Nucor at a crossroads essay sample

On December 7, 1986, F. Kenneth Iverson, chairman and chief executive officer (CEO) of Nucor Corporation, awaited a delegation from SMS . Iverson had to decide whether to commit Nucor to a new steel mill that would commercialize thin-slab casting technology developed by SMS. Preliminary estimates indicated that the mill would cost $280, and that start-up expenses and working capital of $30 million each would push the total cost to $340 million. Successful commercialization of thin-slab casting would let Nucor enter the flat sheet segment that accounted for half the U. S. market for steel. The U. S. Market for Steel

In 1986, U. S. producers shipped 70 million tons of steel mill products. Subtracting exports of one million tons and adding imports of 21 million tons implied 90 million tons of domestic consumption of steel that year. Relative to the most recent peak year, 1979, domestic shipments had decreased by 30% and domestic demand by 22% (see Exhibit I). The decline in demand derived from the stagnation of many steel-intensive industries, particularly automobile manufacture, efforts to use steel more efficiently and the emergence or substitute materials such as aluminum, plastics and advanced composites. Shipments could also be classified by customer group. The four most important ones, ranked by volume, were service centers and distributors, the automotive sector, construction, and the appliance and equipment industries. Service centers and distributors were intermediaries Price, quality and dependability were the three most important buyer purchasing criteria. Uncompetitive pricing was probably the major reason U. S. steelmakers had lost ground to imports. U. S. Steelmakers

There were three groups of steelmakers in the United States in 1986: integrated firms with the capacity to produce 107 million tons of steel by reducing iron ore, minimills with 21 million tons of capacity to produce steel by melting scrap, and specialty steelmakers with 5 million tons of capacity to produce stainless and other special grades of steel.

Integrated Steelmakers

Integrated steelmakers had long operated as a stable oligopoly led by U. S. Steel. U. S. Steel was formed by merger in 1901 in a transaction that capitali7xd its value at $1. 4 billion, or about 7% of U. S. GNP. The merged entity pursued a policy of price leadership that brought stability to a cyclical industry and healthy profits to its shareholders. By World War II, U. S. Steel's share of the U. S. steel market had slipped from two-thirds at the time of its formation to one-third. In the aftermath of World War II, U. S. integrated mills as a whole accounted for about half of the world's raw steel production. Integrated U. S. steelmakers' after-tax return on equity (ROE) had exceeded h e average for U. S. manufacturing in only one year. 1974. This decline in performance was attributed in large part to the failure of the integrated U. S. steelmakers to commit quickly to new technology.

They continued to invest in open hearth furnaces through the early 1960s despite the advent of the basic oxygen furnace, which reduced the cycle time for converting iron into steel from 10 hours to 30 minutes, and ended up, as one source put it with 40 million tons of the wrong kind of capacity. Their share of the flat sheet segment had been slightly lower, reaching 18% in 1986. IAs the 1970s ended, integrated U. S. steelmakers began a dramatic restructuring of their operations. They cut steelmaking capacity from 145 million tons in 1979 to 107 million tons by 1986, with the largest of them shouldering a disproportionately large share of the cutbacks. Labor productivity nearly doubled as a result. U. S. Steel, LTV Steel and Bethlehem Steel were the three largest U. S. integrated steelmakers in 1986, with 59% of total integrated steelmaking capacity and 49% of integrated flat-rolling capacity. Minimills

Although small, nonintegrated steel plants had existed in the United States since the nineteenth century, plants constructed in the early to mid-1960s that used electric arc furnaces to melt scrap into steel were the first to be referred to as " minimills." In addition to adopting improvements in furnace and casting technologies, minimills took advantage of the declines in integrated steelmakers' demand for scrap as the latter switched to basic oxygen furnaces and, later, as their steel production fell.. By the second half of the 1970s, the market for low-end structural products was beginning to reach saturation. Minimills responded by looking for new market outlets. The more aggressive ones expanded beyond their traditional 200-300 mile, typically by acquiring existing mills or by adding large new ones with up to several hundred thousand tons of steelmaking capacity. They also began to move into new product segments. They accounted for 16% of domestic steelmaking capacity. up from 7% in 1975. and a slightly higher percentage of domestic shipments. While 36 companies operated a total of 51 mini steel plants, 43% of all minimill steelmaking capacity was controlled by the five largest competitors: Nucor Corporation

Nucor's roots went back to 1904 when Ransom Eli Olds, resigned from Olds Motor Works, It emerged from reorganization as Reo Motors, a manufacturer of trucks and, eventually, luxury lawnmowers. Reo Motors neither made nor lost much money. In 1954, it sold off all its assets, at a 15% book loss, and began to distribute the proceeds-approximately $16 million-to its shareholders. Takeover prevented Reo from carrying out its plans for self-liquidation. TelAutograph Corporation won control of the company m a proxy fight and, in late 1955, merged one of its affiliates with Reo to form Nuclear Corporation of America. Ken Iverson, a metallurgist, was hired by Thomas in 1962 to run the newly-acquired Vulcraft steel joist business, and later put in charge of the air-conditioning duct business as well. Iverson bet the company by borrowing $6 million to build a small but modern minimill to make steel from scrap at Darlington. South Carolina. Nuclear Corporation of America held its corporate breath until Darlington eventually became profitable.

In 1986, Ken Iverson, by now 61 years old, was still Nucor’s chief executive officer and had just been named the “ Best CEO in the Steel Industry” by The Wall Street Journal. Nucor’s top managers agreed that it knew how to do two things well: build steel plants economically and operate them efficiently. Nucor’s top management also believed that the best companies had the fewest layers of management. Nucor had five layers of management, To make this flat hierarchy work, Nucor decentralized as many decisions as the next layer down could manage. This meant, in practice, that all decisions except capital expenditures, major changes in plant organization, hiring and firing at the department head level (or higher), and pricing were made at the plant level..

To compare the performance of its plants, headquarters received, in order of importance, monthly operating reports, weekly tonnage reports and monthly cash management reports from each of them. The monthly operating reports from each plant were shared with all plant general managers. Because Nucor's top managers believed that " the best motivation is green," they complemented these controls with high-powered performance incentives. Apart from these monetary incentives, Nucor made strenuous efforts to minimize status-related differences among its employees. Everybody received the same insurance coverage and holidays. Nucor tried, in addition, to encourage both openness and risk-taking by emphasizing rather than denying the possibility of managerial mistakes. Operations

At the end of 1986, Nucor's steel operations, encompassing 16 steelmaking and fabrication plants at 10 locations around the United States, accounted for 99% of the company's sales. Nucor Steel sold two-thirds of its output to external customers and one-third internally, Vulcraft, whose joist plants originally impelled Nucor to integrate backward into steelmaking, accounted for three-quarters of internal sales. Nucor's dependence on external sales of steel had increased dramatically since the early 1970s, when they accounted for only 10% – 20% of total production. Service centers and distributors constituted their primary customers. Nucor did not allow discounts for preferred customers or, since 1984, on large outside orders.

Nucor had long focused its operations on production rather than procurement or marketing. This focus had forced it over the years to think very hard about how it recruited, trained and motivated production workers. Nucor selected and trained all employees below the level of department head (accounting for about 95% of its total compensation budget) on a decentralized basis. Each plant general manager administered a psychological test to prospective employees that sought to identify goal-oriented, self-reliant people. Employee turnover at Nucor was about 1 % – 5% per year, compared to an average of perhaps 5% to 10% for the U. S. steel industry as a whole. Although Nucor's operations were decentralized down to the plant level, there was considerable interplant communication. Some of this communication occurred through formal channels. Most communication, however, took place through informal channels. Investment

Nucor had invested steadily and heavily in upgrading its capacity, old as well as new. Since the early 1970s, Nucor had built or rebuilt at least one steelmaking or fabricating facility each year- Over that period, its investment levels averaged 2. 9 times its depreciation charges, although that ratio had declined a bit since the early 1980s. Nucor's heavy investment in facilities reflected its drive to embody technological advances. The company made a serious effort to monitor technological developments worldwide, particularly in Europe and, Japan. Nucor Steel had no dedicated R&D budget. Instead, it regarded capital equipment suppliers as its R&D labs, and treated the costs incurred while starting up a new plant or new equipment as its own process R&D investments. Capital budgeting at Nucor was an informal, iterative process. .

Nucor typically designed new plants as they were being built, with the intention of expanding them and in light of its informal rule of maintaining a ceiling of 500 employees per plant. New plants were located in rural areas with access to at least two railroads, low electricity rates and plentiful water Each construction project was managed by a core group of experienced engineers and operators drawn from other Nucor operations. Nucor had not built any new steel mills since 1981 but had agreed earlier in 1986 to form a 51%/49% joint venture with Yamato Kogyo, a Japanese steelmaker, to produce wide-flange beams, a heavy structural product, at a new plant at Blytheville. Arkansas. Nevertheless, Nucor-Yamato only targeted another non-flat niche, and one that it would share with another minimill, Chaparral, and perhaps several others. Iverson thought that a major expansion of Nucor's steelmaking capacity would require it to enter the flat sheet segment. Thin-Slab Casting

The idea of casting molten steel directly into a thin, continuous ribbon can be traced back to Sir Henry Bessemer. Breakouts were particularly likely to afflict attempts to cast steel in thin shapes because such shapes had a higher ratio of surface area to volume, increasing friction between the casting mold and the steel poured through it. Continuous casting, which began to be commercialized in the late 1950s, marked an important step toward the goal Bessemer had set because it permitted molten steel to be cast into slabs that were only eight to ten inches thick. The efficiency of this process continued to be constrained, however, by the need to reheat slabs, the multiple rolling stands required to crush them hundredfold into flat sheet one-tenth of an inch thick, and the fact that slabs could only be processed one by one. Steelmakers continued, therefore, to hunt for better casting technologies While experiments with Hazelett casters were yielding mixed results, SMS of West Germany, a leading designer of conventional casting and rolling equipment, began to promote another thin-slab casting technology that it called Compact Strip Production (CSP). More than 100 companies sent engineers or executives to observe SMS's pilot thin-slab caster in operation. None of them, however, had yet contracted with SMS to commercialize CSP. The Decision

Nucor started to scan its environment for thin-slab casting technology in 1983, a year after experiencing its first sales decline under Iverson. The initial search turned up a number of relevant projects but none seemed to be ripe for commercialization. SMS, which had supplied casting equipment to Nucor since it built its first steel mill at Darlington, approached Nucor in the summer of 1984 with the CSP concept but Iverson concluded that while it looked good on paper, it was still in an embryonic stage. Nucor ordered a Hazelett thin-slab caster instead and began to experiment with it at Darlington. Nucor spent $6 million on its Hazelett caster through 1986 and developed a special nozzle for pouring steel into it that reduced turbulence. But over the course of the year, it became increasingly interested in CSP. In the summer of 1986, Iverson asked project teams from Nucor and SMS to study the feasibility of a CSP plant of commercial scale.

The teams focused on defining the prospects for a CSP plant with close to a million tons of capacity at an unspecified site in the Midwest, close to the largest steel and scrap markets in the United States. Nucor thought that as the first adopter of CSP, it might be able to secure a $10-$20 million discount off the $90 million SMS was asking as the supplier of core machinery and technical support. Based on prior analyses, these assumptions and basic engineering by SMS, it appeared that the CSP plant would cost Nucor $280 million in total, take two-and-a-half years to complete, and two more years to reach rated production capacity. Nucor also projected the plant’s start-up costs and working capital requirements to be an additional $30 million each.

Iverson was aware of this economic information. He also knew that the Nucor project team that prepared it was eager to proceed with the CSP plant SMS had devoted six months to basic project engineering Would the benefits of being the first adopter offset them? Other minimills were known to be interested in CSP.

Nucor might gain only a two-to-three year head start by being the first adopter if others decided to be fast followers. On the operating side, flat-rolled products presumed steelmaking expertise somewhat different from that required by non-flat products. Additionally, Nucor's policy of locating plants in rural areas might, with a plant larger and more complex than any it had built before, create an overwhelming operational challenge. It was also possible that integrated mills adopting CSP might be able to outpace Nucor on the basis of their cumulated experience at flat-rolled production. As far as marketing was concerned, Nucor was confident that it would be able to penetrate the low end of the flat-sheet market, which consisted primarily of construction applications, where low price was the key to winning business. Nucor's own Vulcraft division could use about 100, 000 tons of flat sheet each year to produce steel deck.

While cheap imports were a force to be reckoned with in external sales to the low end. a measure of protection was provided by the fact that the CSP technology pushed U. S. labor costs down toward the level of ocean freight costs incurred by imports. The high end of the market was a different story. Products such as outer panels for appliances, and bodies and hoods for automobiles would be harder to penetrate because they required superior quality, reliable delivery of large quantities, and relationship-based marketing (including early involvement in product development). Although the first CSP plant's capacity could probably be filled with low-end business, Nucor would also have to target the high end if it brought a second or third plant on stream.

Resource constraints were also a cause for concern. The joint venture with Yamato Kogyo (to produce wide-flange beams) was already agreed upon Technological leapfrogging was another major worry. While the Hazelett caster did not appear to be as efficient as CSP, other attempts to cast even thinner slabs were under way, it was clear that thin-slab casting represented a step toward the ultimate goal of direct casting of sheet and strip. Did it make sense to invest in the former, knowing that it might become obsolete in 10 – 12 years? Although Iverson thought of these years as a window of opportunity, was the window wide enough to justify a full-scale strategic commitment to CSP?