A Study on International Joint Venture: Lessons from the Steel Industry Experience

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CONTENTS

Ⅰ. Introduction

Joint venturing in the world steel industry began in the years immediately following the Second World War, not in steel production but in the development of raw materials necessary to it. Iron ore, coking coal, limestone and other more exotic necessities of the steelmaking process were not in short supply but they not always available in convenient locations and desired qualities. All out war production had tended to exhaust many of the most convenient and most attractive supplies and sent older producers and new entrants to the industry scurrying to find new sources, first in Canada in the 1950s and later in Australia, Africa and Latin America and, only recently, into Asia.[1] some of those international joint ventures were between competing

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1) William T. Hogan, S.J., *Global Steel in the 1990s: Growth and Decline*, Lexington, Massachusetts:

steelfirms anxious to share the costs and the outputs, both of which tended to be beyond the capacities and needs of any one firm. But many were joint ventures between mining firms with both the expertise and the requirement of a guaranteed market and steel producers bringing to the marriage both the capital and the market.

Maturing of home markets during the 1960s accelerated the hunt for export markets during the 1970s in an atmosphere of rapidly rising energy and other costs. Primarily to integrate the raw materials-supplying and steel-producing functions with consequent transportation-cost savings, new international joint ventures were undertaken by the Americans and Europeans in Australia, by Japanese and Brazilian firms in Brazil, and between Austrians and South Africans in the latter country.

The political climate in the United States during those years was hostile toward any joint venture, foreign or domestic, which might be perceived as reducing competition. But combine or perish became the obvious alternatives for American steel firms during the 1980s, and anti-trust policy responded to that reality. Superior quality had been demonstrated abroad which struggling U.S. producers could not obtain the capital to duplicate. Meantime, emerging world producers bursting the boundaries of their domestic markets and hungry to tap the world's largest and most lucrative market were willing and anxious offer capital, technology and expertise.

Such international joint ventures are the focus of this paper which illustrates the magnitude of the international joint venture movement, assesses its motivations, relies upon the basic steel industry for illustrations of its strengths and weaknesses and draws lessons from that experience.

Lexington Books, 1991, pp. 205-207.

II. Defining the International Joint Venture

1. The Definition of Joint Venture

As we intend to focus on international shared equity joint ventures, we should first define in detail just what we mean by this categorization. A scholar 2) defined joint ventures as an integration of operations between two or more separate firms, in which the following conditions are present:

1. The joint venture is under the joint control of the parent firms, which are not under related control;
2. Each parent has invested a substantial amount in the joint venture company; and
3. The joint venture exists as a business entity separate from its parents.

There are two general forms of organization which meet this definition. One is the acquisition of part of one firm by another. In this case, one partner/owner is a distinctly separate firm, while the remaining ownership is shared among whatever private or public equity holding existed previous to the partial acquisition. The other form is the establishment by two (or more) independent companies of third business entity in which the parents each own significant equity shares. Here, the parents share ownership, management responsibilities, and profits of the joint venture company. The parents may hold equal shares of the joint venture, or they may participate as majority and minority interests.

Many academic and managerially oriented books and articles have been written about joint ventures and other strategic business alliances. Equity joint

2) Joseph Brodley, "Joint Ventures and Antitrust Policy," *Harvard Law Review*, Vol. 95(May 1982), pp. 1521-1590.

ventures are but one variety of strategic alliance, with unique advantages and disadvantages over other forms. In order to study international joint ventures in their full organizational context, we need a common understanding of their role in the world of alliances. The next section provides a summary of the alliance forms which places the equity joint venture on the continuum of alliance organizational forms.

2. Joint Ventures and other International Strategic Alliances

A variety of terms have been used to describe cooperative relationships among business firms. "Strategic alliance" is a broad term, encompassing most of the cooperative forms, and also implies the significance of cooperative forms to the strategic success of the companies in question. No longer are long-term licensing agreements or equity joint ventures considered as second best

Table 1. Types of Cooperative Arrangements

Type of Cooperative Agreement	Estent of Integration
Technical training/start-up assistance agreements	Low
Production/assembly/buy-back agreements	
Patent licensing	
Franchising	
Know-how licensing	
Management/marketing service agreements	
Partnerships in:	Moderate
Exploration	
Research	
Development/coproduction	
Equity joint venture	High

responses to government requirements or exotic secondary markets. Rather, cooperative arrangements are used to change the terms of competition across major industries. The subtle differences among the various types of alliances make strategic nuance possible. An extensive list of possible alliance types is provided by Farok Contractor and Peter Lorange[3], and is shown in Table 1.

The table indicates the variety of alliances, listed in order from the least permanent and lowest commitment extended license agreements to equity joint ventures. Technical training or startup assistance agreements require involvement of the two organizations over the period of time which covers the training period, but then terminate by prearrangement. The degree of involvement is that needed to support a small training team in a foreign location for what is usually a short time. Franchising predicates a long and indeterminate lifetime for the alliance, but requires only limited commitment. Most franchise agreements are detailed, requiring only periodic monitoring. Enforcement is primarily in the form of agreed termination for non-performance.

Research partnerships and other high level agreements anticipate long-term alliances with significant degrees of interaction between the partners in a manner difficult to fully specify, thus engendering significant organizational commitments. Such alliances subject the partner firms to mutually high potential risks from opportunism or cheating by the other firm. The most significant degree of partner interaction in an alliance is shared equity ownership in a joint venture.

Stock ownership permits the partners freedom to access information, monitor performance, and control operations in ways which would be subject to high risks and intense negotiations in a contractual mode. Partners can protect their share of the residual income and have input to decision making without

3) F. J. Contractor & P. Lorange, "Why Should Firms Cooperate? The Strategy and Economic Basis for Cooperative Ventures", In *Cooperative Strategies in International Business*, ed., F. J. Contractor and P. Lorange, Lexington, MA: Lexington Books, 1988, pp. 3-30.

constant renegotiation. Equity ventures, by setting up new organizations, can increase the loyalty of managers, who are removed from the parents, and workers, who are usually hired directly by the joint venture, and can encourage transfer of organizationally embedded, implicit knowledge and group skills.

At the same time, shared equity joint ventures do pose risks to the alliance partners. The partner firms may gain new knowledge from their ally, but they also risk opening themselves to the same freedom of information access by the ally. The flexibility and managerial discretion in equity joint ventures make possible the sharing of complex organizational knowledge and skills as well as the opportunity for managers to run the joint venture as an independent firm. This freedom puts the know-how of the parents on the table to some extent, but also provides much greater potential for sustained relationships and high levels of profitability. The complexity of the interactions in shared equity joint ventures makes them of particular interest to alliance studies. This study focuses on equity joint ventures in the steel industry, both from the importance of the industry and the revelations about the globalizing world economy to be found in these ventures.

III. Steel Joint Venture Movement

One way out of the American steel industry's 1980s financial dilemma was to seek foreign investment. But foreigners were no more likely than American investors to find the steel rate of return attractive, unless they had some other incentive. That incentive found its focus in joint venturing rather than either attempting to transplant outposts of foreign firms to American soil as the automobile industry had done or purchase outright the assets of American steel producers. The steel industry's joint venture movement began with raw materials

and spread to steel production, both basic and specialty.

1. Raw Material Joint Ventures

Iron ore, coking coal and limestone, the principal raw materials for steel production, are not in short supply throughout the world, but they are not always available in the locations most convenient and the qualities most desired. After long exploitation, the traditional iron ore supplies of the European and American -industry were declining in quality and ease of access in the immediate post-World War II period. Coal and other raw materials were abundant to the Americans but not necessarily to the Europeans. The Japanese and Koreans, of course, had no raw material supplies of their own.

Canada was the most obvious alternative source of iron ore for the American industry, considering location, distance and political compatability. But the vastness of some of the supplies and the costliness of their development suggested joint venturing. Steel companies could joint venture with each other to spread both the costs and the risks, thereafter sharing the output. Steel companies could also joint venture with mining companies, the former providing the funding and guaranteeing the demand and the latter providing the expertise.[4)]

During the 1950s, American steel firms became mutually involved in 53 joint ventures and involved with mining, transportation or other firms outside the industry in 17.[5)] Of the fifty-three intra-industry joint ventures, forty-four were in iron ore mining, four in coal mining, one in limestone mining, two in coke production, one shipping company and one railroad. Bethlehem Steel

4) William T. Hogan, S.J., *Global Steel in the 1990s: Growth and Decline,* Lexington, Massachusetts: Lexington Books, 1991, pp. 205-206.

5) Daniel R. Fusfeld, "Joint Subsidiaries in the Iron and Steel Industry," *American Economic Review,* Vol. 48 (May 1958), pp. 581-84.

Corporation, Youngstown Sheet and Tube Company, Interlake Iron Corporation, Steel Company of Canada, Finsider and Picands Mather Company, the latter two European, in an interlocking, maze at different ownership rates in each controlled 25 of these early joint venture firms. United States Steel, British Steel, Armco, Republic and others became involved in later years. Wabash Mines, Fire Lake, the Empire Mining Company, the Reserve Mining Company, and the Hibbing Taconite Company, were examples of inter-industry joint ventures extending on into the 1960s and 1970s" the steel partners locking themselves into take or pay contracts to reassure their mining partners.

Joint ventures which brought access to otherwise expensive or inaccessible raw materials were politically acceptable in the United States, that is to everyone but domestic sources cut off from markets. Production joint ventures raised more serious questions, domestically of market domination and internationally of political consequences.

2. Production Joint Ventures

International joint ventures had been attempted during the 1970s by U.S. and Europeans in Australia, by Japanese and Brazilian firms in Brazil and between Austrians and South Africans in the latter country but all foundered, either over government regulation or the economic problems of the industry in the mid-70s. 6) The political climate in the United States during those years was hostile toward any joint venture which might be perceived as reducing competition. However, the Reagan Justice Department opened a crack in the anti-trust door, beginning in 1984.

National Steel first raised the issue. Changing its name to National Intergroup in 1983, it began aggressive diversification into industries with higher

6) William T. Hogan, S. J., *op cit.*, 1991, pp. 213-214.

rates of return, first into aluminum and then into finance. National spun off its Weirton Steel Works into employee ownership the same year and in 1984 attempted to sell its entire steel operations to the United States Steel Corporation. At that point, the Anti-Trust Division of the Justice Department blew the whistle, charging a serious infringement upon competition in the domestic steel industry. The sale would have been allowed, but only on the condition that U.S. Steel simultaneously divest itself of both its Fairless Works and its Granite City, Illinois plant, together amounting to about the same capacity which U.S. Steel would have gained from the National Steel merger. However, the U.S. government posed no objection when one month later National Intergroup announced sale of half interest in its steel facilities to Nippon Kokan (NKK) of Japan. Foreign ownership of steel capacity in the United States was apparently perceived by the anti-trust fighters as a step toward further diversification, the opposite direction from the increased industrial concentration which would have resulted from the U.S. Steel purchase.

Perhaps considering the implications of facilities shutdowns spreading through the steel industry but also probably reflecting the convictions of the administration, the Justice Department made a sharp right turn in its antitrust policy later in 1984. In 1977 it had allowed Jones and Laughlin Steel to acquired Youngstown Sheet and Tube, hoping to strengthen competition against industry leaders USS and Bethlehem. In 1984, after some vacillation requiring the spinoff of some facilities to maintain regional competition, Justice allowed Jones and Laughlin to merge with Republic Steel. That merger involved the purchase of both by Texas non-steel conglomerate LTV, creating LTV Steel as the second largest steel producer in the United States.

Thereafter, the Anti-Trust Division became an enthusiastic promoter of steel joint ventures, domestic and foreign, committed primarily to maintaining a viable domestic industry. Paradoxically, that promotion did not lead to further domestic

mergers because all were too weak to be attractive partners to each other. The creation of LTV Steel, which was to find itself bankruptcy two years after its birth, ended domestic mergers in the basic industry. A decade later, Nucor, the leading mini-mill, would ally itself with U.S.Steel Group of USX in buying Brazilian ore, turning it into iron carbide in Trinidad and then making it into steel in Arkansas by direct reduction. But none of that was even on the horizon in 1984 and was still highly experimental and speculative when announced in 1994.[7] Instead, the National/NKK international partnership became the model for a rash of new alliances.

3. Joint Venture Motives

The National/NKK joint venture reflected well the motives of their respective national industries. The American firms were the most single-minded to begin with. They wanted access to financial capital not available to them from U.S. sources. However, as they began the pursuit of partnerships, some of the U.S. firms recognized other potential gains and ended up finding even more advantages than they expected. Access to improved technologies, a greater quality consciousness, more aggressive preventive maintenance, and changed approaches to employee-employer relations emerged as by-products of the joint ventures.

The Japanese from the beginning had essentially three motives for joint venturing with U.S. firms. They wanted access to the world's largest market. Yet opposition to steel imports were rising and the "not so voluntary" restraint agreements were a "steel fist in a velvet glove" reminder of that threat. Domestic production within the United States seemed to be the only practical

7) "The Odd Couple of Steel: Rivals Nucor and U.S. Steel May Reshape How Metal is Made", *Business Week*, November 7 1994, p. 106.

opening. There might or might not be objection to "greenfield" construction of new Japanese-owned steel facilities, but that was not an attractive alternative at any rate. World steel capacity was already in surplus supply. That, in part,, was the reason for wanting strengthened and guaranteed access to the U.S. market. The only practical approach was to buy into existing U.S. facilities, then invest to modernize and upgrade them, adding new facilities only where no rehabilitatable ones existed.

Finally, and most immediate, Japanese automobile company customers transplanted to the U.S. were complaining of available steel quality and U.S. business methods, entreating and even demanding that their more familiar suppliers come aboard the U.S. industrial scene. They had already imposed that demand upon their Japanese parts and tire suppliers, resulting in their purchase of existing or establishment of new facilities in the United States.[8)]

Building galvanized steel capability in the U.S. would be a particular attraction since the Japanese were accustomed to much heavier anti-rust protection than American manufacturers because of their climate and the more intense use of ice-melting salt.

Two forthcoming international joint ventures would not fit that tri-motivation pattern. Both Pohang Steel Company of South Korea and a Brazilian/Japanese joint venture named California Steel would be welcomed into that state as sources of imported semifinished steel for plants which would otherwise have closed with substantial losses of employment.

4. Census of Steel Joint Ventures

NKK was first with its National Steel joint venture because it had been

8) Martin Kenney and Richard Florida, *Beyond Mass Production: The Japanese System and Its Transfer to the U.S.*, Oxford: Oxford University Press, 1993, pp. 155-89.

negotiating to acquire 75 percent of the Ford Motor Company's steel division when the National Steel opportunity arose. National, on the other hand, had sought to reduce its dependence on the steel industry and a wealthy foreign partner was the next best thing to selling out. Nisshin Steel and Wheeling-Pittsburgh Steel also agreed in 1984 upon a joint venture to produce both galvanized steel and aluminum. Sumitomo Metals Industries and LTV Corporation entered into an agreement in 1986 to construct an electrolytic galvanizing line, followed by a second such line a few years later. Kawasaki Steel and Armco Steel entered a joint venture agreement in 1989 to operate Armco's plant at Middletown, Ohio. U.S. Steel and Kobe Steel joint ventured operation of the USS plant at Lorain, Ohio in 1989 as did Inland Steel and Nippon Steel at Indiana Harbor, Indiana. By the end of the 1980s, all five of the major Japanese integrated producers had formed joint ventures with U.S. steel firms with Japanese firms controlling at least 25 percent of all steel capacity in this country (Table 2).

As noted earlier, for the American firms,, access to financial support unavailable from domestic sources was the major attraction of the joint ventures. Investment of 'the magnitude required to modernize the steel industry was available in the United States only through the stock market.

But the ability to float new stock offerings depended on both the immediate relative rates of return and professional and public estimation of the short and long run outlook for the industry. The Japanese, who depended upon bank loans rather than the stock market and were attuned to longer range concerns than fluctuating stock prices, had only to meet the banks' loan amortization requirements. The Korean government was 70 percent owner of its steel industry. Therefore, governments policies were major considerations in the investment decisions of the Korean steel industry.

With the Japanese auto transplants as a driving force, the needs of that indus-

Table 2. Foreign Steelmakers Investment in U.S. Joint Ventures

Foreign Partner	U.S. Partner	Name	Type of Operation	Location	Date Begun	Employment	Investment ($ mil.)	Foreign share (%)
Nippon	Inland	I/N Tek	Cold rolling	New Carlisle IN	1990	280	520	40
Nippon	Inland	I/N Kobe	Galvanize	New Carlisle IN	1991	250	550	50
Nippon	Inland		Integrated	Indiana Harbor IN.	1989	11,500	186	14
NKK	National Intergroup	National	Integrated	Ecorse MI; Granite IL; Portage, IN.	1984	12,000	2.2bil.	70
Kawasaki	Armco	Armco	Integrated	Middletown, OH.	1989	9,500	1.6bil.	45
Kawasaki	Armco	Armco	Galvanize	Middletown, OH.	1991	100	150	50
Kawasaki	CVRD (Brazil)	Calif	Rolling	Fontana, CA.	1984	725	275	50
Kobe	USX Corp.	USS-Kobe	Integrated and Pipe	Lorain, OH.	1989	3,000	300	50
Kobe	USX Corp.	Protec Coating	Galvanize	Leipsic, OH.	1992	100	200	50
Sumitomo	LTV Corp.	LSE I	Galvanize	Cleveland, OH.	1986	83	100	40
Sumitomo	LTV Corp.	LSE II	Galvanize	Columbus, OH.	1991	100	180	50
Nisshin	Wheeling-Pittsburg	Wheeling-Nisshin	Integrated and coating	Steubenville, OH.	1988	5,500	15	10
Nisshin	Wheeling-Pittsburg	Wheeling-Nisshin	Galvanize	Follansbee, WV.	1988	100	96	67
Nisshin	Wheeling-Pittsburg	Wheeling-Nisshin	Galvanize	Follansbee, WV.	1993	100	120	100
Yamato Kogyo	Nucor	Nucor-Yamato	Mini-Mill	Blytheville AR.	1988	320	210	50
Kyoei/Sumitomo		Aurban	Mini-Mill	Auburn, NY.	1975	315	300	100
POSCO	USX	UPI	Cold roll	Pittsburg, CA.	1986	990	437	50

Sources: Martin Kenney and Richard Florida, *Beyond Mass Production: The Japanese System and Its Transfer to the U.S.*, Oxford: Oxford University Press, 1993, p. 157, and Author's data.

try were major factors in product choice. Therefore, though of necessity buying into integrated basic steel companies, the Japanese focus was primarily on a narrow range of products from those mills. Kobe Steel's choice of the Lorain, Ohio USX mill was its high quality steel bars used in the production of engines and transmissions. Nippon Steel made a major equity investment in Inland Steel but put no money directly into that company's existing facilities. Instead, it put up 40 percent of the capital for a totally new cold-rolling mill and 50 percent of the investment necessary for two galvanizing lines on the same property in New Carlisle, Indiana. Indeed, new galvanizing capability became a major focus of the Japanese investment, as noted above. Modernizing an existing electro-galvanizing sheet metal line near Detroit was a major project for NKK in its National Steel investment. The jointly-owned National subsequently became involved with Dofasco of Canada in a 400,000 ton hot-dipped line in that country. Modernization of an older galvanizing line and the building of a new one at Middletown, Ohio were major motives for Kawasaki Steel's investment in Armco Steel. Nisshin Steel bought 10 percent of Wheeling-Pittsburgh Steel and then put up 67 percent of the cost of a new hot-dip galvanizing line at Follansbee, West Virginia. Kobe Steel and USX invested equally in a new hot-dip galvanizing line at Leipsic, Ohio. Sumitomo Metal Industries and LTV established a joint venture in an electro-galvanizing line in Cleveland, Ohio and another in Columbus, Ohio.

These facilities serve U.S. as well as Japanese auto assemblers but the latter were clearly the driving force. The Cleveland line of Sumitomo/LTV was designed primarily to supply General Motors and Chrysler with pure zinc-coated steel sheets. However, the Columbus line was designed to produce sheet steel coated with the zinc-nickel alloy preferred by the Japanese automobile assemblers, though it can also produce pure zinc and organically-coated sheets.

Japanese auto manufacturers have not limited themselves to the joint ventures

of their countrymen, but the preference is evident, as long as costs and quality are maintained. As of 1993, Honda was obtaining all of its coated steel sheets from Inland and Armco which had joint ventures and Bethlehem which did not. Toyota was buying from LTV, Inland, Armco and National Steel, all joint venturers; Nissan from mills in which Nippon, Sumitomo, Kawasaki, and NKK were joint venturers. Mazda was a major customer of the LTV/Sumitomo Columbus, Ohio facility.[9)]

But the auto industry was not the only motivator for international joint ventures. United States Steel negotiated unsuccessfully with British Steel in 1985 to import slabs as an alternative to modernizing its iron and steel producing facilities at its New Jersey Fairless plant. During the 1970s with its domestic demand booming, Kawasaki Steel had entered into a Brazilian joint venture to produce and import steel slabs into Japan to feed its finishing mills. But when steel demand slowed its growth after 1973, Kawasaki had no further need for the added slab capacity to which it had committed itself. However, Kaiser Steel had closed its Fontana, California integrated plant. Kawasaki, CVRD, a Brazilian iron ore company, and a U.S. steel warehouser and fabricator, the Wilkinson Group, entered into a 1984 joint venture to purchase the finishing end of the Kaiser facility for which it imports Brazilian slab. It was also in that context that United States Steel and Pohang Steel Company of South Korea entered into a joint venture in 1985 to own, modernize and operate the near-obsolete USS finishing mill at Pittsburg, California, no longer able to meet the quality demands of its canning industry customers. And in 1989, The Japanese Yamato and American Nucor mini-mill companies joint-ventured a structural mill on the Mississippi River in Arkansas capable of producing 650,000 tons a year of wide-flange beams up to 24 inches.

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9) B. O. hUallachain, "The Restructuring of the U.S. Steel Industry: Changes in the Location of Production and Employment," *Environment and Planning A*, Vol. 25(1993), pp. 1347-49.

Ⅳ. Lessons from Steel Industry Joint Ventures

The steel joint venture study provide some rather clear lessons. information. First, like the course of true love, none of the industrial marriages were without strain. But even though two eventually ended in divorce, the separations were amicable. None of the liaisons were unproductive and every one saved an industrial enterprise that was otherwise slated for death. A major economic contributor and source of employment was saved for every community where these steel facilities were located. With the exception of I/N Tek and I/N Kote which were totally new greenfield creations, every plant experienced reduced employment, but the alternative was no employment.

There is no reason to think there would otherwise have been an I/N Kote and I/N Tek in a cornfield in New Carlisle, Indiana without that joint venture. Much of the finished products of the two western mills would probably have been imported from the same two countries which provided the saving capital, rather than simply importing the semi-finished product. The steel products of the midwestern joint ventures would have otherwise been produced elsewhere in the midwestern United States, though perhaps not in the same quality and with the same efficiency. Steel prices would have undoubtedly been higher, with advantage to competing producers but disadvantage to consumers. Thus, the economic contribution may have been more local than national but significant to both.

1. Achieving Objectives

All of the participants achieved their objectives. For the American partners,

the primary objective was financial investment to support modernization. None of the enterprises were attractive to either lending bankers or equity investors under the prevailing circumstances. All obtained the "patient capital" they sought--loans from those willing to take the risk and accept interest rewards and slow amortization. But that proved to have its limits. As long as interest obligations were met and the continuance of interest payments with timely amortization was reasonably assured, that patience endured. But as soon as either interest payments or capital repayment appeared doubtful, the bankers became not only impatient but fearful and blew the whistle. That happened in two of the three integrated mill cases, and in each case, the owners' refuge was that supposedly impatient stock market. Fortunately, the joint venture had brought the entities to a promising stage and the Japanese bankers, plagued by the recession at home, bailed out just when steel profits--or the promise thereof, was again attractive to U.S. investors.

For one of the integrated mill-owning U.S. firms, National Intergroup, Japanese money was a second-best solution. They really wanted out of the industry altogether. And that was ultimately what they got. At the end, the long-term outlook for the steel mills may have been better than that of some of their preferred alternative investments, but at least NII was able to sell out of steel for funds to bail out other wavering subsidiaries. All of the other American joint venturers ended up with soundly-financed enterprises. But they got much more in the bargain. All, including National, were much better managed after than before the joint ventures and their aftermath. The Japanese all wanted entry into the world's largest steel market without the political opposition generated by imports. They were also being pushed by their domestic automobile customers who had already transplanted themselves into the world's largest automobile market for the same reason. Steel was only part of a supplier complex including automobile parts, tires and even machinery production being

created under familiar and trusted management in the United States. The U.S. investment may have been part of a larger plan for self-sufficient regional industrial complexes on a global scale.[10] All would probably have preferred to supply the world from their home facilities through export to the extent possible but could see the political handwriting on the wall for that one-sided policy.

The transplants all accomplished their U.S. objective, though its advantage to their parent companies is not necessarily proven. However, NKK at National and Kawasaki at AK Steel end up only with minority stock ownership and no operating role in American steel firms. That ownership status is a substantial departure from the intended two models which were either to buy into existing facilities and modernize them or Join in creating totally new facilities but in either case to remain integrally involved in both policy and operations. The advantages of the more peripheral minority ownership, nonmanagerial status may be debatable, but probably still provides a useful outpost.

The objective of Kawasaki, along with its Brazilian partners at California Steel, was to obtain a finishing mill outlet for its Brazilian iron ore and slab. That-was clearly accomplished. POSCO also needed an outlet for steel capacity imposed upon it by the Korean government for political job creation objectives. That too was accomplished, though there is now probably sufficient far eastern demand to absorb the total production of POSCO's two domestic plants if it were not for the U.S. commitment.

The Japanese firms responding to the pressures from their Japanese auto transplant customers met those requests, though NKK and Kawasaki are no longer directly involved in production and delivery. No one on either side has reason to regret their joint venturing decisions. The transplants will probably continue their now-familiar relationships, despite the reduced involvement of

10) B. O. hUallachian, "The Restructuring of the U.S. Steel Industry: Changes in Location of Production and Employment," *Environment and Planning*, Vol. 25(1993), p. 1347.

their steel counterparts, without a quiver.

2. Challenges for Integrated Mills

The challenges to the integrated mills were clearly more intense than those to the finishing mills. All three were aging facilities requiring large scale modernization, up grading and expansion into coated product. All had traditional work forces, represented by unions immersed in adversarial bargaining; and in all three cases the labor relations stance of the management had long been as adversarial as that of the unions. Indeed, the stance of the unions had emerged as the mirror image of management's responses to employee needs. All three had been deficient in meeting the rising quality demands of their customers.

The Kobe/USS joint venture at Lorain, Ohio was immediately successful for two reasons. First it was profitable and engaged in the production of products wherein the competition was not intense--bar and tubular rather than flat-rolled steel. Its parent's inability to provide the funds needed for modernization was the result of corporation-wide weaknesses, not the Lorain outlook. Secondly, the Lorain management even before the joint venture and many of the American managers who came on board at the time of the joint venture were already committed to the employer-employee relations principals fostered by the Japanese-American partnership. Beginnings of participatory management were already in place; a conversion period was not necessary. In the National and Armco cases, the joint ventures could not solve the basic problems, but they could guarantee survival until more unilaterally American solutions could be mounted. In the National case, that was the exit of a reluctant partner; at AK Steel, the advent of tough-minded management. Ultimate survival under new American management at both entities remains to be tested but appears promising.

3. The Finishing Mills

The task at the three finishing mills was more like that at the Lorain integrated mill. All three faced eager markets and employed willing work forces; the challenge of responding to that demand was primarily technological. The west coast canning and appliance market for the USS/POSCO joint venture and the west coast construction market for California Steel were a long distance from eastern and midwestern mills. The relevant competition was the steel industries of the nations with which the Americans, in one case employees only and in the other owners and employees, were allying themselves. Both western facilities needed only guidance and the provision of technology familiar to their joint venture partners to meet the intensifying quality demands of their customers demands which had in part been generated by the quality demonstrated by the far eastern competitors. I/N Tek and I/N Kote were totally new plants, bettering even the leading technology provided by their Japanese partner, positioned to be leaders in an expanding market, having a new and unsullied work force, and given priority access to both sales staff and customers of their Inland Steel parent. California Steel enjoyed the flexibility of nonunion operation, endorsed by a workforce who continued to reject union organizing gambits. The other two finishing mills, while unionized, had, in the one case, a work force largely free from collective bargaining traditions, and in the other, gratitude for continuance of employment that had looked doomed. And both were far enough away from other steel centers that the international union was not concerned with departures from eastern and midwestern union patterns. All of the joint ventures occurred in an era wherein the battered union was more amenable to compromise than had been its history.

4. Unsolicited Bonuses

The American partners sought and received primarily access to capital but they were rewarded with much more than that. Every plant, whether integrated or finishing, was exposed to and adopted a new commitment to quality. The first step was technological improvements. Only I/N Tek and I/N Kote had complete freedom technologically, but all of the others were rewarded by major upgrading and modernization of existing facilities and the addition of new facilities. However, it was more than technology. There was intense planning, detailed specification of standards, strict inspection and careful quality control, careful equipment maintenance, constant preaching and a reward system placing cash value on quality. All participant firms eventually won plaudits from customers for their quality improvements and some received added orders and even exclusives for certain products. The new quality consciousness across American industry appears to be deepseated and gives promise of permanent change. That itself is an international influence. Higher quality imports eventually forced U.S. producers to raise their standards. Higher quality standards for final products required higher quality raw materials and semi-finished products. Higher quality imported steels forced a higher quality domestic product. Galvanized and other coated product is a prime example. The Japanese made greater use of coated steel to protect their automobiles from the excessive use of ice-melting salt there. Accustomed to that supply, the Japanese auto transplants demanded it and couldn't get it in the United States. The steel joint ventures emphasized that product. Now no American auto manufacturer would be without it. If supply did not create its own demand, certainly competition did, and to the benefit of all.

A switch from "fix it if it breaks" to scheduled preventive maintenance was another universal gain for the joint venturers. Whether that will survive will be

tested the next time cash flow tightens and managers are looking for expenditures that can be temporarily delayed. Ail of the joint venturers were also led by their far eastern partners into long-run planning, though its survival is probably more tenuous, especially for the two integrated mills which have now freed themselves from any international role in their management.

Gains in human resource management are not as obvious. Lifetime employment gave way to cost-cutting needs at UPI, National and AK Steel and remains untested at the other joint ventures. The foreign partners resisted but succumbed to financial pressures. Neither the Japanese nor the Koreans have demonstrated strong commitments to employee participation in workplace rulemaking nor team approaches to production. Their genre has been more the generation of loyalty through employment guarantees than the promotion of employee voice. The participatory experiments are in place as much from American as foreign influence and commitment.

The foreign partners have demonstrated no special gifts for labor relations in these long-unionized establishments. Only at UPI have the employee representatives shown a preference for the foreign partner, but that probably reflects animosity to USX which was prepared to abandon them until the Korean saviors came to the rescue. But even there, labor-management negotiations remain the domain of the American partner. The system would be multiply booby-trapped for an uninitiated employer.

The union reaction is worthy of note. The local unions were, of course, most concerned with the impact of the joint venture upon their local membership. They were favorably predisposed because they knew that, without the joint ventures, their jobs would have disappeared. But that did not eliminate militancy. Often, concessions were made to facilitate the joint venture negotiations. Even without particular local concessions, the national negotiations had involved concessions or limited gains. As soon as the joint ventures were

well-established, they wanted rewards for their members: "We shared the pain; now we want to share the gain!" The local union officers also tended to be imbued with militancy. They were not usually those most amenable to labor-management cooperation. At Lorain, for instance, local union leadership and work team leadership ended up in separate but noncompeting hands. Only at I/N Tek and I/N Kote where there was no history to live down were the new local union leadership and the new local management totally compatible. At the international union level, the reactions were equally divided. All three integrated mills were by tradition, locality and technology part of an industry-wide system of longstanding. The USWA learned in the 1980s the penalties of granting concessions to some and not all in a competitive situation. 11) Relations at National and Armco were such that concessions from what had once been industry-wide bargaining but had now subsided to pattern bargaining were not pursued on either side. USWA negotiators were convinced they could not allow USS/Kobe to escape from the U.S.Steel pattern without repercussions throughout corporate negotiations. On the other hand, the international union was a positive force in working out new relationships in the finishing mills where no national pattern was threatened, the California mills because of distance and Inland/Nippon joint venture because of its uniqueness. Like any other institution, unions respond in accordance with their perception of impact on their raison d'etre.

Trade relations were also improved as a result of the joint ventures. The voluntary restraint agreements and other U.S. protectionist policies since the 1960 were accompanied by disinvestment and neglect of technological and organizational upgrading. American steel firms were using their facilities as "cash cows" to support corporate diversification. The joint ventures, by

11) John P. Hoerr, *And the Wolf Finally Came: The Decline of the American Steel Industry*, Pittsburgh, PA.: University of Pittsburgh Press, 1988.

establishing a viable new model of production organization, may have contributed at least modestly to some amount of reindustrialization. Not only capital but technology has been proven internationally mobile. The center of steel production technology had moved from Europe and the United States and Japan. Now such advanced Japanese technologies as electro-galvanizing and hot-dip-sheet finishing are diffusing back to the the United States through international joint venture. And with notably less strife. Occasionally one hears even the international joint venturers call for government protection, but certainly those voices are muted in comparison with their decibels during the 1980s.

The variety of relationships involved in this study provide insight into the requirements for successful international partnering. Obviously, there must be a shared need, the more intense the better. The partners must really need each other and continue to do so. Once the needs shift, the alliance becomes vulnerable. Objectives need not be identical but they must be consistent. Above all, both partners must be fully committed. Joint venturing is no place for half-heartedness as the National Steel experience demonstrates.

5. Environmental Motives and Consequences

Only California Steel hints at what one might expect to be a major motivation for international joint ventures in steel production: an upstream/downstream mix that saves both transportation cost and environmental degradation. Long-exploited U.S. iron ore supplies are declining in quality while there are ample supplies of rich ores in developing countries. Quality coking coal is still available in the U.S. but can't last forever. Producing steel at the raw material source as in the Brazilian case, rather than shipping for thousands of miles the ten or so ton of raw materials required for every ton of steel slab has obvious

advantages.

In addition, the environmental challenges of steelmaking primarily involve coke ovens and blast furnaces. Raw material supplies are generally found away from population centers in developing as well as developed countries. Poorer countries are likely to make a different calculation of the relative merits of income versus pristineness. Hence, one might expect a trend for steelmaking to occur in developing countries near to raw material supplies, the semi-finished product then being sent to near the consumer outlet for finishing.

Note that the California Steel relationship fits both of these hypotheses, especially with the finishing mills location in the environmentally sensitive Los Angeles Basin. But also note that the USS/POSCO relationship does not. Korea is a small country without raw materials. The necessary raw materials have been coming from as far away as Australia for processing in an environmentally sensitive environment before sending the output thousands of miles further to the U.S. One would expect over time to see China become the raw material source and perhaps even the slab producer with finishing occurring in Korea as well as the United States. Japan and Taiwan also might expect to become eventually finishers rather than basic steelmakers.

V. Conclusion

This study provides many interesting insights on the steel industry and the theory of international joint ventures. The U.S. Steel industry seems to have more life than was expected in the early 1980s. New equipment, new process management, and committed owners appear to make profitable operations possible even in a crowded market. The quality and efficiency introduced by the Japanese and Korean partners appear to have turned these plants around even

National experienced tremendous improvements which can likely be continued without the anchor of NII dragging behind. Also of interest are the very different attitudes displayed by the financial communities in the U.S. and Japan. Lack of capital in a supposedly "dying" industry contributed greatly to the decline of the American industry. New capital with a longer term perspective on the economic development of the industrialized world and the role of steel in it permitted dramatic turnarounds. Properly financed and managed, American steel mills, even integrated operations, could improve their productivity and the quality of their outputs to the point of becoming competitive again.

Joint venturing was only one tool in the successful rebuilding of the U.S. Steel industry at a reduced but stronger level of capacity, but an effective one. As of mid-1995 no other country threatens its survival. Its productivity is as high and its cost structure as favorable as any. The critical competition is from within in the form of technologically advancing mini-mills, but they also face rising competition among themselves. More than anything else, the steel international joint venture experience seems to have proved that marriages among those of common technological languages and industrial commitments can surmount formidable barriers to the benefit of nations as well as firms.

Joint venture theories receive both support and challenges from this study. The importance of organizationally embedded capabilities such as process management systems to the viability of international joint ventures is quite evident. Efficiency models, such as transaction cost economics, certainly can step in after the fact and argue that joint venturing is the most efficient way to govern such relationships. This was not apparent at the beginning, however. Nor were concerns for market power or industry dominance. Rather, traditional considerations of capital infusions through equity. investment, avoidance of real and potential government interference, improved technology, and better management were the focal issues in these instances. A history of joint

venturing in the industry, if not for final production, certainly provided experience with alliance management.

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국 문 요 약

본 논문의 주 내용은 국제경제사회에서 관심을 끌고 있는 기업간 협력형태인 국제합작에 관한 철강산업의 사례연구이다. 논문은 이전에 경쟁관계에 있던 기업들이 자원과 기술을 합쳐 혼자로써는 불가능하던 신제품을 생산하고, 시장을 개척하는 등의 초국가적 산업결합, 즉 국제합작의 규모와 원인을 분석하였다. 이 논문은 미국 내에서 급속히 발전되고 있는 철강업체들의 국제합작에 관한 사례연구를 통하여 그 경험에서 비롯된 교훈을 도출하였다. 교훈의 주요내용은 국제합작에 있어서 기업들에 필요한 전략적 교훈, 국가적 차원에서 국제합작투자를 장려할 것인지 아니면 억제할 것인지에 대한 공공 정책적 교훈, 그리고 실례의 이해와 더불어 이론적 정립에도 기여할 학문적 교훈 등을 들 수 있다.