in 2015 Argentina ranked second after Venezuela as the region’s most challenging countries to do business. The key explanations behind this result can be classified following the Porter Diamond (exhibit 2.2).

Context for firm rivalry

The context for firm rivalry is particularly weak in Argentina. The first important explanation behind this is that business rules have a long history of instability, and legislation has been systematically unpredictable. For example, after restrictions to foreign currency and imports were put in place in 2011 in an attempt to decelerate the fall of international reserves, the costs of trade as measured in dollars per container increased significantly, specially for imports (exhibit 2.3), directly hurting competitiveness. A second explanation is that there are significant trade barriers, as Argentina has systematically eroded its international relations, and is not part of relevant trade agreements besides Mercosur. A third explanation is that over the past fifteen years the private sector has had very limited access to credit. In fact, with a ratio of credit to GDP of 15%, Argentina ranks last in the region (exhibit 2.4). 

Supporting clusters

Interestingly, even in a relatively hostile context for business, many clusters have emerged and grown. It must be highlighted that since the 2001 crisis the complexity of the exported products of these clusters has increased, which means that these goods have more value added than before. A clear example is the transition from agricultural products to processed food. Moreover, what may be even more interesting, is that many of the growing clusters are closely interconnected, both by commercial activities, and by institutions for collaboration in which they are able to exchange ideas and discuss common pains, in order
to collaborate more effectively. For example, the Importers Association (CIRA, for its Spanish acronym) is a business group that encompasses all importers from all sectors and clusters.29

**Demand conditions**

With over 40 million educated, middle-income inhabitants, Argentina provides a medium-size market for most businesses to find an appealing business opportunity. This is a particularly valuable asset for services clusters. A potential caveat is that Argentina’s main tradable activities are based on the export of commodities or commodity-dependent products, which makes the country (and its fiscal revenues) relatively dependent on international commodity prices, and this subject to their price volatility.

**Factor conditions**

Factor conditions are definitely Argentina’s strongest corner. Besides abundant natural endowments, Argentina’s key assets for competitiveness are (i) the high quality of health of the population, and (ii) the abundance of human capital with tertiary education and training.30 These two are particularly conducing to R&D and innovation, which is relatively high in Argentina as compared to the region, even though it is decelerating.31

However, one area in which Argentina has a lot of room for improvement is in overall infrastructure. Given its location at the ‘corner of the world,’ Argentina is naturally disadvantaged in transportation costs. This is becoming a cross-cluster problem as the physical infrastructure of the country reflects a high investment gap, and is deteriorating fast, which erodes overall competitiveness of Argentinean exports (exhibit 2.5).

### 3. Cluster Performance

“You may not think you eat a lot of… soybeans, but you do:
75 percent of the vegetable oils in your diet come from soy
(representing 20 percent of your daily calories).”

-- Michael Pollan (2008)32

#### 3.1. Global Trends in the Soy Market

**General overview of the market**

Originally small, the market for soybean and its derivatives has exhibited a strong growth and diversification, especially after the 1970s. Traditionally grown in Asian countries,
soybean found favorable land and environment conditions for growth in the Americas. The United States Department of Agriculture (USDA) estimates global soybean production for 2015/2016 to have reached 320 million tons\(^{33}\), which represents a 50% increase in production in a decade (exhibit 3.1), and has an estimated value similar to the entire GDP of Ecuador.\(^{34}\)

Over time, yields have risen significantly thanks to advances in technology and science, which led to an increased use of genetically modified crops (GMO). Currently, more than 50% of crops are estimated to be GMO. These technologies have not only contributed to improving yields, but also to increasing resistance to pests.\(^{35}\)

Among all soybean producers, as of 2015, the United States was the largest, accounting for 33% of total production, followed closely by Brazil with 31%. Argentina was the third largest producer with roughly 18% of the global market (exhibit 3.2).\(^{36}\) The fact that the two largest soybean producers are located in different hemispheres allows for year round supply, since harvesting seasons do not overlap, which favors a liquid exchange market.

**Uses of soy**

Raw soybeans are rarely used directly. Instead, soybeans are cultivated and crushed to produce its main derivatives, meal and oil. Soybeans are roughly decomposed into 80% soybean meal, 19% soybean oil, and the remaining 1% is waste.

Soybean meal has been crucial in the development of both poultry and pork related industries globally in the past decades. These types of meat industries use meal to feed animals, because it is intensively rich in proteins. In fact, soymeal is considered to be the most important protein source in the world, with one of the highest protein quality and overall nutrient content, as compared to other plants.\(^{37}\) It also absorbs a higher amount of water than other plants, improving both its yield and its consistency. Demand for soy is therefore primarily driven by demand for soymeal, which is derived from demand for poultry and pork meat. Due to its texture, soymeal it is also good for preparing food for humans, either as an added ingredient or as raw material. Also, soy food products are easily digested and are good for people with gastric or digestive difficulties.

Soybean oil, on the other hand, has more diverse uses. First, it is common for human consumption as frying oil and an input for sauces. Second, it has an increasing role in the manufacturing of industrial goods, such as paint, plastics and lubricants. And third, it has become the driver of the development of the biodiesel industry, which growth has been
primarily pushed in the US, Europe and Latin America, by increasing regulations on the use of fuels, that created incentives towards using biofuels.\textsuperscript{38}

3.2. Key Players in the Global Market

Argentina accounts for roughly half of global exports of soybean meal and soybean oil, followed by Brazil and the USA (exhibit 3.2), in a context of increasing global supply. This increase in supply has been fueled not only by productivity gains, but also as a result of a significant increase in demand for soybean products, which drove to unprecedentedly high prices, thus expanding the harvested area for soybeans eightfold\textsuperscript{39}. The biggest story behind this shift is that living standards in emerging economies, particularly in China, have improved significantly in the past decades driven by economic growth. As income per capita increased, the nominal budget allocated to food consumption also did, which was reflected in a substitution of cheaper carbohydrates with more expensive proteins, including meat.\textsuperscript{40} Another more general factor related to future growth in demand for the soy cluster, is the overall global growth in population, which is not expected to decelerate so sharply in China, especially after the extension of the ‘once child policy’ into the ‘two child policy’. Overall, in terms of present and future demand for soybean and their derivatives, China clearly takes the lead (exhibit 3.3).

As with soybean meal, soybean oil’s biggest exporter is also Argentina, accounting for almost 50\% of exports, followed by Brazil and the U.S (exhibit 3.2). Most of the soybean oil is being consumed in China, the U.S. and Brazil (exhibit 3.4). In this sense, even when soybean oil has exhibited a much greater demand than oils extracted from other sources such as coconut, corn, or olive, its biggest role has been in the development of the fuels market.\textsuperscript{41}

3.3. Argentina’s performance in the Soy World Market

Argentina’s role in the global soy market, has nothing but improved over the past decades. The average yield for Argentinean soybean has increased across the country, at an average annual rate of 1\% since 1990. Thanks to this, the most optimist projections estimate that by 2020 soybean production in Argentina could reach 100 million tons.\textsuperscript{42}

It is worth repeating that despite being only the third largest producer of soybeans, accounting for less than 20\% of total soybean production, Argentina is the largest exporter of soybean meal and oil by far, accounting for roughly 50\% of exports in both cases.
3.4. Importance of the Soy Cluster for Argentina as a country

The soy industry as a whole plays a key role in the Argentinean economy. It accounts for roughly 5% of GDP, more than one quarter of total foreign currency inflows into the country, and it explains about 10% of the fiscal revenues. More so, soybean and its derivatives account for almost 30% of Argentinian total exports according to INDEC. The soy complex is only followed by the automotive industry with 18% of exports, and corn, with roughly 6%.

Besides being an important source of employment, the soy complex has generated significant positive externalities for other clusters. According to ‘the Soy King,’ Gustavo Grobocopatel, “the difference between rich and poor is not going to be determined by capital but by knowledge, and the flow of that knowledge.” In this sense, probably the most remarkable externality is the generating of knowledge, coming from research and development. Argentina has been leading many of the most successful innovative improvements in the soybean industry, particularly over the last decade, and the cluster has been a net exporter of knowledge, not only to other clusters in the country, but also to other regions. In particular, the country has taken a profound approach towards transgenic seeds, which led to improved yields year by year. An example of this is the development of a transgenic seed that is resistant to draughts, being the first of its kind the world.

3.5. History of the Cluster

The first soybeans were planted in Argentina in the last years of the IX X century, but the first statistics where not reported until 1940, when no more than 1,000 hectares were cultivated. Soybeans were introduced by two government institutions, the National Institute of Agricultural Technology (INTA for its Spanish acronym) and the Agronomic Institute of Oilseeds (or IADO), with the idea of producing proteins for the cattle industry. The period from 1940 to 1970 remained experimental until the double cropping system between wheat and soybean appeared. The period after 1970 until 1990, in which the number of hectares reached 4.95 million hectares, showed a process called “sojization” (sojización). A key milestone took place in 1988, when soybean became the major crop in Argentina, surpassing wheat and corn, both emblematic in the Argentinian agrarian economy. In 1990 there was huge technological innovation: the introduction of the technological package that includes genetically modified seeds (GMOs) with their corresponding fertilizers, herbicides and
insecticides. This innovation changed dramatically the levels of production per hectare and the land covered by soybean increased exponentially. This, together with a global increase of prices (especially after 2006), consolidated the industry as a 15 million hectare business in 2005, up from 5 in 1990.

In 2008, the Argentinean government attempted to reform the tax (withholding) structure of crops, including soybeans, which led into huge demonstrations and strikes against the policy and the government (known as the “campo” crisis). Though the law was finally dismissed, the expansion of soybean hectares started to lose speed. Nevertheless, in 2015, the industry reached a new record: 20 million hectares (exhibit 3.5).

The geographical location of the cluster is very concentrated in the center of the country where three regions concentrate 82% of the production (exhibit 3.6). In the last years there has been an expansion to the north, to non-traditional soybean areas: First to places where there were not any crops; second to areas where soy could be combined with wheat, generating two yields per year; and third, to zones that previously were dedicated to livestock. This phenomenon brought up concerns about the overall environmental impact of soy, and also about the risks associated to de-diversifying the agricultural economy.

3.6. Cluster Map

Growers

The soy cluster (exhibit 3.7) has a core that could be divided in two: growers and processors. The first group is very fragmented, including more than 100,000 companies, which range from big multinationals to small farmers. They produce roughly 100,000 direct jobs and nearly 98,000 indirect jobs. There are many industries that offer inputs for growers. The first one is the industry of seeds. Almost 97% of the soybean planted in Argentina is genetically modified, which allows for high production levels per acre. Even when there have been judicial problems with some of these players, including Monsanto, these companies are growing, and in the last years there have been some acquisitions from international companies like Bioagro by Bayer Cropscience in 2014.

A second industry includes fertilizers, herbicides, and pesticides. In general, the seeds plus the fertilizers, herbicides and pesticides are offered together in the technological package, but the inputs are produced by several companies.
Third, the machinery industry has developed significantly, especially driven by a demand for better technology for planting and harvesting soybeans. There are 850 manufacturers in Argentina that in 2015 had revenues of $1.4 billion, out of which $179 million were exports. This sector creates nearly 40,000 direct, and 50,000 indirect jobs\textsuperscript{53}.

Forth, given that the zones where the soybean is planted are mostly semi-arid, the irrigation industry saw a big push, as most of growers adopted any kind of irrigation system.

Fifth, storage facilities companies also grew significantly. After the soybean is harvested, it is saved in store capacities before going to production or direct exports. Currently, demand for storage surpasses supply.\textsuperscript{54}

Finally, there are many services related to the agroindustry. These range from low skilled to very high skilled research and development or consulting.

There are two other clusters related to the growers. The first one is the general agricultural and livestock cluster, which includes producers of other products, such as wheat, corn and meat. This cluster is very strong and organized, which has shown in successful lobbying and massive mobilizations against tax increases in 2008. The second cluster is insurance services. These cover 57\% of the area planted with soybeans,\textsuperscript{55} with products that range from natural disasters to lower productivity than an index.

**Processors**

Processors are significantly more concentrated than growers, with about 50 plants that take the raw soybeans and process them, offering nearly 7,500 direct and 53,000 indirect jobs\textsuperscript{56}. The largest 10 companies produce more than 80\% of the processed soybean products. Given that installed processing capacity exceeds local production, many of these companies are net importers of soybeans and net exporters of derivatives. Their main inputs are cross-industry, and go from machinery (including machinery to extract oil and chippers), packaging devices and services, transportation, and financial services.

The logistic cluster that supports the soybean industry is a key player, given the high volume of material that has to be moved, and also due to the relevance of transportation costs in the final cost of the product.

**Institutions for Collaboration**

Among the institutions for collaboration there is one that unifies the whole value chain: ACSoja. This organization is primarily integrated by private sector actors, and it is known for having volatile, yet open conversations with the government.\textsuperscript{57} There are many
other different institutions for collaboration, both private and public, like the Chamber of commerce of Rosario, Cereal Stock Exchange, Argentinian Agrarian Federation, Argentinian Rural Society, etc. In general their relation with public sector is not so strong.

The soy cluster is related with many state government agencies. Most of them depend of the Secretary of Agriculture, Fishery and Livestock (SAGPYA), which has three institutions dedicated to control, regulation and R&D. From the educational aspect, the soy cluster is strongly related with other government institutions like National Institute of Industrial Technology (INTI), National Institute of Agricultural Technology (INTA), and CONICET (National Scientific and Technical Research Council), which are also strong in R&D. Given the cluster’s location, Rosario National University, in Santa Fe, has different successful programs to support the cluster through R&D and training.

4. Cluster Competitiveness Analysis

“The world is demanding soy beans and Argentina is in a privileged position, plus [is] highly competitive.”

-- Gustavo ‘Soy King’ Grobocopatel (2008)

4.1. Cluster Performance

A deep analysis of the cluster across relevant indicators reveals that Argentina has some competitive advantages as compared to Brazil and the United States, but these are partially neutralized by other disadvantages (exhibit 4.1).

First and most important, Argentina has an important natural advantage in costs, which allows the cluster to have the lowest per-acre costs of the world. This is exclusively a result of the soil quality: Argentinian soils need less fertilizer than the Brazilian and the American, specifically regarding Phosphorus (P), Potassium (K) and Sulphur (S). It is central to highlight that this is one of the most relevant competitive advantages for Argentina.

Second, in terms of processing, Argentina is able to exhibit higher rates of processed products, as compared to other countries. Even when this is explained by a large capacity driven by years of investments, in practice there is a high idle capacity, which is sometimes bridged with imports of soybeans. Though capacity is not binding today, Argentina has the opportunity to capitalize this advantage in the future, by finding a way of experimenting with processes in order to add even more value to these products.
A third important indicator is overall quality of the beans. In this area, Brazil has a key advantage over Argentina because their latitude allows for the development of soybean plants with higher protein content, which translates into higher prices for their products. However, in terms of oil content, even when Brazil still presents a better ratio, it is closely followed by Argentina and the US.

Forth, as for productivity, the US exhibits the highest yields per hectare, while Argentina and Brazil compete with similar productivities. However, the US can produce only one crop per year, while Argentina and Brazil are able to produce two.

Finally, in terms of financial instruments and insurance, the US is much more covered than Argentina and Brazil, but the market in Argentina reached less than 60% in 2014, and is expected to keep growing.\textsuperscript{59}

4.2. Cluster Competitiveness: The Diamond

The soy cluster has grown consistently and proved to be competitive in the international arena, especially in value added products. Porter’s Diamond Analysis provides an enlightening framework to discuss some of the cluster’s competitiveness advantages and disadvantages (exhibit 4.2).

Factor Conditions

In general, the cluster exhibits positive factor conditions that help improve competitiveness. Salient factors are abundant land, high quality soil, and above-average climate conditions, all of which have a positive impact on final production costs. Moreover, the knowledge and skills required for the cluster all fairly covered. National universities, including University of Rosario, have strong linkages with the agribusiness industry.

However, some factor issues that affect competitiveness negatively are the lack of storage facilities. Even when in this sense there has been plenty of innovation, leading, for example to plastic grain elevators, there is a lot of work to be done. Finally, in a context of no access to credit for 1.5 decades, infrastructure has deteriorated considerably, directly impacting on costs. Transportation infrastructure is very important for the cluster because soybeans and derivatives are moved mainly by truck and, later on, through shallow ports.

Context for Firm Rivalry

In general, given the relevance that soybean has for the national budget, there have been many attempts by the government to increase taxation to the cluster. Thought in
general taxes are relatively high, the taxation system is designed to enhance value-added products with lower taxes for them. For example, in 2007 the National Government started granting big subsidies to producers of biodiesel.

As a response to a sustained demand by the sector, one of the first decisions of the new government has been to reduce significantly all withholdings from cereals, except for soybeans, which were reduced from 35% to 30%.60

**Demand Conditions**

The business environment and the local demand exhibit both relevant strengths and weaknesses. As for the former, processing and commercialization companies are in general sophisticated, which is important in order to have a cluster moving towards higher value added products. Also, given the energetic matrix of Argentina, biodiesel produced from soybean has encountered a strong and growing demand, which could be a great business for producers. But on the other hand, the local demand is weak. Given that most production is exported, the cluster is quite vulnerable to commodity price volatility, which has proved to competitiveness.

**Supporting Industries**

The cluster has strong supporting industries, which is essential for the cluster’s international competitiveness. The industries that offer inputs for both growers and processors are well developed, and offer good services. In 2014, there were 850 manufacturers that produced machinery for agribusiness. Moreover, in 1997 Toyota installed one of its producing plants in Argentina, specifically producing two models, Hilux (pick up) and SW4, which are designed for the rural environment and very convenient to move stuff in farms.61 For growers, there is a strong supply of technological packages (seeds, fertilizers, herbicides and pesticides), with many actors involved, most of them multinational. Though there has been an ongoing legal problem with Monsanto regarding intellectual property of genetically modified seeds, the industry is growing fast, and has achieved almost 60% of coverage of the planted area.

The cluster has strong coordination among their players, and ACSoja plays a key role unifying the interests along the whole value chain. Their mission is to “Consolidate Soybean as the main sector in Argentina,” and to this purpose they group together companies, associations, chambers of commerce, research centers, and others. They had a key role in the
cluster’s resilience after the 2008 farm crisis, but there is an open question regarding their ability to coordinate successfully with the public sector.  

5. Issues and Recommendations

“Being competitive is hard. Competitiveness never ends.”
-- Professor Michael Porter (2016)

5.1. Key Competitiveness Issues of the Cluster

Although the soy cluster in Argentina has proved to be one of the most competitive in the world, it still has a structural disadvantage in logistics: its transportation costs are much higher than in competing countries. This comes from a consistent lack of investment in infrastructure, which leads the soy producers to move the grain across the country by truck (more expensive than other means of transportation) more often than competitors in other countries (exhibit 5.1). The underinvestment is most visible in port infrastructure, where Argentinean ports lack deepness to fully load larger ships, which forces them to stop in Brazil to increase the load (further increasing logistical costs).

Incentives for innovation also present a significant challenge for Argentina. Although 90% of seeds used in Argentina are transgenic, legislation has not caught up with these advances and has helped fuel disputes, as was the case with Monsanto’s RR2 seed, when Monsanto tried to force the payment of royalties for a disputed patent onto producers. This led Monsanto to leave the country for a 10-year period and try to take the battle to foreign markets, and, although the Argentina office was reopened, the fight still ensues. This has delayed the adoption of newer and more productive seeds (e.g. BTRR2, which increases productivity by 15%). This lack of clarity in the legislation decreases incentives for R&D in the cluster, particularly for seed companies looking to develop and/or commercialize products in Argentina.

Still, the Argentina soy cluster has a very important asset that can be leveraged towards improving the industry, and that is its strong institutions for collaboration. In particular, ACSoja and the Rural Society are of particular importance, as they concentrate companies along all the value chain, connecting them with chambers of commerce, research centers and other associations. Unfortunately, however, these (and in particular the Rural
Society) have a history of clashing with the government instead of coordinating, although the recent elections may change this.

With these points in consideration, the cluster faces three key opportunities. The most evident one is to deepen into the Biodiesel market. World demand for biodiesel has been growing and could replace huge energy imports from Argentina (near $6.8 billion), while at the same time alleviating the currency deficit. However, anti-dumping policies from Europe (the largest consumer) and the volatile (currently low) price of oil, threaten Argentina’s strength in this area. Although relevant investments in the industry have been made (27 plants, $1.5 billion), current market conditions keep the industry at 40% of capacity (2.5 out of 4.2 million tons a year).

A second big opportunity is related to tax and macroeconomic policies. After taking office at the end of 2015, the new government reduced export duties on soy from 35% to 30% (while export duties on other agricultural commodities like wheat, corn and beef were entirely removed). According to the government, the drop in fiscal revenue should be offset by an increase in income tax. This, together with increased access to credit, should help spur much needed investments in the industry, although this policy can increase instability, as export duties on agricultural goods were the main source of foreign currency.

Third, Argentina can still expand extensively to new production zones. The country’s arable area is growing, and can be extended to lower altitudes (which tends to produce grains with higher protein content). This represents a great cluster, as long as soil erosion does not undermine productivity.

5.2. Policy Recommendations to Increase Competitiveness

The research and analysis we have conducted, together with consultations with cluster experts, led us to develop a broad set of recommendations. We start from more cluster-specific issues to more economy-wide ones, affecting both the public and private sectors (exhibit 5.2).

5.2.1. Cluster-specific policies

R&D, GMO & IP
The first specific set of opportunities identified are those commonly highlighted by industry leaders: fostering research and development and defining intellectual property rights,
especially in the area of genetically modified seeds. In fact, according to Gustavo Grobocopatel, this is a central issue because “the closer you are to the technological and knowledge revolution, the greater your ability to capture value.”

In this line, we propose to explore six different lines that can be achieved with close cooperation between the private and public sectors, together with Institutions for Collaboration:

1. **R&D cooperation:** Cooperation between universities and R&D focused companies should be fostered to leverage the development being conducted in universities (e.g. University of Buenos Aires Agronomy department). This could take the form of privately sponsored long-term programs of internships in specific projects to be conducted by students and professors, which could then become a feeder for R&D talent.

2. **R&D connection:** Improve communication with other R&D centers in the rest of the world, in particular with those researching complementary subjects. To do so, focus on expanding existing private and government sponsored exchanges both for students and researchers, as well as fund trips to seminars and organize seminars locally to attract foreign researchers.

3. **R&D funding:** Increase government-funded R&D and improve incentives for private sector R&D through tax cuts or funding matching by the government.

4. **GMO adoption by producers:** Develop policies to promote adoption of safe and certified GMO, focusing on explaining its complexities to producers.

5. **GMO perception by end consumers:** Improve communications of benefits to consumers and explain differences between certified and tested GMOs and non-certified and non-tested, to reduce resistance from consumers.

6. **IP regulation:** Design regulation that can help R&D investors profit from their investments while enabling mass adoption. This could mimic existing regulation in markets like the EU or the US.

**Biodiesel**

As shown by recent experiences, decisions on biodiesel regulation in the United States and the European Union will affect the vegetable oil market soon. This generates an urgent need to:
1. Reach an industry-wide consensus with public sector, as to whether Argentina will seek to become a relevant player in this industry.

2. Establish commercial relationships with target markets to better predict possible risks and lobby for outcomes.

**Sanitization Certification**

As highlighted by the FAO, there is an open opportunity for the government to update sanitization certification processes and standards in order to reduce risk of diseases, increase the quality of the product and facilitate certification by destination countries. This, however, needs to be done by the private sector in close coordination with trade associations to ensure private sector input.

**5.2.2. Cross-cluster policies**

**Infrastructure – Water**

The improvement of irrigation infrastructure has a big potential to boost yields and compensate for climate change effects in the most affected areas. It is estimated that such infrastructure investments will require approximately $31 billion. Although private sector solutions should be explored, given the fact that this cost represents about 5% of the GDP, it is clear that the government will have to step in, not just for financing but also to bring international organizations such as the Inter-American Development Bank and the World Bank, to bring financing and expertise. Moreover, the National Government should explore improvements on regulation around irrigation in order to incentivize irrigation investments.

**Climate Change**

One of the biggest challenges of intensive agricultural models is related to incorporating initiatives to mitigate and reduce the environmental impact (particularly for family agriculture, which tends to be the most affected). These should include:

- Public policies aimed at balancing arable land expansion needs with the risk of deforestation, in order to minimize the effect of the latter on draughts.
- Public sector driven promotion of multi-product plantation, to diversify risk, particularly among small and medium producers.
- General public sector driven incentives to promote technology development and adoption to mitigate climate change risk. This can be done through attractive financing options, such as subsidies or subsidized financing.
• Creation of incentives to reduce consumption of oil and oil-derivatives, pushing for biomass products, which can be produced on-site.
• Increase of the cooperation with international agencies to receive funding and know-how, particularly with agencies that have already dealt with these problems in other parts of the world, such as the UN’s Food and Agriculture Organization (FAO).
• Inclusion of NGOs in the monitoring of the situation and publication of periodical reports to ensure transparency.

**Infrastructure – Transportation**

Transportation accounts for approximately 40-50% of total cost of the soy cluster, and is one of Argentina’s biggest weaknesses. Initiatives should focus around:

- **Roads:** investments in improving connectivity and quality of roads by the government, particularly in order to extend arable land.
- **Trains:** investments to restore train lines for heavy-duty transportation, thus helping reduce overall transportation costs.
- **Ports:** Bahía Blanca and Rosario ports need to be updated and their depth increased to handle more weight. Opportunity to seek private investments through PPPs, particularly since this could also benefit other clusters (e.g. cement in Bahía Blanca).
- **Intermodal connections:** investments in train and road systems should also consider improvement of connections with main ports to reduce time of transition from one mode of transportation to another.
- **Trucks’ permits:** permits for larger trucks should be considered, which could reduce costs and actually produce less damage to roads (since the have weight distributed among more wheels).

**Infrastructure – Communications & Energy**

This is a critical area for competitiveness in the country, well beyond the cluster. We propose to, first, invest in improving quality of telecommunications connectivity in remote areas; second, increase investments in extending and upgrading the energy grid. Consider upgrading to allow for consumers to feed back into the grid (thus further incentivizing soy producers to use waste for biomass energy); and third, update regulation to foster energy generation through local production (e.g. biomass, PV, wind).

**Public – Private Cooperation**
The relationship between the private and public sectors has been damaged after years of disagreements. There is an urgent need to articulate better communication between government and the different types of producers:

- **Exporters**: focus cooperation and topics of discussion around infrastructure, R&D, commercial strategy abroad and tax policies. Use trade associations as channels.
- **Family agriculture**: focus on strategies for growth (e.g. technology transfers, investments, best practices) and smoothing profit differences between different products to promote crop rotation. Use trade associations or provincial governments as channels.
- **Subsistence farming**: focus on aid and best practices. Use provincial governments or the Social Development Ministry as channels.

**Insurance and Risk Mitigation**

The development and penetration of insurance will be key for the long-term development of the sector. To do this, we propose to:

- Improve risk measurements through greater cooperation between producers, insurers and the Air Force Weather Service. This should help bring the costs of insurance down and attract investments from capital markets into the insurance market (through the offering of insurance as diversified investments).
- Develop alliances between government, producers and insurers to help finance the penetration of insurance into smaller-scale production segments.
- Improve ability to react in emergencies to reduce the social costs to subsistence farmers.

**Credit**

Constrained by exclusion from international credit markets for 1.5 decades, the private sector has had little margin to finance expansion of investments in the cluster. We propose to act in two areas:

1. The Government should lead big investment projects (trying to enroll development banks’, and private investors’ help), focusing on infrastructure and connectivity.
2. The financial sector should consider exploring opportunities to improve access to credit to finance the transition from family farming to exporters. The Government could also lead this initiative through Banco Nación (the National Bank, the largest of the country), while overall private credit is restored in the country.
5.2.3. Macroeconomic policies

Instability

Macroeconomic and institutional instability have been a major deterrent to investments since the late nineties, not only to the soy cluster, but for most economic activities. We suggest that the new government should keep on working on:

• Fiscal and monetary policies that provide predictability to the market.
• Smoothing inflation and exchange rate volatilities.
• Developing regulation that is clear and providing the private sector with a vehicle to voice its concerns about how to better design policies.
• Enacting a simplified tax code, reducing the number and amount of taxes paid (already decreased by 5 p.p. export duties).

6. Final Remarks

Even when the soy cluster has proved to be resilient and competitive, even amidst a relatively hostile business environment, there are many opportunities to be explored, in order to engage into new and more sustainable long-term growth sources. The good news is that Argentina has a natural advantage in agricultural production; the open question is how it can be best capitalized to drive into the future of the cluster.
Exhibits

Exhibit 1.1. Long-term economic growth in Argentina (% YoY)


Exhibit 1.2. Long-term productivity growth in Argentina, Brazil and USA (1950=100)

Source: Conference Board Data.
Exhibit 1.3. Real GDP per capita in Argentina and Latin America (Constant USD)


Exhibit 1.4. GDP Composition in Argentina (% of total)


Exhibit 1.5. Patent Applications by Residents (total per year)

Exhibit 1.6. GINI Index, 2013


Exhibit 1.7. Exports by Argentina, 2014 (As % of total)

Source: Atlas of Economic Complexity, Harvard University.
Exhibit 1.8. Tradable Clusters in Argentina, 2014
Share in world exports by cluster and dynamics

Source: Institute for Strategy and Competitiveness, Harvard University.

Exhibit 2.1. Country Competitiveness Profile

Source: Global Competitiveness Ranking.
Exhibit 2.2. Country Porter Diamond

LOW

(+) Decreasing informality (Campaigns)
(-) Low FDI and access to credit
(-) High Institutional volatility and Legislation Risk
(-) Trade barriers and limited trade agreements

MEDIUM

(+) Relatively large local market
(+) Demand of main products is mostly international, and relatively inelastic
(-) Subject to high volatility of commodity prices

HIGH

(+/-) Some R&D and innovation, but not increasing
(-) Costly and deteriorating physical infrastructure

Context for Firm Rivalry

Supporting Industries

Demand Conditions

Factor Conditions

Source: Built by the Authors.

Exhibit 2.3. Costs of Trade (USD per container)


Exhibit 2.4. Credit by the Private Sector (% of GDP) and Credit Composition

Source: Central Bank of Argentina.
Exhibit 2.5. Logistics Ranking in Argentina as compared to Latin America, 2007-2014


Source: Built by the Authors, based on USDA.
Exhibit 3.2. Soybean and Derivatives Production and Exports by country, 2015

![Graph showing production and exports of soybeans by country](image)

Source: USDA.

Exhibit 3.3. Soybean Meal Consumption by Country

![Pie chart showing soybean meal consumption by country](image)

Source: Indexmundi.

Exhibit 3.4. Soybean Oil Consumption by Country

![Pie chart showing soybean oil consumption by country](image)

Source: Indexmundi.
Exhibit 3.5. Summary of the Soybean Cluster History

Source: USDA, INTA, ACSoja.

Exhibit 3.6. Geographical location of the cluster

Source: SAGPyA.
Exhibit 3.7. Soybean cluster map

Source: Built by the Authors.

Exhibit 4.1. Soybean cluster map

Key advantages as compared with main competitors

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Argentina</th>
<th>Brazil</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quality</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein content</td>
<td>44%</td>
<td>48%</td>
<td>44%</td>
</tr>
<tr>
<td>Oil content</td>
<td>21.5%</td>
<td>22.6%</td>
<td>18.6%</td>
</tr>
<tr>
<td><strong>Productivity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield productivity M Ton/ Ha 2015</td>
<td>3.01</td>
<td>3</td>
<td>3.21</td>
</tr>
<tr>
<td>Number of crops per year</td>
<td>1 or 2</td>
<td>1 or 2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Cost of production per acre</td>
<td>$229</td>
<td>$247</td>
<td>$348</td>
</tr>
<tr>
<td>Estimated Transportation costs (to shanghai in US$/MT)</td>
<td>$150</td>
<td>$180</td>
<td>$95</td>
</tr>
<tr>
<td>Capacity to process (crushing) soybean (ton per year)</td>
<td>68 million</td>
<td>45 million</td>
<td>52 million</td>
</tr>
<tr>
<td><strong>Processing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of usage of the crushing capacity</td>
<td>53%</td>
<td>81%</td>
<td>-</td>
</tr>
<tr>
<td>% that is processed of the total production</td>
<td>67%</td>
<td>41%</td>
<td>47%</td>
</tr>
<tr>
<td><strong>Insurance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area covered with crop insurance</td>
<td>57%</td>
<td>10%</td>
<td>88%</td>
</tr>
</tbody>
</table>

Source: Built by the Authors with data from multiple sources.67
Exhibit 4.2. Cluster Porter Diamond

HIGH
(+) Abundant land & Good soil
(+) Hot summer: ideal for soybean
(+) Skill levels according with industry needs
(+) Location: close to ports but farther to final destiny than other countries
(+) Storage facilities: less storage capacity than production, but plastic grain elevators
(+) Infrastructure: transportation mostly by trucks
(+ ) Infrastructure: ports too shallow so need to stop in other ports to fill
(-) Poor flour quality

MEDIUM
(+ ) Sophisticated processing and commercialization companies
(+ ) Increasing local demand on Biodiesel
(- ) Prices with high volatility
(- ) Weak local consumption

Source: Built by the Authors.

Exhibit 5.1. Transportation Mix

<table>
<thead>
<tr>
<th>Transportation by</th>
<th>Argentina</th>
<th>Brazil</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck</td>
<td>83%</td>
<td>53%</td>
<td>49%</td>
</tr>
<tr>
<td>Train</td>
<td>15%</td>
<td>36%</td>
<td>27%</td>
</tr>
<tr>
<td>Water</td>
<td>2%</td>
<td>11%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Source: Built by Authors based on INTA.

Exhibit 5.2. Policy Map

Source: Built by Authors.
Endnotes


6 Indexmundi (2016).


9 Conference Board Data.


17 Ministry of Economy (2016).

18 National Congress of Argentina (2016).


28 Central Bank of the Argentine Republic.


34 Estimation performed using an average price of $300 per ton, and World Bank data for nominal GDP.

35 Compass (2008) Soybeans and GMO.


39 US Department of Agriculture
