Internationalization Reconsidered: The Case of Siderar

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ABSTRACT

This paper analyzes the internationalization of the Argentine steel producer Siderar by applying a framework which distinguishes between "tangible" and "intangible" forms of internationalization. The former refers to the geographic distribution of a firm's components such as its sales and assets, while the latter refers to whether or not the firm's capabilities and standards to which it strives are internationalized. The case of Siderar shows how a firm can in fact become relatively less international using traditional "tangible" measures, but at the same time vastly much more internationalized with regards to "intangible" measures, such as the quality and value-added of its products, the sophistication of its customers, the efficiency of its operations, and most importantly the practices of its management. In doing so, it is shown how the intangible measures of internationalization provide a better link to performance than do the tangible ones. The evolution of Siderar is contrasted with that of the seamless steel pipe producer Siderca to show how small differences in industry characteristics can affect the correlation between tangible and intangible internationalization.

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1.0 Introduction

Much attention has been devoted to the importance of internationalizing for the long-run competitiveness of a firm. In the course of the discussion, many terms have been put forth to describe firms which are so called "international," among them, multinational, transnational, and global. In most cases, however, the criteria used to determine whether or not a firm meets one of these definitions have been rooted in the physical characteristics of the firm. In most cases this translates into whether or not the firm sells or produces abroad. The objective of the case discussion which follows is to apply a more encompassing definition of internationalization in analyzing Siderar, the principal flat steel producer in Argentina. In doing so, it will be shown that simply relying on physical or tangible characteristics to define the firm's level of internationalization can result in erroneous classifications. In its place a definition which encompasses both "tangible" and "intangible" aspects of internationalization is applied, with the latter being used to describe the extent to which the firm operates at international standards on a variety of aspects, regardless of where its tangible components are located.

Using the above definition, the internationalization of Siderar, formerly the state-owned steel company SOMISA, is compared pre and post-economic reform. In doing so, there are two objectives. The first is to highlight the importance of adopting multiple measures when assessing a firm's level of internationalization. Those proposed here include market, operations, management, procurement and competitive measures. The second objective is to highlight the criticality of analyzing these measures both in terms of their tangible and intangible components. It is shown how changes in these aspects of the firm can produce contradictory internationalization classifications depending on whether one uses simply tangible measures or a more elaborate definition which includes intangible ones as well. Using the former definition, Siderar would appear to be less international today than pre-privatization as its level of foreign sales has dropped considerably. However, when one includes the idea of internationalized capabilities into the definition, the classification which follows is exactly the opposite. In particular, the importance of possessing a management which is internationalized not necessarily from a physical stand point but rather from a capabilities and outlook perspective is highlighted. While the privatization of SOMISA and the economic liberalization surrounding it provided the potential for success, it by no means guaranteed it. It required an "internationalized" management to exploit that potential.

The case analysis itself is divided into six sections. The first of these describes the methodology adopted and addresses the issue of the case selection process. This is followed by a brief history of the steel industry in Argentina leading up to and following the economic reforms of the early 1990s. Emphasis in this section is placed on changes in market structure and their impact on the internationalization of the sector. The third section then turns to the privatization of SOMISA, addressing both the events prior to it and the privatization process itself. The fourth section, which comprises the core of the analysis, focuses on the internationalization of Siderar, contrasting the tangible and

intangible aspects pre and post economic reform on all five of the levels mentioned earlier. The next section contrasts the case of Siderar with that of Siderca, another firm in the same industrial group and the largest seamless steel tube producer and exporter in the world. Emphasis is placed on showing how the two firms may differ on tangible measures of internationalization but are much more similar with respect to the intangible aspects. The case then concludes with a discussion of the implications which follow from the adoption of such an approach to internationalization.

2.0 Methodology

Following the decision to undertake a case study analysis of the impact of radical economic reform on the internationalization of a firm, a case study protocol was developed which is summarized in Appendix A. The unit of analysis in the case is broadly defined as the firm, but in narrower, more precise terms can be classified as organizational change, for throughout the analysis emphasis is placed on the relative change in variable levels as opposed to simply their absolute levels. And, while the focus of the study is on the degree of internationalization, as mentioned earlier the definition of internationalization being proposed is a multidimensional concept and as such an embedded (multiple level) structure is adopted as opposed to a single variable analysis.

As has also been mentioned, the primary focus is on a single case, that of Siderar. However, in order to highlight the importance of industry characteristics in affecting the various internationalization aspects, the case of Siderca is used to selectively contrast with that of Siderar. In selecting a firm for study, it was decided that a critical case approach would be used, in which the firm chosen would be selected not necessarily for its representativeness of the population as a whole, but rather for its ability to highlight the conceptual points being made. Three criteria were used in selecting the firm:

Industry Affected by Market Reforms: The firm chosen should be active in an industry which has been strongly impacted by the market reforms, and which as a result is exposed to international competition to a degree greater than before the reforms.

International Potential: The firm must possess the critical scale and resources needed to compete internationally. Prior, be it limited, international experience should also be required, as the potential for change is greatest amongst those firms which have had at least some exposure to foreign markets. On the other hand, the firm should not be one which prior to liberalization would be considered world-class.

Intangible vs. Tangible Internationalization: In addition, the case chosen should be one which allows for the distinction between the tangible and intangible aspects of internationalization to be made.

Siderar meets the above criteria and also possesses a number of other attributes which make it appealing. The company, now part of the Techint industrial group, was up until recently part of the state-owned steel complex, SOMISA. Following its privatization in the early 1990s the firm was forced to adapt to an environment in which it was no longer protected by neither extremely high trade barriers nor the pockets of the state. As such, it meets the first criterion.

Regarding the second criterion, international potential, Siderar is qualified in two aspects. Prior to privatization, the company had years in which exports accounted for over 70 percent of sales (though not at a profit and as such not to be confused with a world-class firm). Following privatization it gained access to the resources and management capabilities of one of the country's leading industrial groups to aid it in improving its international position, which also relates to the firm's ability to meet the third criteria. Siderar presents itself as an excellent case to distinguish between tangible

and intangible forms of internationalization. As part of the State complex, the firm was by most standards highly internationalized from the point of view of sales, though not in terms of capabilities, as reflected in the repeated losses posted by the firm. By contrast, following its sale to the Techint Group, the firm has reduced export shares dramatically but at the same time reduced costs and improved its ability to "compete" internationally. As such, from a traditional definitional standpoint, the company appears less international today than five years ago, but from a capability and competitiveness standpoint the case is just the opposite.

Another advantage associated with the selection of Siderar is that within the same industrial group is the firm Siderca, the largest producer and exporter of seamless steel tubes in the world. In contrast to Siderar, Siderca, as a result of industry dynamics and issues relating to minimum efficient scale, has internationalized both its sales and capabilities. By comparing the two firms, it is possible to highlight how in one case these two forms of internationalization go hand in hand, and how in another case they need not. Contrasting Siderca and Siderar is also interesting in that it shows what impact differences in political and economic environments can have on the pace at which firms internationalize. In the case of the former, political and economic instability contributed to the process stretching over more than 15 years, while in the case of the latter a stable environment allowed these changes to take place in a third of that period.

2.1 Data Sources

As with most multiple level case studies a variety of data sources were relied upon. They can, however, be classified into four general categories, two primary sources and two secondary sources. On the one hand, primary information came from a series of interviews conducted during the course of two extended stays in Argentina. A complete list of the people interviewed is presented in Appendix B. In total 22 interviews were

conducted, mostly in Argentina though in some cases in the United States, as in the case of the first interview with the Director General Daniel Novegil, which cleared the way for all the subsequent interviews. Overall, the people interviewed included 19 managers at Siderar, Siderca, and the holding group Techint, as well as 3 outside researchers. The interviewees covered a wide range of functional areas, primarily at the senior management level. These areas included, finance, planning, production, procurement, human resources, information systems, and sales. In addition to the information obtained from these interviews, primary literature was obtained from Siderar and Siderca (as well as Techint). These ranged from annual reports and internal magazines to special presentations.

With regards to secondary material, there were also two main sources, outside research reports and academic articles on the steel industry in Argentina, and press clippings on the firms in question. The former included material from the Argentine Steel Institute and Paine Webber as well as FIEL (Fundación de Investigaciones Económicas Latinoamericanas), while the leading business daily paper, El Cronista, and the leading monthly business magazine, Mercado, were the main press sources.

2.2 Validity and Reliability

When adopting a case study approach, the issues of validity and reliability need to be addressed (Yin, 1994). For the type of case study being undertaken here, the two forms of validity of most concern are construct and external validity. The former refers to "establishing correct operational measures for the concepts being studied," while the latter relates to "establishing the domain to which a study's findings can be generalized" (Yin, 1994, p. 33). In order to guarantee the validity of the constructs used, multiple data sources were used for each general concept, as was described in the section above. Efforts were made to confirm information provided by people from inside the firms with external

data sources. In addition, when possible, similar issues were discussed with multiple people even within the firm.

As for the external validity of the study, the same conceptual framework adopted here was used in a broad-based survey of Argentine firms (Toulan, 1996), which provided similar support for the approach being adopted. Furthermore, while the experiences of Siderar and Siderca may be on the extreme end of the response spectrum for Argentine firms, the population for which the ideas presented here is appropriate is not restricted simply to companies in Argentina. Rather, the ideas being explored in this study can be applied to the internationalization process of any firm, and not just those undergoing extreme environmental changes. Lastly, on the issue of reliability of results, most of the evidence presented is based on actual events in the history of the firm or concrete numerical figures, both of which are reproducible, given access to company personnel and records.

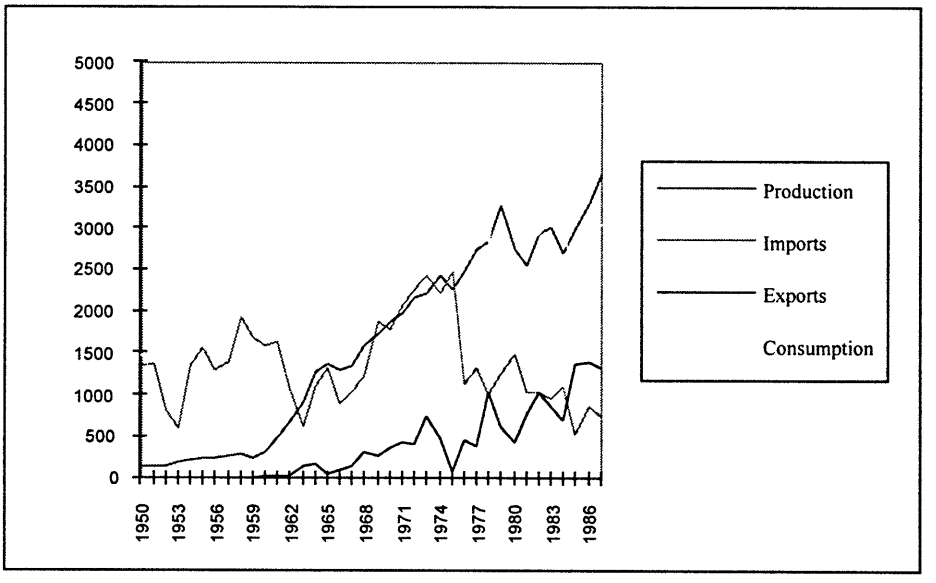
3.0 History Of The Steel Sector In Argentina

Of all the industrial sectors affected by the economic reform policies of the Argentine government since 1989, the one which has been perhaps most impacted by the combination of privatization, deregulation, and trade liberalization is the steel sector. Over this period, the industry has gone through what conservatively would be called a restructuring but which in reality resembles more of a revolution. This has entailed the transference of control of the industry from the public to the private sector and a subsequent dramatic increase in productivity. As will be discussed, these changes have resulted in radical market structure changes in the sector.

The history of the steel industry in Argentina is in fact relatively short. While steel production developed in the country by the end of the 1800s, it was focused exclusively on the final stages of lamination and was dependent on hot-rolled steel imports. It was not

until the 1940s and the advent of import substitution policies that the sector began to integrate backwards into hot-rolled steel production. A national steel plan was developed -- Plan Siderúgico Nacional -- in 1947 under the auspices of the D.G.F.M. (Dirección General de Fabricaciones Militares) with the goal of eliminating the country's dependence on hot-rolled imports. In addition to marking a change in the degree of vertical integration present in the country, the plan of 1947 radically changed the actors controlling the domestic steel industry. Whereas the existing downstream production was completely dominated by the private sector, the proposed hot-rolled facility, SOMISA, was to be a joint project of public and private capital with the former having a controlling interest. In fact SOMISA stood for Sociedad Mixta Siderurgia Argentina. In the end, however, the private sector was excluded not only from the SOMISA project but also from competing in the hot-rolled sector in any way (San Martin, 1988).

Chart 1- Argentine Steel Industry (1950-87)



Source: San Martin, 1988.

The SOMISA facility located in San Nicolás, 250 kilometers outside of Buenos Aires, came on-line in 1960 with an installed capacity of 315,000 tons per year. This

however, was still far short of the apparent domestic consumption of roughly 2,000,000 tons. In order to further reduce imports, expansion projects were undertaken which boosted capacity to 1,000,000 tons by 1965 and 2,500,000 tons by the early 1970s. During this period, there were also plans put forth by private concerns, the main ones being Techint and Acíndar to build integrated facilities. In all cases, however, they were rejected by the D.G.F.M. The result was a complementary market structure in which the public sector controlled the primary production stages and the private sector dominated the finishing processes, both benefiting from extremely high levels of protection through tariff and non-tariff measures, tax incentives, tariff exemptions (on inputs for producers), and institutional entry barriers (Azpiazu and Nochteff, 1994).

In addition to specialization by stage of production, there was a rough specialization by type of product, with SOMISA being the only flat products producer until 1968 and the entry of Propulsora Siderurgia (Techint). And, even then Propulsora was dependent on buying the hot-rolled coils from SOMISA or importing them. By contrast, most of the private investment in finishing was devoted to non-flat products, primarily tubes and long products, in which the leading players were Siderca (Techint) and Acíndar. In total there were 59 firms involved in steel production in Argentina by 1975 (see Table 1).

The limitations of the existing market structure, however, began to show by the mid-1970s. Domestic apparent consumption reached a peak of 183 kg/capita in 1975. The rigidities of the domestic production, though, meant that roughly half of that consumption had to be imported. In fact roughly 20 percent of the country's total imports in the early 1970s were associated directly or indirectly with the steel sector (Bisang and Chidiak, 1995).

Table 1- Argentine Steel Industry Evolution (1975-1992)

	1975	1980	1985	1990	1992
INTEGRATED	Alt Horn Zapla SOMISA	Alt Horn Zapla SOMISA Acíndar Siderca	Alt Horn Zapla SOMISA Acíndar Siderca	Alt Horn Zapla SOMISA Acíndar Siderca	Aceros Zapla Aceros Paraná Acíndar Siderca
TOTAL	2	4	4	4	4
SEMI-INTEGRATED	Aceros Bragado Aceros Ohler Acíndar Cura Brothers Gurmendi La Cantábrica Mairimi/ Sinai Santa Rosa Siderca Tamet	Aceros Bragado Gurmendi La Cantábrica Santa Rosa Tamet	Aceros Bragado Tamet	Aceros Bragado Tamet	Aceros Bragado
TOTAL	10	5	2	2	1
LAMINATORS	Propulsora Cañar Fortuny Hermac ILFA Lamina, Basconia Laminfer Satz & Alvarez Trafilam . .	Propulsora Adabor Cañar Fortuny Hermac ILFA Lamina, Basconia Laminfer Satz & Alvarez Trafilam .	Propulsora Adabor Cañar Fortuny Hermac ILFA Lamina, Basconia Laminfer Satz & Alvarez Trafilam .	Propulsora Adabor Cañar Fortuny Hermac ILFA Lamina, Basconia Laminfer Satz & Alvarez Trafilam .	Propulsora Cañar Fortuny Hermac ILFA Lamina, Basconia Laminfer Satz & Alvarez Trafilam . .
TOTAL	47	38	36	33	21
INDUSTRY TOTAL	**59**	**47**	**42**	**39**	**26**

Source: Azpiazu and Basualdo, 1995.

It was at this point that the national steel policy began to undergo a restructuring. The monopolization of the upstream reduction process by the government was eliminated. Two private firms, Siderca and Acíndar, vertically integrated backwards. Unfortunately, these investments were followed by a substantial drop in domestic demand. Whereas local demand had grown by over 75 percent from 1965-1975, the following ten years saw a reduction of demand by roughly the same amount. This was due to the virtual elimination of the construction industry, reductions in infrastructure

spending, and a reduction in automobile production by two-thirds (Mercado, August 1991). The impact of these two processes, increased investment and reduced demand, was two-fold. On the one hand, local demand for SOMISA production dropped off significantly, in part due to the overall market contraction and in part due to the fact that two of its previously largest clients, Siderca and Acíndar, were now self-sufficient. This most likely contributed to the continued denial of Propulsora requests to vertically integrate.

Table 2 - Acíndar Holding Evolution

SECTOR	1950-59	1960-69	1970-79	1980-85	1986-90	
STEEL PRODUCTS	1. Acíndar (1942) 2. Acinfer (1955)	3. Armetal (1961) 4. Indape (1961)	6. Marathon Argentina (1971)	7. Gurmendi (1981) 8. Santa Rosa (1981) 9. Genaro Graso (1981)	10. Clamet (1986) 12. Puar (1986) 14. Tejimet (1986) 16. Indema (1986) 18. Perfilar (1987) 20. Clavimet (1987) 23. Baplesa (1988) 25. Tamet (1988) 30. Cuplamet (1990)	11. Toron (1986) 13. Fardermet (1986) 15. SAMPA (1986) 17. Felix Simon (1986) 19. Laminar (1987) 21. Aser (1987) 24. Concable (1988) 26. J. Navarro (1988) 31. Tal. Met. Belgrano (1990)
STEEL COMMERC.					27. M. Heredia & Co. (1988) 34. Acindar Brazil (1991)	28. Acindex (1988) 35. Acindar Chile (1991)
OTHER INDUSTRY		5. Acinplast (1962)				
FINANCE					22. Invertrad (1987)	
SERVICES					29. Sider Flight (1988) 33. Electal (1990)	32. Coinsa (1990)

Source: Azpiazu and Basualdo, 1995.

The second major impact of these investments by Siderca and Acíndar was an increase in concentration of the private firms. As a result of producing their raw steel at prices cheaper than available in the local market and also as a result of their investment in other technological advances, these two firms were able to eliminate most of the domestic competition in their respective product areas. This occurred in part through acquisition and in part through plant closure. As is revealed in Tables 2 and 3, the two firms, but particularly Acíndar, dramatically increased their acquisition activity in the 1980s. The result was a reduction by over 50 percent in the number of firms in the Argentine steel sector, from a high of 59 in 1975 to just 26 by 1992. Furthermore, the market share of the four leading players went from just over 50 percent in 1973 to virtual control of the entire market by the end of the 1980s.

Table 3- Companies Controlled by Siderca

SECTOR	Pre-1960	1961-70	1971-80	1981-90	1991-95
STEEL PRODUCTS	1. Dálmine Safta (1954) 2. Siderca (1960) 3. Cometarsa (1949) 4. Tubos & Perfiles (1949)	6. Dálmine Siderca (1964) 7. Propulsora Siderúrgica (1961)		9. Siderca (1984) 10. Aceros Revestidos (1985) 11. SIAT (1986) 12.Metalcentro (1987)	14. Tamsa (1993) 15. Dálmine (1995)
FINANCE	5. Bernal (1957)		8. Siderca International (1980)	13. Invero (1987)	

Source: Azpiazu and Basualdo, 1995.

The dramatic reduction in domestic consumption starting in the mid-1970s also contributed to the growth in exports of all the large players, including those owned by the state. In reality, the construction of SOMISA in 1960 marked the beginning of Argentine

intra-industry trade in the steel sector. For, even though the country was still heavily dependent on imports, it did begin to export raw steel in 1960, mostly to neighboring countries and in relatively small amounts as a percentage of domestic consumption. However, when domestic demand began to fall, the importance of external markets increased substantially. The three large players, SOMISA, Siderca, and Acíndar, found themselves with excess capacity and turned to foreign markets to compensate for the domestic downturn. As a result, exports increased from an average of 250,000 tons per year from 1960-1977 to an average of 950,000 tons from 1978-1987, or roughly one-third of domestic production, with positive net exports being recorded in 1978, 1982, and the years following and including 1985. The domestic industry was able to sell so extensively on the international market by subsidizing exports with higher domestic prices. The largest share of these exports went to other Latin American countries, but significant shares were also held by the Asian, European and US markets.

As such, the Argentine steel industry in the first half of the 1980s could be characterized as being increasingly concentrated, highly protected, and more and more dependent on foreign markets to sell-off excess capacity. The second half of the 1980s, saw another reorientation occur within the sector. This was due to a number of factors, not least among which was the continued depression of domestic demand. In addition, however, the second half of the 1980s also witnessed depressed conditions in the international markets with prices falling and antidumping practices increasing. These effects were compounded with the beginning of the deregulation of the sector. Sectoral promotion regimes were repealed, non-tariff barriers reduced, and tariff levels cut substantially. These trends were consistent with the general liberalization of the Argentine economy and the gradual withdrawal of the State from the sector.

In reaction to these changes in the environment, the leading firms initiated new investment plans (Table 4). By far the most ambitious of these was undertaken by Siderca

which accounted for over two-thirds of all the investments in the industry in the second half of the 1980s, orders of magnitude greater than that of SOMISA, particularly if one considers the difference in size between the two firms. It is in large part as a result of these early investments that Siderca is today the world leader in its product area.

Table 4 - Argentine Steel Investments, 1985-1991 (US$ million)

FIRM	1985	1986	1987	1988	1989	1990	1991	TOTAL
SOMISA	26	29	16	28	20	35	30	184
Siderca	79	148	225	152	43	20	23	690
Acíndar	11	22	14	16	8	2	3	76
Propulsora	2	2	3	2	2	5	6	21
Others	3	0	3	2	1	0	0	9
TOTAL	121	201	261	198	74	62	62	980

Source: CIS (Centor de Industriales Siderúrgicos)

3.1 The Liberalization of the Steel Sector

This reorientation of the steel sector which began in the mid-1980s picked up speed in the end of the decade and the early 1990s as a result of the sweeping economic reforms of the Menem government. These reforms impacted the existing trade regimes, regulatory structures, and ownership mix of the sector, all of which increased the openness of the industry to foreign competitive pressures. While the reduction of tariff rates had begun earlier in the 1980s[1], by 1989 tariffs on steel imports still ranged from 5-40 percent. In 1990, however, this schedule was reduced and compressed to 0-24 percent. It was followed in 1991 with a regime of 5 percent tariffs on raw materials and inputs not produced locally, 13 percent on other inputs and semi-elaborated products, and 24 percent

[1] During the 1970s tariff rates on steel products ranged from 50-100 percent.

on finished goods. This regime was also subsequently replaced by a dual system, one for Mercosur members (0 percent on inputs and semi-elaborated products; 18/23 percent on final products) and one for all others nations (0 percent on inputs; 6/8 percent on semi-elaborated products; 14/18/25 percent on final products). While one could claim that such a system is fairly protective, it is orders of magnitude less so than in past. It has also sharply limited the ability to subsidize exports through elevated domestic prices.

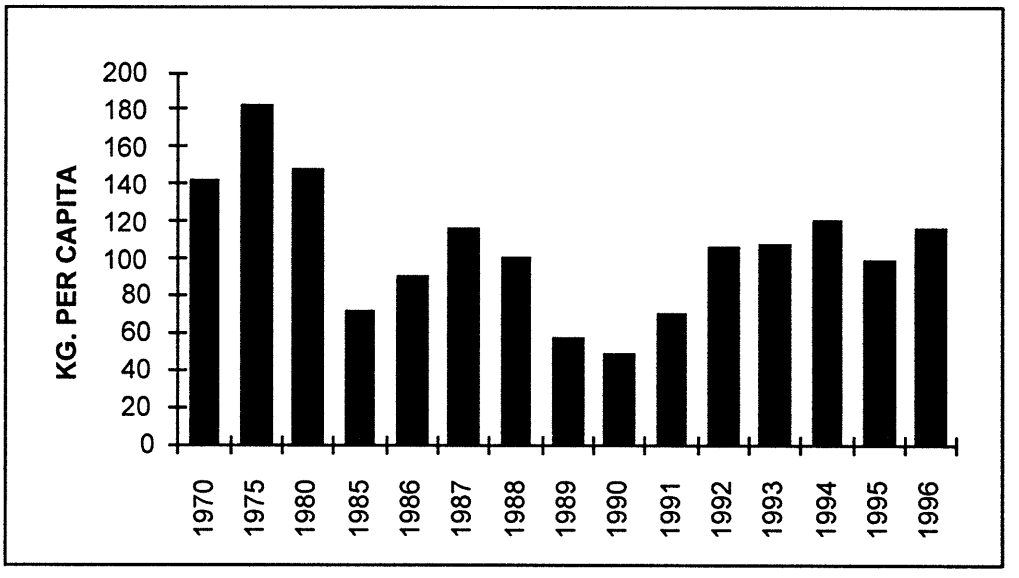
More important, however, than the reduction in tariff barriers has been the reduction of non-tariff and other regulatory barriers. The first major change was the removal of the D.G.F.M. as the regulatory body of the steel industry, which had previously dictated domestic price levels. In addition, a pair of decrees (2284/91 and 1998/92) had major effects on the steel industry. The first of these repealed the industrial iron and steel promotion regime which had previously been in place. It also eliminated quantitative restrictions on the importation of iron and steel products. The need to obtain government authorization to import and/or export steel products was also done away with. Furthermore, the Decreto de Compre Nacional (Buy Argentine Decree) which gave special treatment to local firms in government purchases was also eliminated. Deregulation of the port and maritime transportation have also served to increase foreign competitive pressures as they have reduced the cost of importing products into the country. Other deregulatory measures, however, have had potential benefits for the domestic industry, among them the opening of the energy and transportation markets as well as the reduction in tariffs on raw iron ore and coal imports from Brazil as part of the Mercosur Agreement. The result of these combined changes was a drop in iron ore and coal prices in the domestic market by 20-22 percent in the first part of the 1990s.

This trend towards increased liberalization, however, has not always linear, as in the year following the above changes, 1992, the statistics tax on imports was raised from 3 to 10 percent, increasing the protection provided to domestic industry. The latter,

however, has been eliminated for trade with Brazil, the domestic industry's largest competitor in terms of imports. In general, the sector is much more open today than at any period in its recent history. One indicator of this is the fact that domestic steel prices fell between 15 and 20 percent from June 1990 to December 1993.

The adoption of the Convertibility Plan by the government in 1991 also had significant implications for the sector, some positive and some negative. The economic growth which the Plan encouraged had a positive impact on domestic steel consumption. With an average GDP growth rate of 7.7 percent from 1991 to 1994 and consumer durables leading that wave of growth, the steel sector saw a rebounding of per capita steel consumption, though still well below its all time high (see Chart 2).

Chart 2 - Argentine Per Capita Steel Consumption (1970-1996)



Source: Azpiazu and Nochteff, 1994, CIS.

The Convertibility Plan, however, also resulted in an instantaneous increase in production costs vis-a-vis imports as a result of the level at which it fixed the exchange

rate. Labor suddenly became very expensive. Nominal wages in the steel sector increased 25 percent from April 1991 when the Plan was adopted until December 1993. By contrast, the steel prices fell by 14 percent during the same period, resulting in an effective labor cost increase of 45 percent (Azpiazu and Nochteff, 1994). While this change would have a negative impact in the short-run, it would encourage a reduction of the labor force and dramatic increases in productivity in the medium and long-run.

3.2 The Major Players

As was described earlier, the Argentine market has become increasingly concentrated over the past 20 years, to the point that today it is dominated by two players, the Techint Group through Siderca and now Siderar, and Acíndar. These two groups are involved in a variety of areas, though their focus lies in the steel sector, particularly in the case of Acíndar. In reality, Acíndar is a holding comprised of over 35 individual firms, most related to steel but also with minor interests in services through the privatization of state enterprises (electricity generation, gas distribution, and rail transport). Ever since its beginnings in the 1940s, Acíndar has been focused on growth, constantly acquiring firms along the way. Its product strategy has also been to diversify its gambit of products, all however in the area of long-steel products. Today, Acíndar, as a result of the closing of SOMISA non-flat production, has a virtual monopoly in the long-products market in Argentina, which constitutes 37 percent of steel production in the country. And, with a production capacity of 1.25 million tons/year (Azpiazu and Basualdo, 1995 p. 89), it is the second largest volume producer in the country, behind Siderar. Even though Acíndar went through a streamlining of its production system via employee cutbacks and capital investments, it has not done so to the same extent as Siderca or more recently Siderar. From 1991 through 1995, the firm had an accumulated net loss of $252 million.

The group which has come to dominate the remaining two steel sectors, flats and tubes (55 percent and 8 percent respectively of the local market), is Techint. As with Acíndar, Techint is a diversified group with interests in construction, energy, and services. In total, the group is comprised of more than 60 firms, employing over 29,000 people. Several of these acquisitions came out of the recent privatization program of the government, in partnership with other local as well as foreign firms (see Table 5). Its main focus, and origins, however, are in steel. It is widely considered to be "the" leading industrial group in the country and to possess one of the best managements in all of Latin America. The Group was founded in the late 1940s by Agostino Rocca, who immigrated to Argentina from Italy where he served as head of the Italian state steel sector. Its first major incursion into the steel sector was through the establishment of what came to be known as Siderca in September 1954 in Campana, 80 kilometers outside of Buenos Aires. The facility was the first to produce seamless steel pipe in all of South America. Though only a semi-integrated facility until the mid-1970s, the Group continuously invested in expanding the productive capacity of Siderca from its first days. The firm's rise to international preeminence, however, did not occur until the end of the 1970s and the 1980s when heavy capital investments were undertaken, including the backwards integration of the firm into primary steel production. While Siderca is the leading tube company in the Techint Group, it is not the only one. The group also has a number of smaller firms participating in the tube sector including SIAT S.A. and Tubos y Perfiles SAIC. As will be discussed later, the firm has also more recently made substantial investments internationally in this area, acquiring Tamsa of Mexico in 1993 and Dálmine of Italy in 1995.

Table 5 - Techint Involvement in Argentine Privatizations

SECTOR	FIRM	% OWNERSHIP	PARTNERS
STEEL	SOMISA	51 percent	Usiminas (Brazil) CVRD (Brazil) CAP (Chile) Acindar (Arg.)
ELECTRICITY DISTRIBUTION	EDELAP	24 percent	Houston Power (US)
NATURAL GAS TRANSPORTATION	Transport. Gas del Norte	20 percent	Novacorp (Canada) JP Morgan (US) Petronas (Malaysia) Transcogas (Arg.)
OIL EXPLORATION*	"El Tordillo" "Aguarague"	43 percent 52 percent	Perez Companc (Arg.) Santa Fe Energy (US) Energy Develop. (US) Grupo Soldati (Arg.) Amplex (US)
TELECOM.	ENTEL/ Telefónica Arg. S.A.	8.3 percent	Citicorp (US) Perez Companc (Arg.) Grupo Soldati (Arg.) Telefónica (Spain) Various banks
RAILROADS	Rosario-Bahía Blanca	58 percent	Perez Companc (Arg.) Grupo Soldati (Arg.) Iowa Intl. RR (US) Chase Manhattan (US)

* Only primary fields listed. Participation also in various smaller secondary sites.

Source: Azpiazu and Basualdo, 1995.

The other major component of Techint's steel business is in flat products, initially focused around Propulsora before the privatization of SOMISA, and Siderar after it. Propulsora itself was founded in 1968 in Ensenada as a downstream processor, buying the hot-rolled coils either from SOMISA or via imports. As with Siderca, the Group also had a number of smaller specialized facilities, among them Arsa, Sidercolor, and Serviacero, which undertook galvanizing, electroplating, and pre-painting. Following the

privatization of SOMISA, all of the individual finishing firms were incorporated into the new Siderar. Most of the management of Siderar, however, came from Propulsora, and in fact the firm served as a breeding ground for top managers for the entire Group. The new heads of Tamsa and Dálmine, for instance, both began in Propulsora.

4.0 The Privatization Of SOMISA

In addition to reform of the tariff and regulatory structure of the industry, the third main component of the restructuring of the sector was the privatization of the State's two integrated steel mills, Altos Hornos Zapla[2] and the much larger SOMISA. The intent to privatize the state steel complex was voiced under the Radical government of Raúl Alfonsin in the mid 1980s. However, it was not until the election of Carlos Menem in 1989 and the passage of the Ley de Reforma del Estado in August of that year that the privatization process became a reality, in part as a result of the desperate need of the government to reduce the fiscal deficit. The failure of these firms to invest seriously in new technology during the previous two decades had put them in a very uncompetitive position. SOMISA was still operating using the basic technology it had acquired in the 1960s. Its market position was further weakened by its inability to provide competitive financing to its customers, resulting in its having to sell much of its output to international traders at prices below variable cost. In addition, the firm was burdened by a labor force much in excess of its actual needs, a vestige of state employment objectives and exceedingly powerful labor unions. By the early 1990s, SOMISA had accumulated a debt of $1.8 billion, or more than the equivalent of roughly three years of sales. In 1991 alone the firm posted a loss of $573 million, and in 1992 a loss of $417 million (FIEL, No. 22).

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[2] Altos Hornos Zapla was eventually sold for $32.2 million to a consortia which included Citicorp Equity Investments, Aubert and Duval, and PENSA.

The privatization solicitation itself had only one restriction, that no two local steel firms could participate in the same consortia. This condition, a requirement of the World Bank, was aimed at preventing a solidifying of the Techint - Acíndar duopoly in the local steel sector. In the end, the winning (and only) offer was made by Techint through its firm Propulsora Siderúrgica.

Before the privatization actually went through, the government needed to address the issue of the firm's exceedingly large work force, without which no private concern would purchase SOMISA. In 1991, at the advice of Braxton consultants, the government initiated an early retirement program to reduce the size of SOMISA's work force. It succeeded in doing so to a large degree, reducing employment from 12,700 to 6,800 by the time of the privatization in 1992. The government did so at a cost of $148 million, or roughly $25,000 per person (Bisang and Chidiak, 1995). Despite these reductions in employment, the firm was still unprofitable and in dire need of capital investment. Therefore, in order to successfully privatize the assets of the firm, SOMISA was divided into two entities. Aceros Parana, the part which would eventually be privatized, was given the majority of the personnel and installations, while what was called the SOMISA Residual, and which the government retained ownership of, was given most of the firm's debt ($1,800 million versus $100 million for Aceros Parana). In preparation for the privatization, Techint also reorganized Propulsora. The Old Propulsora was merged with the capital resources of Techint's consortia partners to form what was known as the New Propulsora, of which Techint retained 66 percent ownership. The New Propulsora then acquired 80 percent of Aceros Parana in November 1992. The remaining 20 percent of Aceros Parana was given to an employee stock ownership program (ESOP). Finally, in July 1993 the two firms were merged into the new entity Siderar, of which Techint retained a controlling interest. Since then, several of the original investors have withdrawn and in the beginning of 1996 12 percent of the firm was given in a public

offering. That percentage has since increased to 25 percent through listings both in Buenos Aires and New York. A breakdown of the ownership structure in 1993 and 1997 can be found in Table 6.

Table 6 - Siderar Ownership Structure

INVESTOR	**1993**	**1997**
Techint	57%	51%
ESOP	14%	14%
CAP (Chile)	10%	---
Acíndar	6%	---
CVRD (Brazil)	5%	5%
USIMINAS (Brazil)	5%	5%
Public Offering	---	25%
Others	3%	---

Source: Marcus and Kirsis, 1994, Siderar.

For the four months prior to the actual privatization of SOMISA in November 1992, the Techint management team in charge of the project developed a comprehensive parachuting plan. Roughly 100 managers from Techint, Propulsora, and Siderca were organized and each given a certain area for which they were in charge of developing a rapid change program. Once the privatization was complete, these 100 managers (or centurions to use the words of Percy Barnavik) were parachuted into their positions, and within two months they were successful in balancing the cash flow of the firm, which had been consistently negative up until that point.

5.0 The Internationalization Of Siderar

As was mentioned in the beginning of the chapter, the main objective of this case study is to apply an elaborated definition of "internationalization" to the case of Siderar both pre- and post-privatization so as to highlight how standard definitions could mis-classify the degree of internationalization of the firm. While traditional definitions of internationalization take as their measures tangible aspects of the firm, such as location of sales or facilities, they may miss what I believe to be at the core of the interest in whether or not a firm is international, which is "does the firm compete at international standards?" Tangible measures such as those suggested above are used in part because of the ease of data collection and comparability across firms, but also because it is believed that there is a positive correlation between them and international competitiveness. It is reasoned that by being present in foreign markets, one will be exposed to more competitive pressures than if one operates solely in one's local market. While this may be true in terms of exposing one to a higher number of competitors it does not necessarily imply that they exert more competitive pressures, as it depends on whether the market in which one enters is more advanced or not.

A second major limitation of standard definitions is that they tend to focus primarily on market and production measures of internationalization. Other aspects of the firm are normally assumed to correlate with these two, such that if one is internationalized in terms of sales one will also be so in terms of management or procurement practices. While in general this may be true, the contrapositive need not be, that is to say that one could be internationalized in the upstream and support activities without being so in the downstream ones.

Table 7 - Internationalization Framework

	FORM OF INTERNATIONALIZATION	
	Tangible	**Intangible**
Market	Location of Sales	Sophistication of Demand
Operations	Location of Facilities	Sophistication of Technology
Management	Location of Management	Adoption of Mgmt. Practices
Procurement	Location of Suppliers	Sophistication of Suppliers
Competition	Location of Competition	Level of Competition

With these ideas in mind, the goal of what follows is to apply the proposed internationalization definition to the case of Siderar to not only obtain a better understanding of how the internationalization of the firm has changed since the privatization, but also to highlight how the use of more restrictive definitions can produce mis-leading conclusions.

5.1 General Strategies

Before taking over SOMISA the management of Techint identified a number of general strategies to adopt immediately. Four general themes were highlighted: recovering the domestic market; investing heavily in capital and human infrastructure; increasing the level of value-added of the firm; and seeking only the best inputs. Each of these had the goal of raising the international competitiveness of the firm, and are reflected in the various internationalization aspects of the firm.

5.2 The Internationalization of Markets

Of the four general objectives, recovering the domestic market was the most immediate concern for management. SOMISA in its final years was exporting on the order of 70 percent of its production. For this reason, the firm might have appeared to be quite international. However, if one looks beneath the surface to analyze the reasons for this growth in export activity, one realizes that it was not an explicit goal. It was not the objective of the SOMISA management to internationalize as part of a growth strategy. The real reason for this change in market venue was that the firm found it more and more difficult to sell its production in the domestic market. This was compounded with a production mentality in which the idea of operating below full capacity or putting one of the blast furnaces into hot idle was not conceivable. The result was excess supply which domestic consumers did not want to purchase. The reason for the drop in domestic demand for SOMISA products is not simply the result of a drop in overall domestic demand. Rather, there are a number of firm-specific features which caused clients to seek other suppliers. Three important factors can be identified. The first relates to the quality of the final product. Given the lack of investment in SOMISA's facilities and the often misaligned incentives associated with state-enterprises, the quality of the steel being produced by SOMISA did not meet domestic standards which were being raised with the increase in access to higher more reliable quality imported steel. Even smaller-size steel users were turning to importers.

A second factor which contributed to SOMISA's losing of the domestic market is related to the first factor, namely attention to customer service. In talking to steel users, one of their biggest complaints with SOMISA was the unreliability of the firm in terms of delivery. Even if the quality of the steel were not a problem, the lack of dependability of on time deliveries in the correct quantities forced many clients to search for alternative sources. This was particularly true in continuous fabrication industries such as the

automotive industry in which a break in the supply of steel could cause the entire facility to cease production.

The third major factor contributing to SOMISA's demise in the domestic market also related to customer service, but in the area of financing. As was mentioned, by the end of the 1980s, the financial position of SOMISA was incredibly weak. With consistently negative cash flows, it is no surprise that the firm was unable to offer financing to its customers. With importers (primarily Brazilians) offering six month to one year financing, SOMISA found itself quickly losing customers. This weakness of the firm was particularly hurtful in competing in the Argentine environment in which access to capital in the open market was (and still is) exceedingly tight, making the financing of a purchase often the deciding factor in which supplier to choose.

SOMISA's response to losing to its domestic market was to increase its sales on the international market. Exports rapidly increased to nearly 70 percent of sales by the beginning of the 1990s. The weaknesses which SOMISA exhibited in the domestic market could more easily be overcome in the international market by selling through traders which would pay cash up front for the firm's production, thus avoiding the financing problem. Traders would also buy low quality steel and on short term notice, making quality and delivery problems less of a barrier. Selling to international traders, however, would only serve as a temporary fix for what was in reality a chronic problem. It did not serve to induce improvements in the firm's performance which is normally hoped for by serving international markets. In fact it encouraged the strengthening of existing practices and mentalities which emphasized production over sales. This could only serve as a temporary solution, though, a way in which the firm could sell its current production, for the prices at which the traders would buy SOMISA's steel did not even cover variable costs. Therefore, although on the surface it may have appeared as though SOMISA was in fact an internationalized firm, it was so only from the point of view of

the physical location of its sales and not in terms of the intangible nature of those sales. For, the sophistication of demand which it was serving via foreign traders was in fact below that present in the local market.

Following the privatization, the trend towards the tangible internationalization of sales changed direction very rapidly. The stated goal of the new management was to regain the domestic market which had been lost during the previous five years, at the expense of exports to traders. In its last year, SOMISA exported 65 percent of its production. By contrast in its first year, Siderar exported a mere 15 percent of its output. This figure has since grown but management does not expect it to surpass one-third of production. The objective of the Siderar's management is to in fact de-internationalize the tangible aspect of its market but re-internationalize the intangible aspect. That is to say decrease foreign sales but at the same time increase the level of sophistication of the local and foreign demand which it serves.

Siderar has addressed this issue by improving the gambit of products and services it offers its customers and more uniquely by helping their customers to improve their competitive positions in their respective markets, resulting in increased customer sophistication. In reality this process has occurred in two stages, with the improvement of Siderar services coming first. The result has been an exceedingly rapid recapturing of the domestic market. Siderar's domestic market share in its various product categories has rebounded substantially, from 56 percent in 1992 to 74 percent in 1995[3] (see Table 8 for more detail), reflecting an increase in monthly domestic sales from 67,000 tons to 95,000. This increase in market share is even more impressive if one excludes cold-rolled coils, whose figures include the prior production of Propulsora as well. Within a matter of couple of years the firm has reached the point at which it is now very difficult to increase its market share as the remaining imports tend to be products which Siderar does not

[3] In 1996 the overall domestic market share of Siderar increased to 79 percent.

produce such as stainless steel above 1500 mm widths or products which demand qualities which the existing plant cannot achieve.

Table 8 - Siderar's Argentine Market Share (percent)

	1992*	**1993**	**1994**	**1995**
Hot Rolled Coils	28	61	70	70
Cold Rolled Coils	71	79	81	80
Tin Plate	39	63	77	77
Weighted Average	56	67	72	74

* SOMISA + Propulsora

Siderar's management has achieved this rapid growth in domestic market share by addressing the weaknesses of SOMISA mentioned earlier and going beyond them by offering new value-added services. The first of these weaknesses related to the poor and inconsistent quality of the steel which SOMISA produced. This issue was attacked in a number of ways. The first, which will be elaborated in greater depth in the next section, entailed massive investments in technology upgrading, on the order of $438 million from 1993-1996, including rebuilding of the blast furnaces. Furthermore, management has implemented strict quality control measures where there were none before, the result being ISO9002 certification for all the various facilities during the past two years. By doing so, it is in compliance with internationally recognized standards of excellence. Siderar is in fact the first privatized firm in Argentina to receive ISO9002 approval. The next challenge the firm has posed for itself is to obtain ISO9001 and ISO14000 certification would also encompass the product design and environmental control aspects of the business.

With regards to the issue of reliability, the new management has attempted to instill the idea of serving the customer into the way in which clients are dealt with. Siderar benefited in this area from the incorporation of the Propulsora sales force which already had this approach. Correcting this problem was key to the firm's strategy of trying to not only recapture their customer base but also stabilize it, for the idea is to try to move more and more clients towards longer term agreements, be they formal or informal.

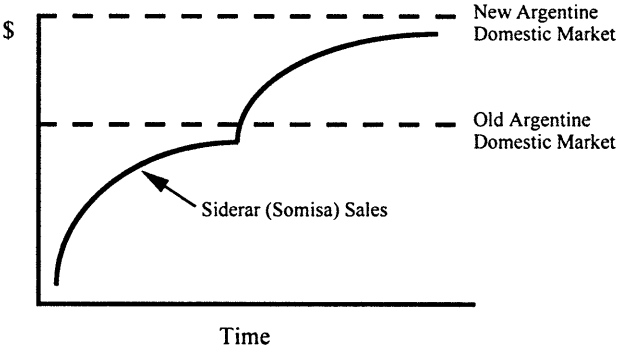
The third major weakness of SOMISA related to its inability to provide financing to its customers. Given the massive productivity improvements in the past few years and improved management, the firm is now turning a profit and able to finance sales to its smaller and medium sized customers. In addition, being affiliated to Techint allows the firm to access capital on the international markets at rates much below those which its clients would have to pay in the domestic market. In general, Siderar currently offers 60 days financing, though in certain situations this financing is extended to 180 days. Without this financing it is unlikely that even with the other improvements the firm would have been able to recapture domestic market share from imports, for the Brazilian firms are and have been offering very attractive financing options, subsidized by the government.

In addition to trying to correct for the weaknesses of SOMISA, the management of Siderar has attempted to increase the value-added it provides its customers, both in terms of the product and service. By merging the upstream operations of SOMISA with the downstream operations of Propulsora, Siderar is able to offer customers a wide array of product features beyond basic hot-rolled coils, including electrogalvanizing and prepainting. It is also developing an agreement with General Motors to provide finished car parts to their facilities on a just-in-time basis.

Together, the above mentioned changes have helped Siderar to regain dominance of the Argentine market. With the first phase of recapturing the domestic market

complete, management is in the midst of implementing the second phase of its strategy which is to in fact grow the size of the domestic market. Its goal is to do so by improving the international competitiveness of its domestic customer base, which in turn should increase their demand for steel as well as the sophistication of that demand. Rather than simply seeking new markets abroad, the firm is trying to expand existing ones at home. Siderar has attempted to grow domestic demand through a variety of innovative measures, including management training for existing customers, institutional consulting, and attracting new foreign investment of steel consuming industries.

Figure 1 - Siderar Sales Plan



Perhaps the most novel contributions of Siderar's management in the area of customer development have been its effort to increase the competitiveness of its small and medium customers. It has attempted to do so through a variety of programs, including the establishment of a six month management training program for the top managers of its small and medium sized customers, the objective being to improve the skill base of those clients which are most threatened by the opening up of the economy. Such a measure is both offensive and defensive, for while the objective is to help these firms grow, there is also the acknowledgment that in some cases this assistance may be necessary simply to maintain a firm's existing position in the face of growing imports.

The program, entitled Programa Para el Desarrollo de Ejecutivos Industriales, was conceived by Siderar to provide management training for its small and medium-sized customers. In the first year, they enlisted the support of the Argentine government and developed the program jointly with the faculty of IAE (Instituto de Altos Estudios Empresariales), widely considered to be one of the leading business schools in Argentina. The program, currently in its third year, is funded 75 percent by Siderar and 25 percent by the participants, the latter to ensure that only those firms with an real interest would participate. The program lasts 13 weeks and meets for one day per week during that period. Each session of the course includes participants from approximately 35 firms. (In total Siderar has more than 500 domestic clients.)

The objectives of the program are delineated as the following:

"• Mejorar las capacidades directivas de gestion

• Comprender mejor la situacion real de sus empresas en el entorno actal y futuro, y de la relacion de estas con Siderar.

• Incorporar la metodologia de planeamiento y desarrollo de business plans."

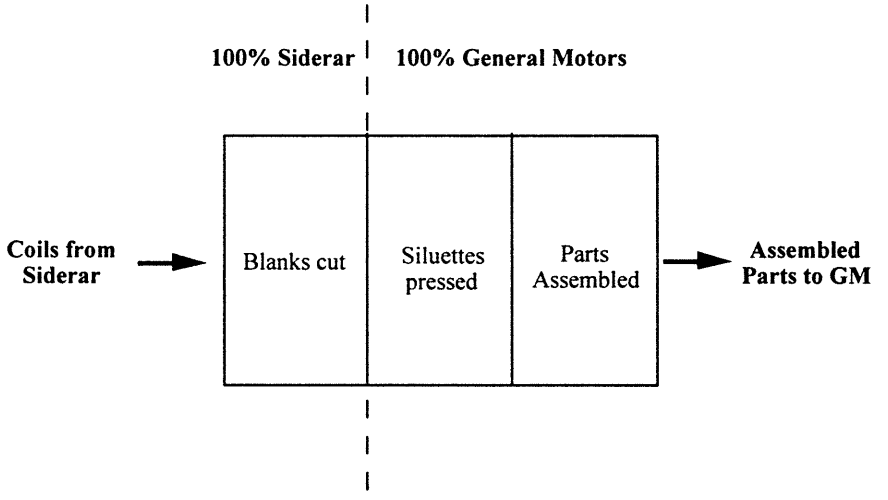
Towards this purpose the course is organized into two sections. The first is an academic training component which covers the traditional business school topics concerning finance, human resources, business policy, accounting, commercialization, and operations. The second component of the course is based on incorporating these concepts in the development of a business plan for each firm using a framework provided by the faculty. Each participant is to develop (in a team) a comprehensive business plan for his/her firm, which includes surveying customers on a variety of issues and developing a series of action items. The best of these business plans are then presented to Siderar management at the end of the course. The eventual goal would be to follow up on the progress of these firms in adhering to their business plans down the road.

In addition to assisting their customers in the area of management training, Siderar has also at times provided them with technical assistance regarding institutional arrangements. Given its scale and the experience of Techint, Siderar is able to assist smaller clients which lack knowledge of how national and international institutions operate. Among the areas in which they have helped customers are dealing with the tariff and anti-dumping regimes. It is hoped that by sharing its institutional knowledge, Siderar can help protect their domestic customers and encourage their expansion abroad.

Most recently, Siderar's management has developed a plan to install an "information pipeline" connecting itself with its customers through the internet. Again, the primary objective of such a project is to hopefully increase the competitiveness of these small and medium sized firms. The "pipeline" has three aspects. The first is to provide customers with information from Siderar regarding orders, credits, and other aspects of the customer's account. In addition to providing customers with Siderar specific information, the link will also allow them to access relevant information regarding economic reforms, sources of funding, and special government programs for small and medium-sized firms. For the latter, Siderar has hired a consultant to collect the relevant information. The last component of the pipeline will consist of a management control system software which firms can use for conducting their operations. The biggest challenge Siderar will face in making this pipeline work is in educating their customers as to the benefits of using such a link. Most small and medium-sized firms in Argentina have yet to be connected to the internet and as such Siderar will also have to provide training in how to use the system. In its first year, 1997, the pipeline will be connected to 150 of Siderar's customers and eventually be expanded to the rest. It is hoped that such efforts will help make these firms more competitive vis-a-vis imports and preserve Siderar's local customer base. In addition, however, such a program has the additional impact of increasing customer loyalty as it the increases potential switching costs.

While the previous strategies for growing the domestic market have focused on improving the competitiveness of existing domestic customers, an additional approach adopted by management has been to try to attract foreign producers of indirect steel imports such as durable goods. One such example is the joint venture it is establishing with General Motors to provide GM's new plant in Santa Fe with not just steel coils but rather cut blanks for car parts. The idea for this venture was developed by Siderar as a way of moving into higher value-added products and will entail Siderar building a facility to cut these blanks.

Figure 2 - Siderar-General Motors Joint Venture



The objective of such an agreement is several fold. On the one hand it represents Siderar's attempt to integrate further downstream into the value chain and provide customers with higher levels of value added. On the other hand, it is also part of a general strategy to move towards deeper and longer term arrangements with customers, something which was non-existent in SOMISA. A similar agreement to that with General Motors was also discussed with Volkswagen, though those talks are currently on hold. Even with such joint ventures targeted at indirect imports, though, roughly 50 percent of the steel weight of most cars produced in Argentina is still imported.

While the primary strategy of Siderar's management was to focus on regaining and growing the domestic market, this did not imply that it would ignore international markets. For while exports have been reduced substantially as a percent of sale, they still play an important role in the firm. Furthermore, the customer-oriented policies adopted in the domestic market have been incorporated into the way in which they approach the export market. The most important of these changes has been an effort to move away the use of traders. This is in line with the Techint culture, evident in the workings of Siderca, of developing close relationships directly with the customer. Whereas SOMISA sold none of its exports directly to end users, in 1995 nearly 40 percent of Siderar's exports were arranged directly with the customer, a percentage which varies by geography. In the rest of Latin America, a market which SOMISA did not serve, the vast majority of sales are made directly to the end user. In the United States the share averages 30 percent, with those sales near their office in Houston being direct and those on the two coasts being conducted through traders. The European market is likewise a mix between direct and indirect sales. Asia, however, is still completely served through traders. The eventual goal of the firm is to have a mix of direct/traders of 50/50. The planned establishment of sales offices in Milan and Singapore will aid Siderar in achieving this goal. Even when Siderar does use traders, however, they always request to know who the final consumer is so that they may provide after-sales service. In essence the role of the trader is changing from one of a sales agent to one of an administrator and financier.

Their strategy in attracting a direct customer base has been rather traditional, knocking on doors. Given their export size relative to the large world players, however, such a strategy has worked. They have done so by targeting niches and specific customers with which to develop long-term arrangements. Siderar's management has also tried to shift the type of product which it exports to ones with higher value-added contents such

as cold-rolled coils and hot-dipped galvanized products as opposed to simple hot-rolled coils.

This past year, 1995, exports rose to 523,000 tons (~35 percent of sales) from 127,000 tons (~10 percent of sales) in 1993. This was due in part to the contraction in local demand as a result of the Tequila Effect. However, the goal for the future is to maintain exports around 500,000 tons. When asked what they would do if in the future the domestic market picked up dramatically, it was replied that capacity expansion options would be looked into. It is the intent of management o be primarily a supplier of firms in Argentina, but at the same time to maintain a reasonable presence in foreign markets.

What the above analysis has shown is that even though Siderar's markets may appear on paper less internationalized today than under SOMISA management, the sophistication of demand which it is serving is well above that demanded by the traders to which SOMISA used to sell. Furthermore, this increase in demand sophistication is actually something which Siderar has encouraged as a means of preserving and growing its local market. As will be seen in the following section, the firm's ability to adhere to such policies has been due in part to massive improvements in the operations of the firm.

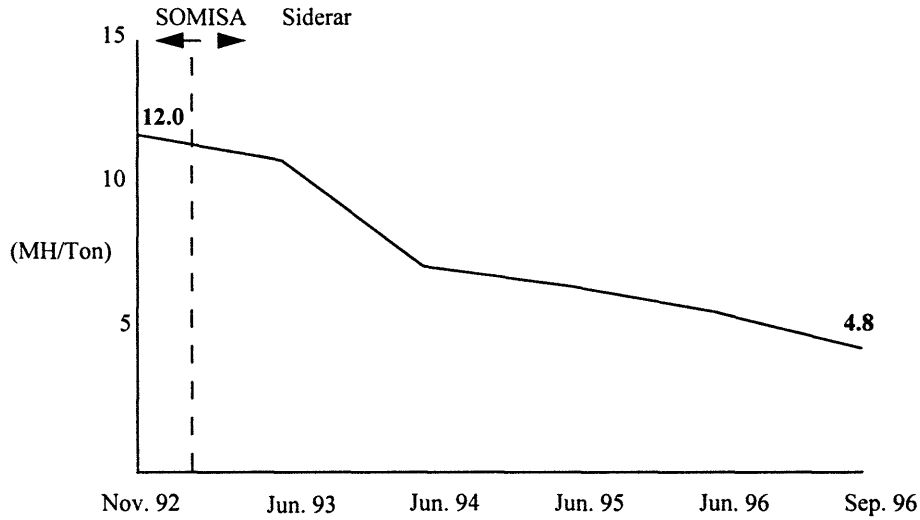
5.3 The Internationalization of Operations

Given the nature of the flat steel industry and the economies of scale entailed, it is fairly uncommon for a firm to physically internationalize its facilities. This is true both in the case of SOMISA and that of Siderar. Since the privatization, however, Siderar has moved to internationalize its sales offices. Whereas SOMISA had neither production nor sales offices outside Argentina, Siderar, as part of its effort to increase direct exports, has established an office in Houston and plans on doing the same in Milan and Singapore. As such, it is possible to claim that although the firm is less internationalized in terms of

sales today than under SOMISA, it is in fact more internationalized in terms of the physical location of its operations.

Changes in the tangible internationalization of the firm's operations, however, pale in comparison to changes in the intangible nature of those facilities. As will be argued in what follows, Siderar's operations are much closer to world class levels today than five years ago. In the steel industry a widely accepted measure of performance is the number of man-hours per ton of steel. As is evident in Chart 3, this metric has undergone an order of magnitude improvement in Siderar since the privatization.

Chart 3 - Labor Productivity



This increase in labor productivity is due to improvements in two areas. On the one hand, substantial labor reductions had to be made. As mentioned earlier, at its peak SOMISA had nearly 13,000 employees, which by the time of privatization had been cut nearly in half. Further labor cuts were made, however, following the takeover as well, contributing to the dramatic increase in productivity. With the combined work forces of SOMISA, Propulsora, and the other smaller Techint flat steel entities, Siderar started out

with a head count of 7523. By September 1996 this number had been reduced by another 1600, resulting in a work force of just over 5900 employees.

The other area which has contributed to the improvement in performance relates to the capital infrastructure of the firm. At the time of takeover, the Techint management devised a comprehensive investment plan totaling $438 million over five years. As Table 9 shows, the majority of this sum was targeted for the SOMISA General Savio facility, in large part to rebuild the blast furnaces, with a much smaller amount targeted for previously-owned Techint plants. This investment plan extends from the privatization to fiscal year 1997/98. However, by the end of 1995/96, 90 percent of the investment plan had already been completed.

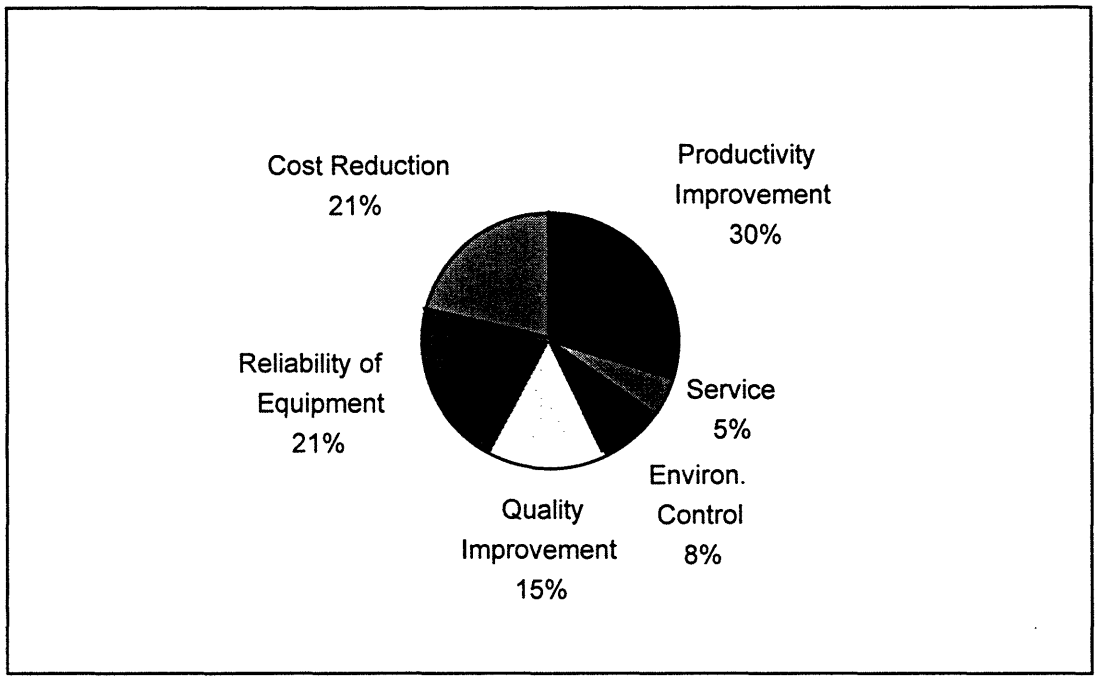
Table 9 - Siderar Investment Plan (US$ million)

PLANT	INVESTMENT
General Savio	369
- Raw material/ Sinter	2
- Coke plant	41
- Blast furnaces	141
- LD converter	41
- Hot-rolling mill	46
- Cold-rolling mill	30
- Environmental control	18
- Other	50
Ensenada	18
Florencio Varela	34
Haedo	17
TOTAL	**438**

Much of the investment has been devoted to rebuilding the blast furnaces, for at the time of the takeover SOMISA was operating two antiquated blast furnaces, one from the original facility and a second which was built in the 1970s. It was decided to rebuild completely the older blast furnace. To do so, however, they first undertook basic repairs and ran the two furnaces full time to build up stock. Then in December 1994, the older

oven was shut down and rebuilt completely, eventually reopening in August 1995, with not only modern equipment but also an increased capacity, which allowed them to then put the other oven in hot idle.

Chart 4 - Investment Plan Breakdown
(100 percent=$438 million)



Source: Siderar.

Aside from the above example, in most cases the machinery did not need to be scrapped. Rather, the policy was to adopt new "technologies," which they define as "changes in process design using existing equipment." This entailed wide-spread adoption of control and support systems to improve the operating performance of the existing machines. Furthermore, management's effort to apply the latest technology to its existing equipment has benefited from a series of relationships with foreign firms, universities, and experts. Several of these were carried over from Propulsora, though the majority of them are recently established. In some instances these relationships consist of

formal technological assistance as in the case of Hoogovens, while in the case of others such as that of USIMINAS in addition to providing technological assistance, the relationship consists of line personnel from Siderar visiting the USIMINAS facilities to learn various work practices. Lastly, still other relationships are of a research nature such as that with Carnegie Mellon in the area of clean steel.

Table 10 - Siderar Technology Partners

PARTNER	**TECHNOLOGY**
Hoogovens (Holland)	Blast furnace, Hot strip mill
Nippon Steel (Japan)	Tinplate
Carnegie Mellon University (USA)	Clean steel
USIMINAS (Brazil)	All production lines, safety
Hatch (USA)	Lamination
Clecin (France)	Cold-rolling
Mannesmann (Germany)	Continuous casting
CSN (Brazil)	Blast furnace
Dr. Manfred Wolf (Germany)	Blast furnace

In addition to the assistance which Siderar receives from foreign firms, it now also has access to significant in-house research capabilities through its affiliation with Techint. On the one hand it has been able to draw upon the expertise of Siderca both through consulting arrangements and more importantly through the permanent transfer of personnel, particularly during the privatization process. On the other hand, the Techint organization has a centralized research center, Centro de Investigación Industrial (CINI), which will research specific technical and scientific questions for the companies in the

Group. CINI itself also possesses relationships with local and foreign universities which it utilizes when it lacks the specific knowledge in-house. Through this various mix of technology sources, Siderar has become much more tapped into the latest technologies and is much more efficient at using its existing equipment than it was pre-privatization.

In addition to the increases in labor productivity, these changes have had substantial impacts on efficiency and quality. Scrap levels have been reduced in half as evident from Table 11. Furthermore, in addition to the ISO9002 approval discussed earlier, the firm has received several illustrious quality awards, including the Technology Innovation Prize awarded by the United Nations Industrial Development Organization (UNIDO).

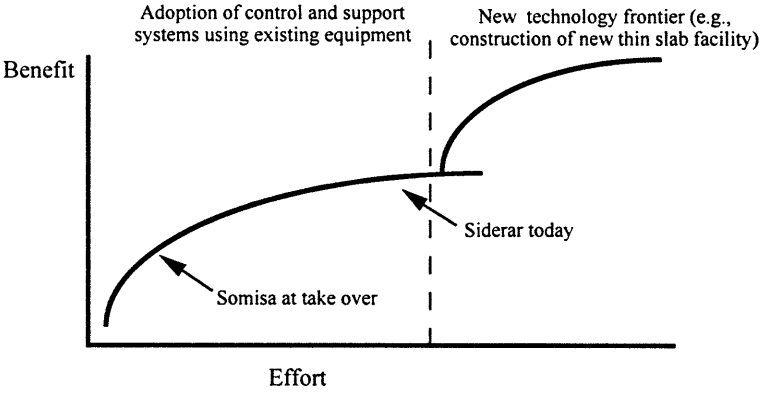
Table 11 - Kilograms of Input per Ton Produced

YEAR	KG OF SCRAP/TON STEEL
Mar/ Nov 1992	1082
FY 1993	1069
FY 1994	1048
FY 1995	1043
FY 1996	1041
FY 1997	1038

With the completion of the current investment plan, however, management believes that it would have reached the highest level of performance feasible with the existing plant structure. Further increases in investment would not earn their return. The next stage will be to undertake another major investment but in this case in constructing a new facility to balance the production capacity of the various parts of the plant. Whereas the majority of the capital investments to date have focused on the upstream production process, the next series of investments will focus much more on the downstream process,

in particular the continuous casting process. Currently the firm has excess capacity at the blast furnace and finishing stages. The number one blast furnace as was mentioned is currently in hot idle. Where the bottleneck exists is in the casting of the steel. The current proposal is to build a thin slab facility which would cost on the order of $400 million (above and beyond annual maintenance and other investments of $100 million) but would balance out the capacities of the various parts of the plant. Currently Siderar still has to import a certain quantity of hot slabs to satisfy the steel shop demands. These imports, however, increase the final product cost by roughly $100 per ton, or 25 percent, making it uncompetitive in the export market.

Figure 3 - Operations Strategy



By restarting the number one blast furnace and building a thin slab facility, Siderar would increase its capacity from roughly 2 million tons to 3.5 million, with a required increase in labor of less than 10 percent, or roughly 500 personnel. The result of such an investment would be a reduction in the average MH/ton from its current level of 4.8 to roughly 3.0-3.5, which would put it on par with the US, Japan, and Europe, and well ahead of the Brazilians. Furthermore, given the fact that labor in Argentina is less

than half the cost of labor in the Triad, the absolute labor costs per ton would be substantially less.

This investment is being made with the assumption that the firm will not change its geographical distribution of sales, but rather that domestic demand will continue to grow until it reaches a per capita level consistent with other economies of similar development levels. The new facilities, themselves are not scheduled to go on line until 2000 or later.

As mentioned earlier, a critical component of the improvement in productivity of Siderar relates to the adoption of support systems throughout the production process. In reality, the upgrading of systems has occurred in all parts of the firm, not just the production process. At the time of the takeover, SOMISA had only very basic production information systems which were very old, and there existed extreme deficits in maintenance, accounting, current accounts, billing, and personnel systems. Furthermore, there were virtually no personal computers anywhere to be found in the firm. To address these issues, management devised a three staged plan.

The first phase, which began in December 1992, had the objectives of putting in place those systems which were non-existent and improving those which were. This first entailed rationalizing and standardizing product codes and technical specifications as well as improving the flow of products across the various plants. Most of the new systems put in place came from Propulsora (maintenance, accounting, billing, cost). However, some were also imported from Siderca. The only new system which was purchased from outside the Group was the personnel and wages system.

The second phase of the plan which began in June 1993 and lasted until December 1994 had the primary goal of integrating and simplifying the systems put in place, and improving the administrative productivity of the firm. Among the systems which needed to be unified across the various Siderar plants were sales, accounts payable, pricing,

procurement, and billing. Fusing these systems entailed not only providing the necessary infrastructure, but also modifying existing systems entailed not only providing the necessary infrastructure, but also modifying existing systems when necessary. During this phase, 800 personal computers were also purchased from IBM, Compaq, and Olivetti. Aside from being used to operate the control systems, their primary purpose has been to increase administrative productivity by improving the communication flow within the firm., including the widespread adoption of e-mail. For, even though SOMISA possessed its own host mainframe, it possessed virtually no terminals by which employees could take advantage of it. The installation of this network of computers was accompanied by intensive training programs in how to operate them, for the prior skill base of the firm in this area was as poor as its physical infrastructure.

The accomplishments of the first two phases would most likely not put Siderar at world class levels in terms of information systems. They simply brought the firm up to acceptable standards. It will only be with the further investments planned for the third phase that Siderar will reach a level of information integration closer to that of the leading steel firms in the world. The objective of this phase is to revise and re-engineer the basic processes of the firm. A cornerstone of this phase is the adoption of SAP, a German client server package, to integrate the various systems. It has already been implemented in the area of procurement, integrating all the stages from the solicitation of an order to delivery to dispachment of payment. From start to finish, it took roughly one year to put this system in place. Other areas which are targeted for SAP include client interfaces (client questions, orders, dispatching, billing, accounts, etc.). The eventual goal of this reengineering is to reduce costs and personnel[4], as well as eventually electronically integrate with clients and related firms.

[4] The systems department itself has already been reduced from 130 people to 90, and the eventual plan is to move the entire systems functions to a new Techint firm which still operate systems for all the firms in the Group.

Most recently, in an effort to gain economies of scale and increase efficiency, the IT functions of both Siderar and Siderca have been merged into a separate Techint company. In this sense, the company is "insourcing," to use Daniel Novegil's words, the company's IT capabilities. The control of the new company will rotate between the head of Siderar and the head of Siderca every three years. While in many cases, as will be discussed, the company opted for increased levels of outsourcing, this is one in which both from an efficiency and a strategic point of view, insourcing appeared to be the most logical choice.

In addition to technological and systems improvements, the management of Siderar undertook a number of strategic operations decisions. Among the most fundamental has been the elimination of all non-flat products. All capacity previously devoted to long-products has been redirected towards flat production or sold off.[5] This switch is in line with a refocusing on the domestic market as most of the long production was destined for the export market. This narrowing of the product line is part of the firm's effort to focus solely on what it knows how to do well, producing flat steel. As will be discussed later, this policy has been extended to other parts of the production process by contracting out services which do not relate directly to the production of steel. Another major strategic decision was to move management from Buenos Aires to San Nicolás in an effort to reduce costs and improve control. Only the executive and sales offices remained in Buenos Aires.

As mentioned at the beginning of this section, the firm remains today relatively national in the physical location of its operations. However, once again it has been argued that the intangible nature of those operations is much more internationalized in the sense of being closer to world-class standards. Productivity figures reveal that the myriad of

[5] As a result of Siderar's withdrawal from the long products market, the domestic long products market is basically monopolized by Acindar.

measures adopted to improve the physical performance of the firm have had an impact. These improvements have also translated into dramatically improved financial performance, with net income reaching $60 million in 1994/95 and a positive operating cash flow of $100 million versus significantly negative figures for both measures pre-privatization. Despite these order of magnitude improvements, however, Siderar's cost structure will always keep it on the fringe of world-class cost standards. It is for this reason that so much emphasis has been placed on the development of services and other value-creating activities for the client. For, in a pure price war, particularly in foreign markets, Siderar will come up at the short end of the stick.

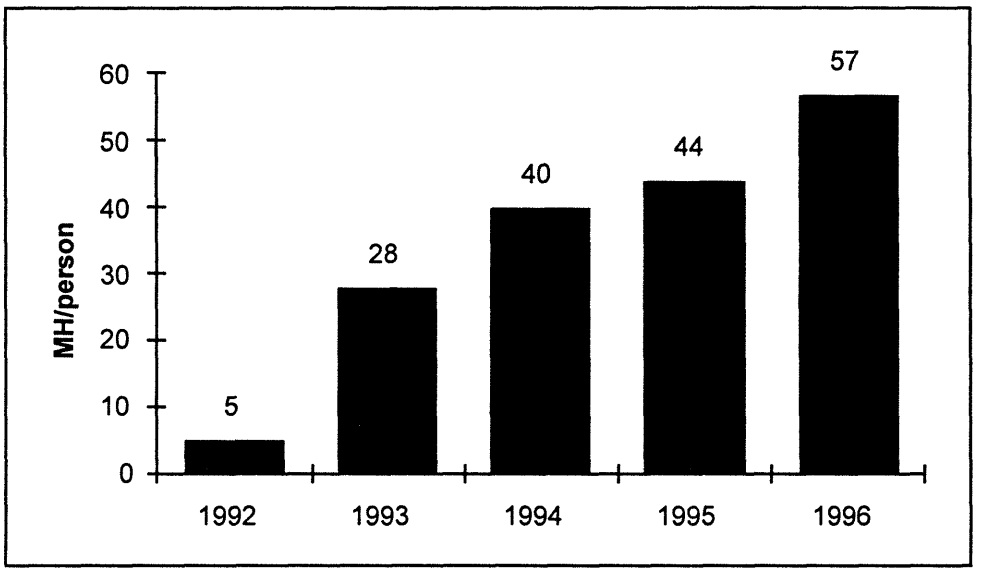
5.4 The Internationalization of Management

As was mentioned in the Introduction, probably the most critical form of internationalization relates to the management of the firm, not necessarily in terms of its physical location but rather in terms of its capabilities and outlook. In many ways, the success of all the other forms of internationalization is dependent upon it, for it is the managers who have actually undertaken the changes being discussed. In this respect, perhaps more impressive than the improvements in the performance of the physical capital of Siderar have been the changes in its human capital. Even though the management of Siderar is overwhelmingly local from a tangible point of view, it has become extremely internationalized from an intangible perspective. This improvement has focused on two areas in particular, human resource management and the organizational design of the firm.

Among the most important assets which Techint brought to the SOMISA privatization was its management expertise, particular through Propulsora. The Group as a whole is widely considered to possess the best managers in Argentina. It was also one of the few which possessed a supply of highly-trained managers large enough to staff the

various positions within the new enterprise. The root of Group's success lies in large part in the importance it places on human resource development and training, areas which were all but ignored under SOMISA management. This emphasis on developing employees is a belief which spans all levels. It is not something restricted only to top managers. Rather, employees at all levels are provided with training. Chart 5 shows the growth in average hours of training per person per year from a low of 5 hours at the time of the privatization to 57 in 1996, or 3 percent of the average worker's total hours.

Chart 5 - Hours of Training per Person (SOMISA/Siderar)



For the purposes of training and development, the firm divides its work force into three groups: operators, supervisors, and upper management. The first of these receive technical training both in Argentina and abroad. Through an accord with USIMINAS, roughly 100 operators and supervisors travel to Brazil each year to visit and work with USIMINAS employees. In total 366 workers had participated in this program from December 1992 to 1996. While part of the objective of these visits is to take advantage of

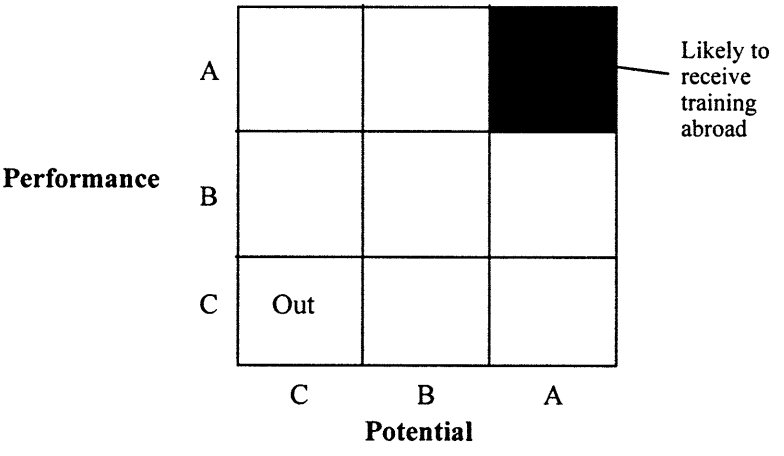
USIMINAS's expertise in hot and cold-rolling processes, the head of Human Resources claimed that exposing the workers to the USIMINAS culture, which has been greatly influenced by the Japanese, is just as important. The hope is that through osmosis, the workers will develop the level of commitment exhibited by the USIMINAS work force. As such, it is as much a culture changing program as it is a technology transfer mechanism. Aside from the program with USIMINAS, Siderar also brings professors to San Nicolás from the Industrial Engineering School in Spain to conduct specific courses for employees as well as customers and suppliers. When appropriate, functionaries at this level have also been provided with computer training as mentioned in the last section.

For the supervisors, training has been less technical and more managerial. The first thing done when the privatization occurred was to make sure that everyone with the title of supervisor or above had a clear picture of how their position fit into the overall working of the company, for previously one of the problems was that each functionary did his/her job in isolation, without concern for how the system as a whole functioned. The training of these managers has continued in the form of further management training in house and visits to foreign plants.

The group which has the highest training component, however, is that comprised of professionals. These employees receive training organized both by Siderar itself and by Techint. These managers are continuously evaluated not only for the purposes of compensation but also to determine which ones to invest in training further. They are evaluated both in terms of current performance and future potential, with those with the highest marks in both categories being the ones which will most likely be trained abroad (Figure 4). For professionals there are five organized programs, which as of 1996 included 879 participants. The two largest ones are part of what is called the Young

Professionals Program.[6] During the first year of this program these managers receive intense management training, which is followed up by supplemental training during the following four years. Last year there were 465 participants in the Young Professionals Program. Other programs include an internship type program for university students (Practicas Rentadas) and a Senior Management program to improve aspects such as language training. The instructors for each of these training programs include both local and foreign academics as well as internal Techint personnel.

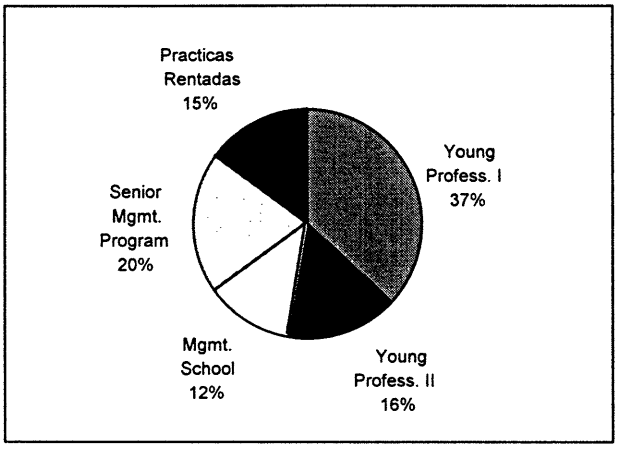
Figure 4 - Personnel Evaluation Approach



In recognition of its human resource efforts, Siderar was recently awarded the Carlos Pellegrini Prize by the Argentine Union of Industrialists, given to the firm which has excelled the most in developing and investing in its people.

[6] Young Professional I covers the first year of the program while Young Professionals II covers the following four years.

Chart 6 - Professional Training Since Privatization (100 percent = 879 participants)



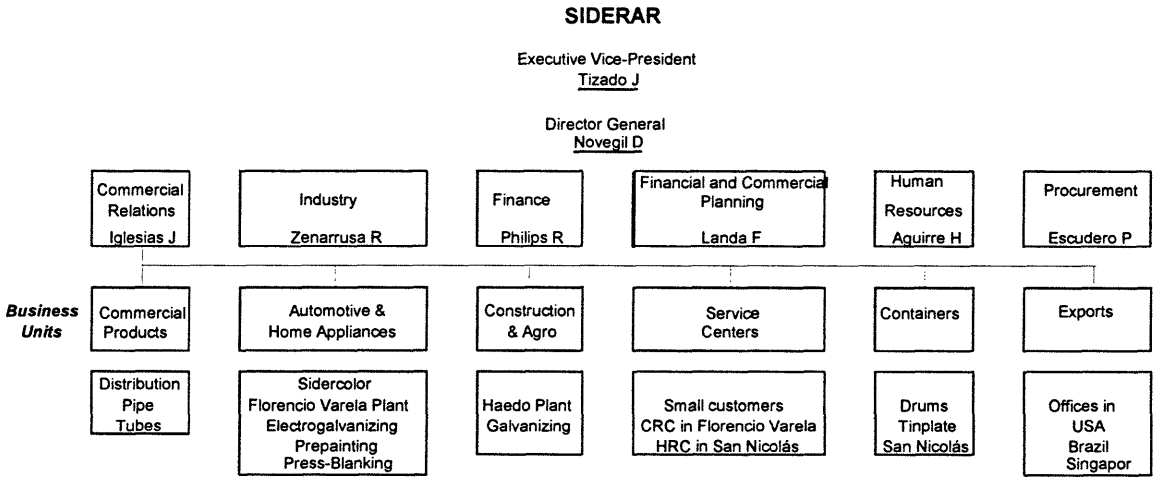
The second area of management which has undergone extensive revisions since the privatization is the actual organization of the firm. The major change in this area has been the establishment of business units as defined by consumer groups. Previously, SOMISA had been organized along functional lines, with all production facilities reporting to the industrial manager. Today, the firm has adopted the organizational design in place in Propulsora which is based on the consumer, reflective of the difference in mentality of the two firms. Currently, Siderar has five business units, each focused on different industry segments, as well as a separate unit dedicated to export sales. The divisions include Automotive and Home Appliances, Construction and Agriculture, Tinplate, Commercial Products, and Service Centers. The last of these sells to the hundreds of smaller customers from a host of industries. In most cases, each business unit is responsible for not only sales but also for one of the firm's various finishing facilities. The main San Nicolás plant, however, remains under the direction of the industrial director. As such, the firm is operated in somewhat of a matrix form. Reorganizing Siderar along these lines has helped the firm to move away from the SOMISA mentality

in which production drove sales rather than vice versa, and has allowed the firm to be more focused on serving customer needs.

In addition to the broad-based organizational redesign described above, Siderar has also initiated a reorganization of its white-collar work force so as to improve efficiency. Following a diagnosis by McKinsey and Company, three conclusions were arrive at: 1) a need to reduce the total number of white collar employees; 2) a need to reduce the number of layers; and 3) a need to increase the span of control. Following the diagnosis, Siderar's General Manager selected a team of six key top managers to work full time on implementing the strategy. The result was a reduction in white collar personnel by more than 400; a delayering of the firm from a maximum of seven to four levels; and an increase the span of control ratio from 1:2.9 to 1:4.9. These changes hold the potential to save the firm on the order of $15 million per year.

All of these managerial and organizational changes described above are intended to raise the competitiveness of the firm and bring its management closer to world-class standards, regardless of the fact that it is all located in Argentina.

Chart 7 – Siderar Organization Chart (1997)



5.5 The Internationalization of Procurement

The area of procurement is in fact one in which the firm has reached a higher level of internationalization not only intangibly but also tangibly since privatization. Granted, this is not an industry which requires a wide variety of inputs. Most procurement relates to raw materials, services, or spare parts for machinery. In all three of these areas, however, Siderar has become as international on a tangible basis as is possible in the industry.

With regards to raw materials, the primary inputs are iron ore and coal. The bulk of the iron which Siderar purchases comes from Brazil's top supplier, CVRD, which was also a supplier to SOMISA due to Argentina's lack of iron ore deposits. The firm also currently has a host of secondary suppliers of iron which it maintains relationships with in the case of any delivery problems with CVRD. In terms of coal, virtually all of it is purchased from Australian suppliers. Prior to the privatization, much of it was also imported. However, as a result of the "Buy Argentine Decree" which subjugated state firms to purchase from domestic suppliers when available, SOMISA was forced to buy whatever coking coal was for sale in the country, which unfortunately was of very poor quality, which in turn affected the quality of the steel produced. With the repeal of the Buy Argentine Decree, Siderar has been able to import all of its coal.

While the firm's raw materials did become more tangibly internationalized, the real improvements have come on the intangible front. The firm has adopted the policy of purchasing the highest quality inputs possible. The result of this policy has been an increase in tangible internationalization, but it was the intangible process which spurred the tangible process. Aside from the quality of the product itself, efforts have been made to improve the prices paid by the firm for those inputs. SOMISA previously paid relatively high prices to its suppliers, for several reasons, not the least of which was corruption. In addition, however, SOMISA was not considered reliable when it came to

payment resulting in higher prices when suppliers did agree to sell. Furthermore, SOMISA existed in an era in which the labor unions had a strong influence on the firm's decisions, in this case in determining which suppliers to choose, which were often not the economically rational choices. By addressing all three of these issues, current management has been able to reduce average input prices substantially. The firm has also improved its internal purchasing operations by centralizing the purchasing functions in San Nicolás, which previously were split between Buenos Aires (main raw materials) and San Nicolás (smaller orders and parts). Aside from better pricing, the firm has attempted to improve the quality of its relationships with suppliers by moving towards longer term contracts. The current contract with CVRD, for instance, extends through 2005. Previously, SOMISA was obliged to have public bids for all contracts and would change suppliers for a few pennies.

The area of services, which by definition is highly national in terms of physical location, has also been greatly impacted. In accordance with management's objective of focusing on its core competence in steel production, Siderar has proceeded to "privatize," to use their words, many services which the firm previously supplied in-house. The three primary services which went on the "privatization" block were the oxygen plant, the thermoelectric plant, and the port, each of which were given international tenders. In selecting the firms which would receive the supply contracts, Siderar would simply state the price it would want to pay for the service, knowing what investments would be required to have the facility operate at that level. In the case of the oxygen plant, the decision came down to two French firms Air Liquide and Praxair, with the former eventually winning the contract. It has been publicized that Air Liquide is scheduled to invest $20 million in refurbishing the plant. With regards to the thermoelectric facility, the final two candidates were once again foreign firms, the European firm Tractabelle and Houston Industries of the US, which eventually won the concession. Houston Industries,

which has committed to investing $80 million in the existing plant, will provide Siderar with all of its electricity and vapor needs. It will also then sell whatever excess energy it produces to the local grid, with Siderar receiving a royalty. The last of the major concessions, the port, has been given to a joint venture between Portia and Clark Chapman. Portia operates the Mersey Docks in Liverpool, while Clark Chapman is the part of the Rolls Royce group which manages port facilities. They beat out two other foreign firms (PNO and Sarros). Once again the initial investment is expected to be roughly $30 million. Furthermore, there are plans to utilize the excess capacity of the port (which is connected via rail to areas such as Mendoza) to ship non-related products. Such operations would bring Siderar an extra $10 million in annual revenue.

In all of these cases, one sees that the firms chosen to run the concessions are world class companies and that each concession entails a substantial investment on the part of the service provider. In addition to the major services described above, the firm has also extended its policy of focusing on steel to other areas of the plant by sub-contracting out a variety of more minor services which were previously undertaken by SOMISA. These services include domestic transportation, handling of scrap, packaging, food services, and daily and heavy-duty cleaning of the plant. In most cases the concessions were given to Argentine firms though not always.

The last area which falls under the area of procurement relates to the purchasing of spare parts. Under SOMISA management, when a part broke, local metalworkers from San Nicolás were used to make the repairs or build a replacement part. This practice has since been done away with. As a rule, only OEM parts and/or personnel are used, so as to guarantee the quality and reliability of the repair. As such, much progress has been made towards internationalizing the procurement process at Siderar, partly through foreign purchases but also through affiliations with world-class firms providing services locally.

5.6 The Internationalization of Competition

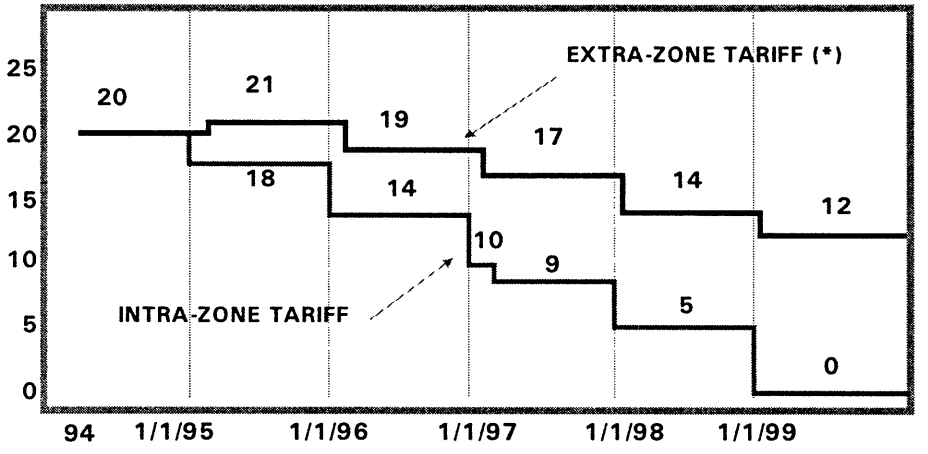
In the area of competition, it may appear that since SOMISA was selling most of its products in foreign markets that it was facing higher levels of international competition. However, in reality SOMISA was selling in what resembles a commodity market, in which one could be guaranteed a sale as long as the price was low enough. Given that the firm had a relatively loose budget constraint, it was able to meet this requirement, though losing millions of dollars in the process. In this situation the firm does not benefit from the efficiency pressures imposed by higher levels of international competition because one is able to sustain continued losses in the short run. Without a strict budget constraint the incentives for responding to stiffer competition are relatively weak.

The tangible internationalization of competition can be interpreted as having increased in the sense that today tariff and non-tariff barriers in Argentina are substantially lower than they were in the past. Therefore, even though imports have dropped dramatically, this has occurred despite increases in foreign competitive pressures, indicating that the improvements in the domestic supply have been that much greater given the changes in the institutional environment.

Furthermore, given that the primary threat via imports are the Brazilian firms and the scheduled further reductions of tariffs for Mercosur members, the threat of foreign competition in the Argentine market will only increase in the future. Chart 8 shows the time table for the scheduled elimination of tariffs between Mercosur members. As can be seen, by the year 1999, tariffs on steel will be eliminated all together. Already, Brazil's share of steel imports into Argentina has increased to account for over 90 percent of total steel imports. Among the leading competitors by sector are CSN (construction/ automotive), USIMINAS (automotive/ appliances), and COSIPA (commercial), all of which benefit from a series of subsidies, including one on iron ore prices at home. This

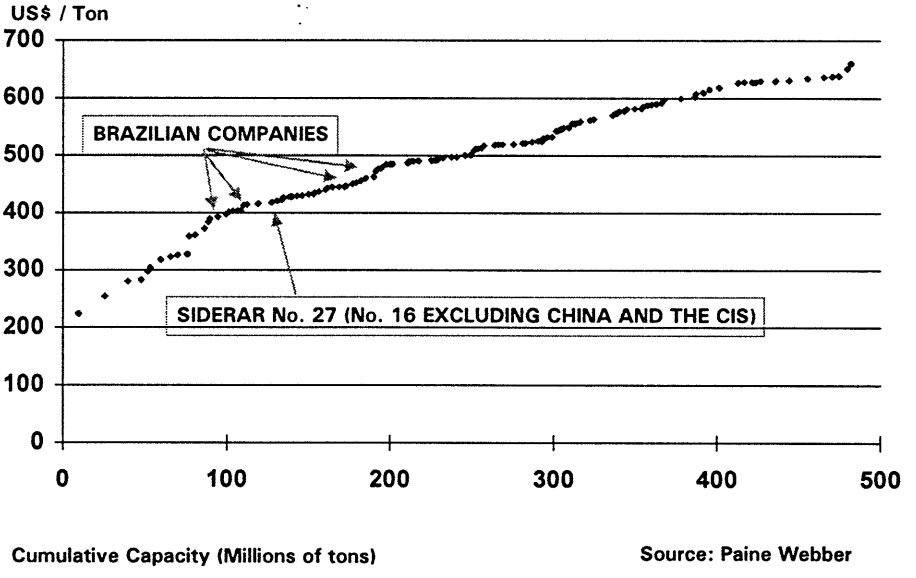
subsidy, though, should end with the privatization of CVRD, the main iron ore producer in Brazil, in 1997.

Chart 8 – Mercosur Tariff Evolution: Hot and Cold Rolled Coils



(*) Currently 3% must be added to the extra-zone tariff in concept of statistic rate.

Chart 9 – Siderar's Position on World Cost Curve (1994): Cold Rolled Coils Pretax Cost



With regards to foreign markets, even though Siderar has a smaller presence than SOMISA did previously, the competition which they do confront is more sophisticated. This is due in part to the increase in the quality of the steel they sell, in which case the firms they compete against will be more world class than those which produce lower quality steel. Furthermore, the firm is now exporting not only better quality products but also ones with higher value added, thus putting them again in competition with more sophisticated firms. Lastly, by selling directly to end users as opposed to through traders they go head to head with the competition on each transaction.

In response to this increase in competitive pressures from abroad, management has undertaken a comprehensive benchmarking program, something which was non-existent in the days of SOMISA. Several methods and metrics of benchmarking are used. On the one hand, the firm has participated in unit cost studies undertaken by the Paine Webber. As can be seen from Chart 9, the firm compares rather favorably post privatization, ranking in the top 11 percent of steel plants in the world.

In addition to these more macro benchmarks, Siderar itself performs detailed product benchmarking. In doing so, management selects specific Siderar products and then benchmark them on a variety of issues against competitor products. In choosing the firms against which to benchmark, the criteria is to take the best in the world. Among the firms against which they conduct their benchmarking are Nucor (US), Nippon Steel (Japan), Hoogovens (Holland), USIMINAS (Brazil), and ILVA (Italy). The issues on which they compare the products include a whole host of quantitative and qualitative aspects, such as chemical composition, weight, mechanical qualities, quality, etc. They obtain the information they need for making these benchmarks through a variety of sources, including talking to and visiting competitors such as USIMINAS. When this is

not feasible, they will buy the competitor product or else talk to other specialists in the field.[7]

Therefore, even though there are no other local competitors in Argentina, Siderar does face in fact significant competitive pressures from abroad, pressures which are greater today than under SOMISA ownership. The tangible internationalization of competition in the sense of confronting foreign firms and the intangible internationalization or quality of that competition have both increased since privatization. However, as has been shown above, Siderar itself has become much more competitive and is better able to meet this heightened level of competition than SOMISA was able to confront its more limited competitive threats.

5.7 The Impact of Internationalization on Performance

As has been alluded to throughout the above discussion, the increase in intangible internationalization of Siderar through the various programs and efforts undertaken by the firm's management has resulted in a dramatic improvement in virtually all performance measures. Revenues and production have doubled, while productivity has increased by more than 100 percent. The result of these improvements has been a dramatic turnaround in annual financial performance, and with it a rapid increase in the equity of the firm, from roughly $300 million in 1993 to $1.2 billion in 1997. Even if one were to remove the physical investments into the business since the takeover, the increase in the value of the firm as measured by its stock price is still on the order of $500 million, a testament to the importance which management has played in this turnaround. By most measures, the firm compares rather favorably with world leaders. Its ROA and ROS are similar to those

[7] Samples of specific benchmarking comparisons were provided to the author, but for reasons of confidentiality, the author decided it would not be appropriate to include such an example.

of US Steel and well above those of Nippon Steel, even though its output is below that of both.

Table 12 - Siderar Performance Indicators

	Take Over	Present
Revenues (US$ million)	552.6 (FY '93)	938.7 (FY '96)
Share of Domestic Market	56% ('92)	79% ('96)
Labor Productivity (MH/ton)	12 (Nov '92)	4.8 (Sept. '96)
Production ('000 tons/year)	934 (FY '93)	1718 (FY '96)
Equity (US$ million)	300 (June '93)	1223 (Feb. '97)
Net Income (US$ million)	-9.7 (FY '93)	61.0 (FY '96)

6.0 The Internationalization Of Siderca

The internationalization of Siderca both parallels and stands in contrast to that of its sister firm Siderar. As will be discussed, if one were to apply traditional definitions to these two firms, their internationalization paths would appear to run in exactly the opposite directions. While Siderar has moved to reduce its presence in international markets, Siderca has adopted just the opposite strategy. Whereas Siderar went from exports representing 70 percent of sales to roughly 30 percent, Siderca has aggressively grown exports to account for more than 80 percent of production, not to mention its foreign investments.

The internationalization of these two firms, however, is much more similar if one incorporates the intangible aspects of the process into the definition. While the two differ on tangible levels of internationalization, they are both highly internationalized in terms

of competing at world-class standards, pointing to the fact that these two aspects need not go hand in hand. This difference between Siderar and Siderca can be best understood by analyzing it from the point of view of firm versus industry effects. Whereas the intangible internationalization of the two is in large part due to the management philosophy and practices which they both share through their affiliation with Techint, the contrast in tangible internationalization can be best explained by differences in industry characteristics which make one market global and the other much more multi-domestic in nature, to use Porter's terminology. The two key aspects which distinguish these two industries from each other relate to the ratio of minimum efficient scale to total world demand and the level of technology utilized.

The two industries have relatively similar minimum efficient plant scales of roughly 1,000,000 tons. However, the level of overall market demand differs by orders of magnitude. Whereas world flat steel demand is well over 400 million tons, that for seamless tubes is less than 20 million tons, resulting in a relative minimum efficient scale 20 times greater in the seamless tubes sector than in the flat steel sector. The implication of this difference in market size is that it is relatively rare for a firm to be able to sell its full capacity completely in its local market. In order to produce at a minimum efficient scale, it must export. By contrast, most flat steel makers could do without exporting and simply serve their domestic market. A second implication which follows is that the tubes sector will be much more highly concentrated than the flat steel sector, as the industry has room for at most twenty or so facilities operating at minimum efficient scale. Therefore, even though Siderca and its affiliated firms produce the same amount of steel as Siderar, the former has a global market share of roughly 21 percent while the latter's share falls well below 1 percent. In addition to having a small physically dispersed market, the seamless tubes sector is also a much more technologically sophisticated sector. In contrast to the flat sector, it is not one in which anyone could easily set up shop, thus

posting a barrier to massive entry. The advanced technology required in the sector also translates into higher levels of value-added per kilogram, reducing the relative importance of transportation costs in the final price of the good.

As such, these two factors, minimum effective scale and the type of technology employed help to explain the basic difference in the level of tangible internationalization between Siderca and Siderar. What follows, the role of these factors will be elaborated on as they relate to specific aspects of the internationalization process. It will also be shown how this process of tangible internationalization at Siderca was accompanied by intangible internationalization as well.

6.1 Internationalization History

Dálmine SAFTA came into existence in 1954 as the first producer of seamless tubes in South America. With an initial capacity of only 40,000 tons, it served the domestic market exclusively. In 1962 it was merged with Siderca SAFTA, a steel shop created to feed the pipe mill, to form Dálmine Siderca. Eventually the firm was renamed simply Siderca. By the early 1970s, the firm had undergone a number of expansions resulting in a capacity of 250,000 tons. The start of the firm's expansion into foreign markets began in 1976, following the construction of a direct reduction facility, which allowed the firm to eliminate its dependence on SOMISA primary steel inputs. The next year capacity was once again raised to 300,000 tons. Exports in these early years were relatively small and conducted exclusively through the use of traders. By the end of the 1970s Siderca was exporting roughly 20 percent of its production.

It was not until the early 1980s that the firm consciously developed a strategy to increase its position in the industry by more aggressively attacking foreign markets. They did so at a time in the industry's history when plants were closing in the US, Japan, Belgium and the United Kingdom as a result of sharp declines in the price of oil in 1982

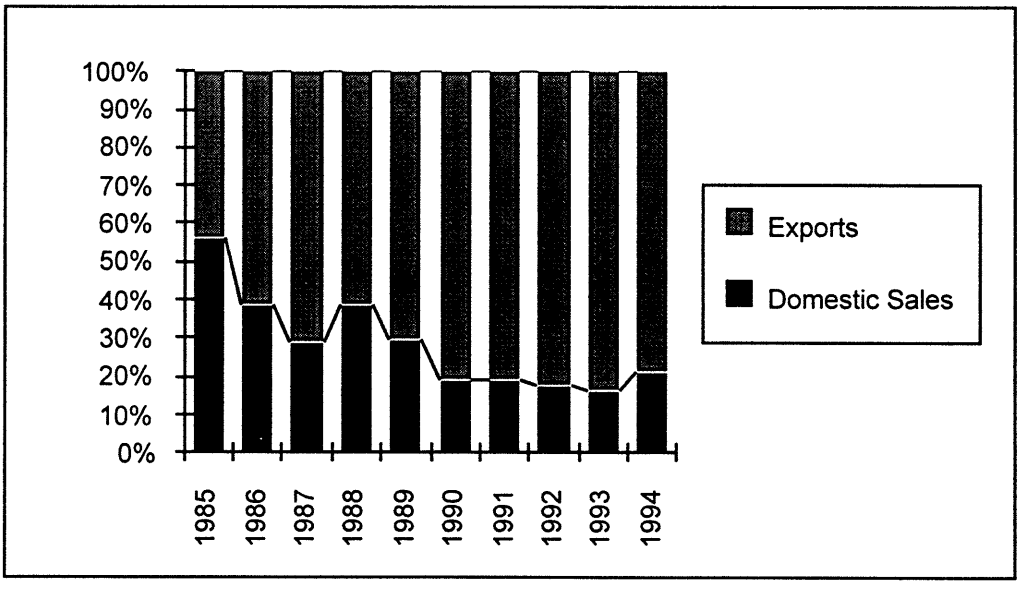
(the petroleum industry being the largest user of seamless pipe). Rather than retreating, however, the firm saw these market changes as an opportunity. They expanded their own international commercial network and then in 1988 completed construction of a second hot rolling mill which increased the firm's capacity to 650,000 tons. All the additional capacity was devoted to producing for the external market. The 1990s saw the firm continue its expansion abroad, but now via acquisition. In 1993, Siderca acquired a controlling interest in TAMSA of Mexico and most recently in December 1995 Dálmine of Italy. With the acquisition of TAMSA, Siderca became the largest exporter of seamless tubes in the world. The incorporation of Dálmine has since made them not only the largest exporter but also the largest producer in the world, with an annual capacity of roughly 2 million tons.

In contrast to Siderar, the change in the internationalization strategy of the firm took place over the course of two decades, in part due to the instability of the environment in which the firm operated. There was no punctual event as in the case of Siderar. By the time the government adopted its market liberalization program in 1989, Siderca was already one of the leading global players. It is true that for its first 25 years the firm took advantage of the benefits of a closed economy. They faced virtually no competition in the Argentine market. However, in contrast to most other firms which benefited during this era of isolation, Siderca reinvested the rents it accrued in the domestic market towards improving its position internationally. It stands as one of the rare examples in Latin America in support of the infant industry projectionist argument. The remainder of this section will attempt to highlight what factors contributed to this successful internationalization both in the tangible and intangible senses.

6.2 The Internationalization of Markets

As was mentioned previously, Siderca has been extremely successful at internationalizing its market scope. In tangible terms it has increased exports from 20 percent of sales in the late 1970s to 80 percent by the early 1990s[8]. In addition, it has inherited the international markets of TAMSA and Dálmine. The internationalization of the industry was lead by the Japanese players. However, Siderca was not far behind and has since surpassed the Japanese which have in fact retracted from the market. The firm currently sells its tubes in over 70 countries around the world. The only major market in which its presence is relatively small is the United States, which is dominated by local players.

Chart 10 - Siderca Sales Mix



The firm's tangible internationalization of sales has been accompanied by an intangible internationalization as well, particularly in the last decade. Prior to the firm's construction of its direct reduction facility and rebuilding of its mandrel mill in 1976, the

[8] Even though domestic sales account for only 20 percent of production, they account for a much larger share of revenue due to the sizable difference between domestic and international prices.

quality of the pipe being produced was relatively low. However, it satisfied local demand, much of which came from the state oil company YPF. Deciding to expand abroad, however, also required the raising of quality standards, for even the low end of the market had certain quality standards.

Starting in the early 1980s the firm also began to focus much more on the needs of their foreign customers by building their own commercial network. They first entered markets in which their traders did not sell such as China, and then gradually began to displace their traders with direct sales. By the mid-1980s the use of traders had been eliminated completely. While the goal of the firm is to be close to the customer, because of the firm's geographical disadvantage it has had to make considerable investments to do so. Today, Siderca (not including TAMSA nor Dálmine) has over 50 sales people in 11 international offices spread throughout the world. In addition, it maintains stock facilities in the United States, Venezuela, Mexico, Holland, Singapore, Australia, and Indonesia which carry critical spare parts for the petroleum industry as part of an effort to reduce delivery times. For, if a customer knows it will take several weeks to obtain a replacement pipe when one breaks they will more than likely choose an alternate supplier. With these facilities, they are normally able to deliver a replacement part within a couple of days. In Argentina the goal is to be able to do so within 24 hours. In this sense the firm's geography is a considerable handicap, particularly in markets such as the US in which local suppliers often have stock right next door to the petroleum facilities. The acquisitions of TAMSA and Dálmine have in part helped to overcome this disadvantage in Latin America and Europe, though it is still an issue in the US and Asia. In addition, the firm provides a number of other services to its customers. It will provide in the field service both before and after the sale, as well as assist in pipe string designs. Furthermore, it offers client assistance training when requested.

As part of the firm's attempt to cultivate relationships with its clients, it has tended to move towards longer term agreements and protocols, as in the case with Chinese government (and formerly the Soviet government). In some cases this has taken the form of minority participation in local finishing facilities in which Siderca provides the technical assistance needed to set up the facility. Though it is not the preference of the firm to enter into these ventures, as they would rather sell their finished product directly, they do participate in them so as to at least guarantee the sale of unfinished pipe to the concern. Currently, Siderca is involved in such ventures with the Malaysian and Venezuelan governments.

This effort to provide more value-added to the client, both in terms of higher quality products and better service, has been heightened in recent years as a result of the impact which the Convertibility Plan has had on the relative cost of labor in Argentina. Previously the firm had benefited from relatively cheap wages compared to the major players in the world. However, the exchange rate at which the peso was pegged suddenly eliminated this advantage. Furthermore, this occurred in 1991 at a time when the tube producers of the former Soviet Union began to enter the international markets with low quality products but at extremely cheap prices. These two factors combined to push Siderca towards serving the higher end of the market. Therefore, in the process of tangibly internationalizing its sales, Siderca has also been forced to raise the level of sophistication of its product/ service offerings.

6.3 The Internationalization of Operations

One of the factors which eventually forced Siderca to internationalize its market scope, the effective minimum efficient scale, restrained the initial internationalization of the firm's physical infrastructure. Until the acquisition of TAMSA and Dálmine, all of Siderca's production was based in its plant in Argentina. As mentioned, however, it did

begin to internationalize its sales offices in the early 1980s, and currently has a network of offices including Houston, Singapore, Dubai, Beijing, Dusseldorf, Caracas, Bogota, Jakarta, Stavanger, London, and Moscow. It also established a number of international stock facilities. However, in 1993 the firm's physical components were not that much more internationalized than those of Siderar today. In contrast to the case of Siderar, though, the market structure of the tube sector and Siderca's position within it made the idea of foreign expansion through acquisition attractive. The export nature of the tube sector increased the potential for synergistic relationships between the acquired firms and Siderca. As is discussed below, the 1990s has seen Siderca enter into a new stage of tangible internationalization.

6.3.1 The Impact of the TAMSA and Dálmine Acquisitions

The most recent stage of Siderca's internationalization process has entailed the acquisition of controlling interests in two other leading firms in the sector, TAMSA of Mexico in 1993 and Dálmine of Italy in 1995[9]. Both of these firms are ones which at one point or another were headed up by the founder of Siderca, Agostino Rocca, prior to immigrating to Argentina[10]. There were varied reasons for undertaking these acquisitions. In the case of TAMSA, five stand out as being most important. The first of these was to increase the basket of products which the firm produced, for even though the two both produce seamless tubes, TAMSA tends to specialize in casing which are of wider diameters and Siderca in pipe of narrower diameters. There is a range in which the two overlap, but together the two cover a much wider diameter span than either individually. The area of the spectrum in which they do overlap gave rise to another reason for the

[9] All three firms were are roughly similar in volume, with Siderca being the largest by a small margin.
[10] Agostino Rocca started his industrial career as an engineer in the Italian state steel firm, Dalmine, before eventually becoming head of the entire state steel sector. Following WWII, he moved to Mexico and helped found TAMSA prior to moving to Argentina.

acquisition, the improvement of delivery logistics. For those products which the two firms produce in common, customer orders could be filled from either facility depending on the geographical distance and the tariff treaties which the customer's country has with Argentina or Mexico. In the case of US sales for instance, tubes which formerly came from Siderca may now come from TAMSA so as to fall under the umbrella of NAFTA.

The acquisition of TAMSA would also allow Siderca to leverage its international sales network to a much greater extent. Together the two firms have 11 worldwide sales offices, each of which now sells both Siderca and TAMSA products. In addition to sales costs, it was thought that there were a number of areas in TAMSA in which costs could be reduced, procurement being one of the leading ones. In the end, productivity increased 30 percent in TAMSA following the take over without any further investments, simply as a result of reorganization and the adoption of new practices. The last factor pushing for the acquisition was the fact that the two facilities utilize the same technology in their operations, making a takeover that much easier.

The acquisition of Dálmine was undertaken for similar reasons to those of TAMSA, but two stand out as being the most important. The first is product complementarity. Whereas Siderca and TAMSA both are focused on products for the petroleum industry (OCTG tubing and line pipe), Dálmine's product portfolio is much more targeted towards industrial customers such as the automotive industry. Their specialization lies in mechanical and pressure tubes as well as cold drawn tubing (Chart 11). The acquisition of Dálmine is in line with Siderca's goal of diversifying its product and customer base so as to reduce the impact of the volatility of the petroleum market on the firm's sales. The second key objective to be accomplished through the Dálmine acquisition is to increase the firm's presence in Europe. As Chart 12 reveals, the geographic location of the firms' sales is very complementary. Not only would they be able to increase distribution in Europe, but the Siderca and TAMSA network in the rest

of the world could be used to grow sales of Dálmine products in regions where they are currently weak. Together the Siderca holdings have a production capacity of roughly 2 million tons, 1.2 million of which are exported outside of Argentina, Mexico, and Italy.

Chart 11 – Product Complimentarity

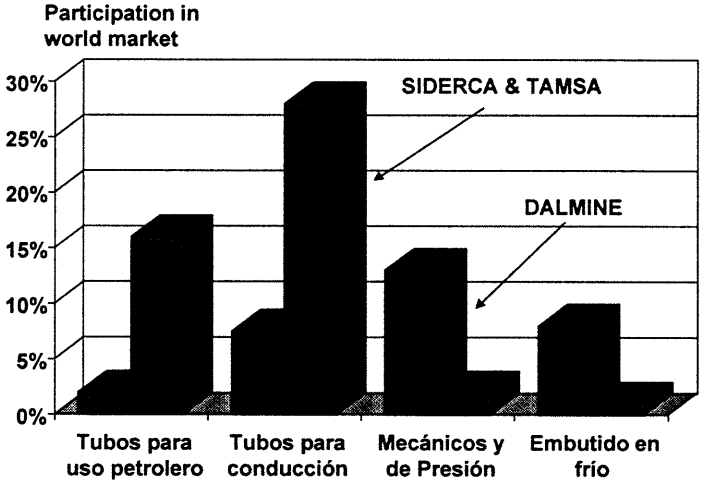
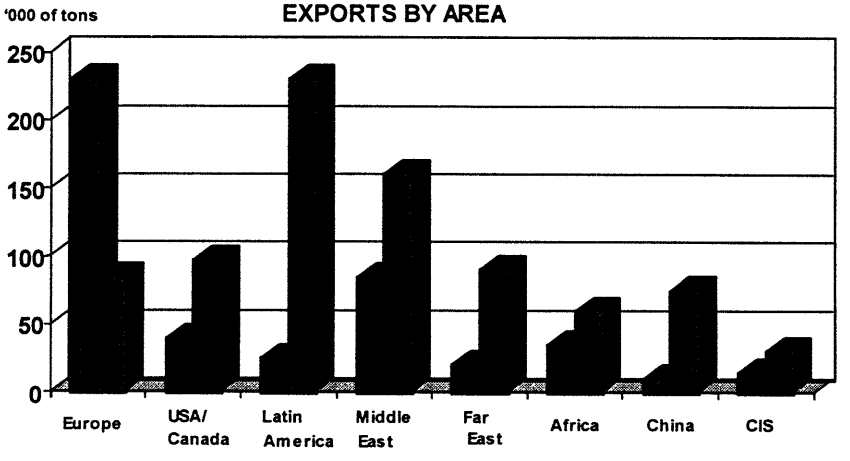


Chart 12 – Geographic Complimentarity



The tangible internationalization of Siderca has been greatly enhanced by the acquisitions of TAMSA and Dálmine. However, the intangible internationalization of its operations took place prior to these investments, and in some ways could be viewed as having been a prerequisite for them. The tangible internationalization of sales starting in the 1980s was accompanied by a significant upgrading of the Siderca facilities in Campana. During the second half of the 1980s, $650 million were invested to modernize the existing plant and construct a second laminator which would be dedicated solely to the export market. These investments gave Siderca the most modern facility of its type in the world (which it still is 1996). In 1993 the firm received ISO9001 certification for its entire operations process (design, manufacturing, and technical support services). In 1992 the firm also began a continuous improvement program which by 1994 included over 750 employees working in 120 teams. Most of the changes proposed through this program have not required major investments but have been fruitful in their return. Changing the logistics of the rolling process for instance resulted in a 10 percent capacity increase or roughly 70,000 tons.

The level of sophistication in the Siderca operations is attested to by the fact that following the TAMSA and Dálmine acquisitions, technical personnel from Siderca were sent to the other two companies to upgrade their operations. In the case of TAMSA this involved 40 key personnel while for Dálmine roughly 20 have been sent. Among the personnel transferred to the acquired firms were members of Siderca's information systems group, which as mentioned earlier was also very important in the transfer of technology to Siderar. The importance of IT systems in the firm is reflected in the four fold increase in e-mail users within the firm to nearly 1200 from 1990 to 1995. These physical improvements in the firm over the last 10 years have been accompanied by a substantial reduction in employment, from 5600 in 1985 to just under 4000 in 1994. The result of these investments in capital infrastructure along with a rationalization of workers

has resulted in substantial productivity improvements, from nearly 20 man hours per ton in 1993 to less than 16 in 1995.

Were it not for the intangible internationalization described above, it is doubtful whether Siderca would have been able to tangibly internationalize its operations, as much of the competitiveness of the firm lies in the sophistication and efficient use of its technology.

6.4 The Internationalization of Management

With the internationalization of operations has come a substantial internationalization of management, both tangibly and intangibly. The management of the firm has become geographically dispersed not only via the acquisition of the TAMSA and Dálmine management teams but also through the sending of Argentine nationals abroad. Siderca currently has over 100 Argentines posted in positions abroad, either in one of the acquired firms or in sales offices throughout the world. The president of Siderca himself, Paolo Rocca, spends one week in Italy and one week in Mexico for every two weeks spent in Argentina.

More important to the firm's success, however, than the physical location of its managers has been the quality of the management practices adopted. As in the case of Siderar, Siderca has been the beneficiary of the management philosophy of the Techint Group, which places a strong emphasis on training and human capital investment. The origins of the firm's current human resource policies can be traced back to 1983, when not only the firm but the entire Group underwent a substantial revamping of its human resource management. The timing of this change coincided with Siderca's increased expansion abroad, for it was discovered that in order to compete abroad they would need to increase the quality of their human resources. Much of the older work force near retirement age was replaced with a better educated (at least 12 years of schooling),

younger population. In addition, comprehensive training programs were integrated into the human resource department. Training packages for each position were developed. For technicians this consisted primarily of technical courses which would be followed by qualifying examinations needed to move to the next level. At the supervisor level, more emphasis has been placed on management training with the idea of changing the way they approach their position from one of a supervisory role to one of a facilitator. In total, the work force received over 105,000 man hours of training in 1994 via 1350 activities and courses, covering maintenance planning, the development of continuous improvement group, safety programs, quality and production programs, and courses offered by faculty of the School of Industrial Organization in Madrid. Though the average hours per worker is less than that of Siderar, the cumulated training is substantially more, as this these policies have been in place in Siderca for 10 years more than at Siderar. At the level of senior management, the training is very similar to that for Siderar, as coordination of these programs is handled for the most part by the Techint Human Resources Department. In Argentina roughly 30 managers per year are sent to post-graduate programs in industrial management and business administration. In addition 2-3 managers yearly are sent to full time programs in the Untied States or Europe. As with Siderar, language training has also received much greater attention in the last few years, with English and Italian courses being offered in the plant. The firm's management is currently in the process of establishing joint programs across in conjunction with Dálmine and TAMSA so as to share the expertise which each possesses.

In addition to placing an emphasis on training, in 1994/95 Siderca initiated a total quality management effort. Its approach was based on the European Model of Quality developed by IESE for the European Foundation for Quality Management (EFQM). Various firms were visited which had adopted TQM policies and a model was developed to focus the entire enterprise on the importance of results (economic and non-economic,

quantitative and qualitative), the satisfaction of the client, the satisfaction of personnel, and a positive impact on society. The first stage of the task force has been to undertake a self-diagnosis of the company, identifying points of strength and opportunities for improvement. The following list of priorities was arrived at as areas for improvement in the future:

1. Improved leadership which shares the values of the firm.
2. Improve communication channels within the firm.
3. Extend the Continuous Improvement groups and empower operating personnel.
4. Integrate sectoral and strategic plans.
5. Reorganize processes from a functional setup to one based on serving the client
6. Improve identification and meeting of client needs.
7. Refocus society aimed programs.

Lastly, Siderca is in the process of redefining the relationship between it and TAMSA and Dálmine. Whereas currently the firms are integrated at the level of sales and somewhat production, each maintains its own management structure. Future plans exist to integrate the workings of the firms to a much greater degree. As in the case of Siderar, the firm would be based around customer defined business units, in this case the petroleum sector, industrial sector, and engineering companies/ distribution sector. The first of these would be based out of Argentina, while the last two would be headquartered in Italy, implying a greater integration of the Mexican and Argentine operations.

All of these efforts to improve the quality of the firm's management and organization have been critical to Siderca's ability to expand abroad. In the process, the firm has also tangibly internationalized its management. Without the intangible changes, however, it is again unlikely that the tangible internationalization would have taken place.

6.5 The Internationalization of Procurement

As with flat steel, the pipe sector has relatively few inputs. Iron ore and coal comprise the main inputs, and as with Siderar they are imported from Brazil and Australia respectively. The only other foreign import are electrodes which are imported

from the US and Europe. In contrast to Siderar, the thermoelectric plant is still operated in house. However, the concession for the oxygen plant has been given to Air Liquide and a ten year contract has recently been signed with Praxair to build an additional facility on the land adjoining Siderca to directly provide them with the oxygen which they must currently truck in. In general, the level of internationalization, both tangible and intangible, is very similar between Siderar and Siderca. Only if one includes TAMSA and Dálmine could one say that the level of tangible internationalization is greater at Siderca.

6.6 The Internationalization of Competition

When Siderca decided to expand into foreign markets, it also proceeded to internationalize the competition it faced. In the local Argentine market, Siderca enjoyed a virtual monopoly. Tariffs of 50-70 percent along with the relatively small size of the local market and its geographical distance from other suppliers effectively discouraged foreign players from entering the market. When it decided to enter the international market it found itself confronting world-class players. It also entered foreign markets at a time when the world-wide industry was consolidating. Plants were closing in all parts of the world, and industry concentration was increasing. Therefore, while the number of competitors was dropping the strength of those which remained was that much greater. The high-end of the market was lead by the Japanese firms (NKK, Kawasaki, Nippon Steel, and Sumitomo) and Mannesmann of Germany. Other leading competitors included USX and Vallouree of France. As mentioned, more recently the former USSR plants have entered the market, but at the very low end. Prior to its acquisition, TAMSA also competed in the same market. Therefore, by choosing to go abroad and to compete in the high-end of the market, Siderca not only faced foreign competitors but also world-class foreign competitors. Today, Siderca has the most modern production facility in the world,

and through its acquisitions the largest overall world-market share of seamless steel pipe for the Oil and Gas Industry. It is also operating in an industry which is continuing to consolidate, not only through acquisition but also through the withdrawal of certain firms. Of the four leading Japanese firms, three (NKK, Kawasaki, and Nippon Steel) are retracting from the market and converting their tube capacity to serve other needs. The rigidities of their production systems which benefited them in high demand periods have become a source of weakness in a time of fluctuating market demand. The only Japanese player which is making aggressive moves in the market place is Sumitomo which is in the process of constructing a new facility which will be the most modern in the world. Therefore, Siderca along with a few other firms currently define world-class standards in the industry.

Given the high concentration in the industry, it is on the one hand much more difficult to conduct formal benchmarking with one's competitors, as firms are less willing to exchange information. On the other hand, at the level of the technologist, it is a much smaller community which facilitates the informal transfer of information across firm boundaries. However, the nature of this transfer is more qualitative based, making exact comparisons difficult. Siderca is, however, able to make detailed internal benchmarks with TAMSA and Dálmine.

In summary, it has been shown how the tangible internationalization of competition in this case also resulted in the an increase in the intangible level of the competition which Siderca faced. This is because the market in which it entered is global in nature, one in which once a player decides to go international, it must do so on a world-wide basis, and thus be confronted with the world's best.

7.0 Conclusions

What the above discussion has shown is that in both cases, Siderar and Siderca, one is able to distinguish between the tangible and intangible internationalization of these two firms on a variety of aspects. A detailed analysis of the progression of the internationalization process has been presented for each firm. Figure 5 summarizes these changes from what would be classified as a generally low level of internationalization (Stage 1) to a much more heightened level (Stage 2)[11]. What this figure reveals is that while in all cases the two firms moved monotonically along the horizontal axis towards higher levels of intangible internationalization, the same is not true of the vertical axis. In some cases movement was towards increased tangible internationalization, while in other cases there was no change, and in still others the trend was towards lower levels of tangible internationalization. This conclusion is reinforced by the summary of Siderar's internationalization process provided in Table 13, in which one observes that the firm has a high intangible while relatively low tangible level of internationalization.

By highlighting this distinction between tangible and intangible aspects, one gets at the heart of the interest associated with internationalization, which is the assumption that it will result in a higher degree of competitiveness and eventually improved returns. As the case of Siderar shows, however, narrow physically-based definitions can produce misleading interpretations. On the one hand, simply selling in foreign markets, does not necessarily mean that one is operating at international standards. Conversely, one can have a world-class operation which sells all of its production in the domestic market.

The contrast with Siderca showed how key industry characteristics can determine whether these two forms of internationalization need to go hand in hand. In the case of Siderca, the global nature of the seamless tube sector fostered a correlation between the

[11] In the case of Siderar, Stage 1 is the period pre-privatization and Stage 2 post-privatization. For Siderca, Stage 1 can be considered pre-1980 and Stage 2 post-1980.

two forms of internationalization, while the multi-domestic nature of the flat steel sector made it possible separate the two.

Table 13 - Internationalization Summary of Siderar

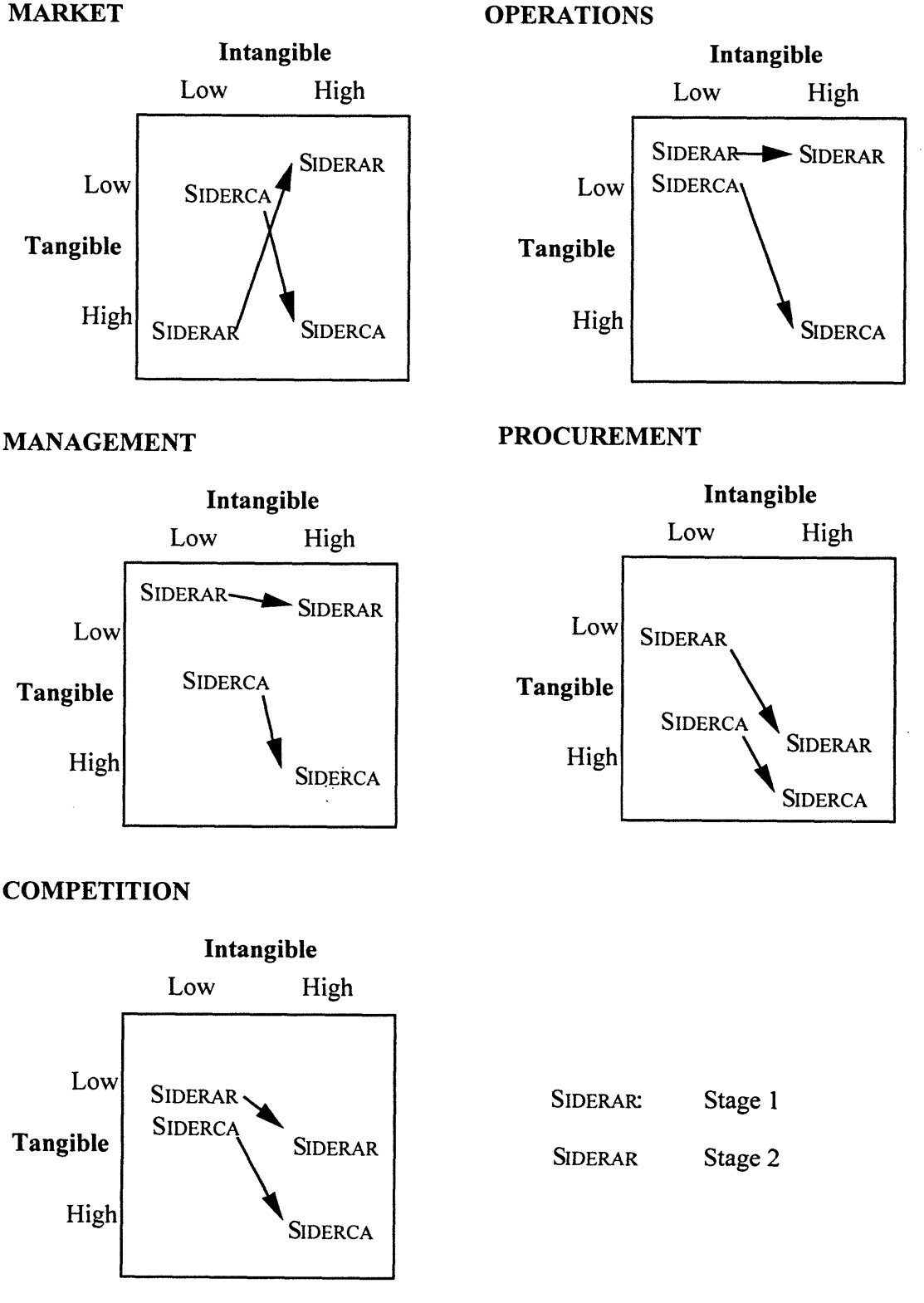
	Form of Internationalization	
	Tangible	**Intangible**
Market	• 25 percent of sales outside Argentina	• Alliances with MNEs in Argentina • Management training for domestic customers • Reduction of sales through traders
Operations	• All facilities in Argentina	• Adoption of leading technologies • Technology partnering • Heavy capital/ quality improvement investments
Management	• All management in Argentina	• Extensive training at all levels • Heavy organizational investments • Quality mentality adopted
Procurement	• Raw materials as well as machinery inputs imported	• Outsourcing of local non-core functions to international firms
Competition	• Competition from imports domestically and against leading firms in export market	• Competitive benchmarking of global industry leaders

It was also shown how in certain cases, one form of internationalization will encourage the other. With Siderar, for instance, the intangible internationalization of the procurement process resulted in a higher level of tangible internationalization, while with Siderca the tangible internationalization of sales encouraged the intangible internationalization of the firm. Therefore, there is no restriction as to which of the two forms is the leader and which is the follower.

Lastly, the case has shown the importance of analyzing multiple firm aspects in assessing the internationalization of the firm, for simply looking at downstream activities can be misleading. Upstream and support activities also have the potential to be internationalized and are the factors which are often at the root of the firm's competitiveness. In the current analysis five aspects were highlighted (market, operations, management, procurement, and competition). However, there are others firm aspects which deserve further attention, among these R&D abilities and firm ownership structure. How will the recent public offering of Siderar, for instance, foster the further internationalization of the firm?

Though the distinction between tangible and intangible internationalization was used here in the context of analyzing firm response to environmental changes, such an approach is more broadly applicable to static analyses of internationalization as well. The implication which follows from adopting such an approach is that certain firms which are currently labeled "local" may in fact be international. Likewise, some firms which are considered "international" according to standard definitions, may in fact be much more local in nature.

Figure 5 - Aspects of the Internationalization Process: Siderar vs. Siderca



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APPENDIX A

Case Study Protocol

I. Purpose Of Study:
- To understand the impact of an environmental shock on the level of internationalization of a firm, incorporating into the definition both tangible and intangible aspects of the process.

II. Research Design:
- Unit Of Analysis
  - Organizational Change
- General Characteristics:
  - Embedded (Multiple Units Of Analysis)
  - Single Case Design
- Selection Method:
  - Critical Case (Analytic Generalization, Not Sampling)
  - Specific Case Criteria (See Text)

-Mode Of Analysis:
  - Pattern Matching Using Nonequivalent Dependent Variables

III. Propositions
- Sources Of Data For Each
- Strategies For Each

IV. Organization Of Report:
- Mix Of Linear Analytic Structure And Theory Building Structure
  - Issue
  - Methodology
  - History
  - Findings
  - Conclusions

V. Procedures:
- Scheduling of Company Visits: (weeks of)
  - November 20, 1995
  - April 1, 1996
  - April 8, 1996
  - April 29, 1996
- Areas To Interview
  - Human Resources Management
  - Commercial Relations
  - Procurement
  - Market and Product Strategy
  - Operations Redesign
    - Production
    - Information Systems
  - Technology
  - Alliances/ Acquisitions
  - Benchmarking

APPENDIX B

Case Study Interviews

Name	Position	Location	Date
Daniel Novegil	Director General (Siderar)	Boston New York	June 15, 1995 Feb. 16, 1997
Jorge Donoso	Head of Investor Relations (Siderar)	Buenos Aires	Nov. 20, 1995
Angel Rossi	Head of Capital Markets and Management Control (Siderar)	Buenos Aires	Nov. 20, 1995
Oscar Montero	Procurement Manager (Siderar)	Boston	Jan. 22, 1996 Feb. 18, 1996
Pedro Escudero	Procurement Director (Siderar)	San Nicolás	April 1, 1996
Solano Perez Duhalde	Head of Information Systems (Techint)	San Nicolás	April 1, 1996
Hector Aguirre	Human Resource Director (Siderar)	San Nicolás	April 1, 1996
Mario Sverdlik	Manufacturing Manager (Siderar)	San Nicolás	April 2, 1996
Juan Carlos Mina	Materials and Services Manager (Instituto Argentino de Siderurgia)	San Nicolás	April 2, 1996
Jorge Iglesias	Commercial Director (Siderar)	Buenos Aires	April 8, 1996
Miguel Punte	Human Resource Director (Techint)	Buenos Aires	April 8, 1996
Lorena Loustau	Training Manager (Techint)	Buenos Aires	April 8, 1996
Marcelo Paladino	Director of Research (IAE)	Buenos Aires	April 9, 1996
Hernán Ortiz Molina	Researcher (FIEL)	Buenos Aires	April 9, 1996
Jorge Iommi	Engineering Manager (Siderca)	Campana	April 29, 1996

APPENDIX B (Continued)

Name	Position	Location	Date
Alberto Crotti	Human Resource Director (Siderca)	Campana	April 29, 1996
Ariel Stainoh	Commercial Planning Manager (Siderca)	Buenos Aires	April 30, 1996
Susana Danon	Director, Information Center (Techint)	Buenos Aires	May 2, 1996
Marcela Goldschmit	Researcher, FUDETEC (Techint)	Campana (phone interview)	May 2, 1996
Alejandro Iglesias	Export Sales Department (Siderar)	Buenos Aires	May 2, 1996
Hernan Pelfini	Sales Manager for Commercial Products (Siderar)	Buenos Aires	May 2, 1996
Fernando Landa	Head of Commercial and Financial Planning (Siderar)	Palo Alto	Oct. 12, 1996