Disruptive innovation essay sample

Finance, Investment

Continuous Casting Investments at USX Corporation is a case involving a large, established mining and steelmaking company that after almost 80 years of existence is deciding whether to go forward with a $600 million dollar investment to upgrade its Mon Valley steel facility. From its founding in 1901 through the 1970's the company dominated the steel industry. In the 1980's USX was hit hard by poor economic conditions and higher manufacturing costs. In addition, " minimills" which had previously not been a competitive factor for USX, obtained cost advantages and began competing heavily with integrated mills such as USX. USX responded by closing or selling eight of inefficient facilities and restructuring its remaining manufacturing facilities to focus on hot-and-cold rolled sheet, strip and tin products rather than a larger range of products which it had done in the past.

Additionally, USX invested over $2 billion to improve its processes to become one of the, if not the, most efficient steel manufacturer in the world by improving labor efficiency from 11 man hours per ton (mhpt) to just 3 mhpt. As described above, in the 1980's USX made many large investments to improve its efficiency and remain competitive in the market and a market leader, primarily as a low cost producer of high quality sheet and strip steel. For example, it invested $800 million and $200 million at two facilities, respectively, in the early 1980's to launch continuous slab caster and hot-rolling mills. Nonetheless, the Company was in a mature market and competition was increasing. Although USX was an unquestionable market leader for 80 years, like so many well established companies, by the 1980's and early 1990's would need to further increase innovation if it was to be in

the 10% of companies that would continue to grow consistently over the next 10 years. USX would soon find itself in a position to "potentially adopt a new technology (rather than the traditional continuous casting system) at its Mon Valley complex.

However, in in the process of deciding whether to implement the technology, USX was faced with the challenge of increasing market growth through innovation in a mature market and exploiting growth avenues that would result in high gains without high risk. Additionally, USX was faced with the emergence of smaller mills in the competitive market (i. e. competitive market changes), the complexities of assessing a new technology based on information from a competitor that has different resource and technological needs and constraints, and meeting the growth expectations of consumers and other shareholders, all without becoming a victim to the success or growth dilemma. First, USX was challenged with how to continue growth as a competitor in a mature steel market. USX was aware of the need to further reduce costs and increase efficiency in order to remain competitive in the market.

As such, it actively explored new technology and innovations. The initial goal of the Company was to implement the continuous casting and hot rolling mills at a third mill just as it had done at two other mills, as described above. Doing so would present different challenges due to the unique nature of that mill, which was not one mill, but rather a complex consisting of two mills located in Monongahela Valley. The first mill was the Edgar Thompson (E. T.) Works and the other the Irvin Mill. USX put together an expert team of

engineers and researchers to develop and implement the continuous casting process between the two mills. The result would be a $600 million investment. Although USX was proactive in researching and engineering the potential for the traditional continuous casting system at Mon Valley, the ability to gain a "competitive advantage would still be limited. If the traditional continuous casting system, as described above, were implemented, the company would certainly reduce costs and increase efficiency over the previous process. However, the chances of growth may be minimized since it did not offer any real advantage over what other fully integrated steel companies could employ.

An additional factor was the fact that minimills were increasing use of innovation and beginning to compete with the integrated mills. Although the high dollar amount of capital investment required to participate in the flat-rolled steel market created a barrier for the minimills, many minimills had entered other product segments where the amount of necessary capital investment was much lower. This had allowed minimills to capture 30% of the U. S. steel market by 1990. USX would need to explore a more creative way of producing steel. It was becoming harder and harder for USX to find growth markets, with the increasingly competitive minimills. Like many companies, USX could face the success dilemma – failure of leaning companies to stay atop their industries when technologies or markets change even when they continue to improve core competencies. USX was being challenged to find a way to reignite growth and increase revenues and profit margin. USX was a leader in exploring opportunities that could potentially increase its efficiency and capacity as well as decrease operating

and capital costs. USX had been perhaps the earliest leader in developing a new thin slab casting, which would become known as CSP. Such casting would result in cost savings due to production efficiencies.

At the same time, it presented challenges due to increased technological difficulties in producing thinner pieces of steel, from the production in terms of reducing the amount of friction when producing thin vs. thick slabs, to the length of the steel pieces needed in order to produce the same volume in thin "casting. Although USX was a leader in addressing these issues, it was Nucor, a minimill, which would be the first to implement the new CSP system successfully. One of the researchers on the Mon Valley team was aware of a continuous thinslab casting compact strip production (CSP) that had been only been implemented by the minimill Nucor. Based on the results at Nucor, if this state of the art technology could be used at USX it would reduce the cost of steel sheet and stripe by 10% to 15% and reduce capital costs per ton by 67%. The CSP technology allowed for thinner slabs of steel to be produced, which eliminated some steps in the production process. It also allowed for the continuous casting and rolling operations to be combined.

Because a cooling step was eliminated, energy consumption could be cut in half. By focusing on the CSP process as an alternative, USX was addressing the growth challenge aggressively, but would be faced with additional challenges as it further explored this opportunity. USX found that the same technology used by two different companies can produce two diametrically opposed results. Specifically, the efficient scales of minimills were dominated by geographic considerations and rolling mill technology rather than by

required blast furnace scale, as is the case with integrated mills. As such, USX would need to take into account these differences when comparing the cost savings and efficiencies that were incurred by the minimill with the savings that may be incurred by USX. Furthermore, the capacity needs at Mon Valley of 3, 000, 000 tons of annual continuous casting was four times that at Nucor. The CSP system as constructed by Nucor, could not handle the capacity needed at Mon Valley. Future studies that looked at capacity of just half that amount were still deemed unreasonable. Beyond that were the complexities involved with the 10 mile distance between E. T. and Irvin.

Although a number of very creative scenarios were "discussed and analyzed to make the CSP technology work between the two facilities, none of them were ultimately practical, in that transporting molten steel 10 miles entailed tremendous risks that made the technology impractical. In fact, based on all analysis conducted by the USX research team, the CSP technology could not possibly be implemented successfully and cost effectively in order to serve its' customers' needs. With the possibility of using the new CSP technology nonexistent based on all of the analysis, USX was facing the same challenge of so many other companies, which is finding growth opportunities. How does it continue to grow or to gain a competitive advantage when implementing a new state of the art technology is not a cost effective option? Innovation in a mature market can be challenging and the company has found that it can't take advantage of a rare opportunity. However, the challenge does not just lie in the difficulty of finding and implementing a potential growth opportunity.

High risk growth opportunities do exist. The bigger challenge is finding those opportunities that will result in high growth without high risk. If USX went forth with the CSP implementation at Mon Valley, there was the potential that it could result in a payoff of up to $15 per ton. If it were successful, it was an opportunity that could put USX far ahead of competitors. Companies can take any number of risks. The challenge is that big risks can also result in big losses. USX could certainly ensure some, but likely limited growth, by implementing the traditional continuous casting system via incremental innovation at Mon Valley. However, discontinuous/breakthrough/radical innovations which can result in the highest gains also come with the highest risks. The CSP at Mono Valley was a perfect example of the challenge of implementing radical innovation without exceeding tolerant risk levels. Not only "were such radical opportunities not approved by shareholders, even if they were, the potential reward comes with the risk of total downfall of the company. USX had to balance the risk levels of all stakeholders and most stakeholders are incredibly risk adverse.

Pursuing more conservative growth opportunities may be in the best interest of USX. However, future opportunities may be few and far between. An additional challenge and complexity faced by USX in terms of the new technology was meeting the consumers' needs. For example, even if the CSP analysis passed in terms of cost and flexibility it would still involve significant risk and challenges, in that the product quality may not meet the standards of consumers at Mon Valley. Not only may the consumers not approve, but with that risk also came the inherent risk assumed by the investors/owners of decreased revenues due to loss of market share even if the new process

reduced costs, met the needed capacity, and increased efficiency. The risk is much less for the minimills, which already serve markets that are less concerned with quality. The challenges described above by USX including finding low risk growth opportunities in a mature market, responding to market changes and new competition, and meeting the growth expectations of consumers, investors and shareholders are all illustrative of the challenges faced by nearly all companies in mature markets. The Mon Valley complex, due to its unique nature, further complicated the already existing challenges. USX, like other companies, must continuously explore opportunities for growth. However, even when Managers respond to investors demand to grow by finding new growth opportunities such as installing a new technology, the odds of creating successful growth in the long term is still very low.

Even though all analysis of the CSP project, as mentioned several times above, has made it clear that the conventional casting technology was the correct investment for Mon Valley, Kappmeyer should not sign the proposal without further considering other investment options outside of the two described in the case. The researchers and engineers only compared two investment options – the CSP investment option involving continuous thin slab casting and the $600 million option for the conventional casting. Yes, the CSP investment in terms of the complexities of Mon Valley, the integrated steel market vs. the minimills, and USX’s unique customer base has been proven to be the incorrect decision. However, based on the information presented in the case, Management (i. e. Kappmeyer) has not considered other options to grow the business beyond the conventional

continuous casting and CSP technology at Mon Valley. With either investment, USX is still focusing on its same particular customer base and relies on its motto “ Mon Valley sells surface, not bulk.”

Additionally, the main advantage is cost savings, with which other companies would likely soon compete. That strategy has clearly worked in the past. There is no doubt that USX must assume sufficient quantity and quality to those customers. However, it appears as if USX has not even considered investments at Mon Valley that would allow it to increase its customer base and/or begin to serve another niche market. For example, would it be possible for Mon Valley to implement the conventional continuous casting system at Mon Valley but create an expansion that could involve use of the CSP technology at low costs and serve customers who demand lesser quality? Does USX have investment opportunities that involve a merger, acquisition on joint venture with a minimill (specifically Nucor’s Crawford) or even another fully integrated mill? In other words, USX has failed, thus far, to consider modifications or different basic technologies to "either the conventional continuous casting and hot-rolling process or the CSP casting system that could serve new markets, which is known as architectural innovation.

These are ways to grow the company that involve more than just implementing new machinery and technology and may allow for USX to expand its market and customer base and further take advantage of economies of scale. If USX continues to focus only on its current customers and what has worked in the past, USX is likely to become a casualty of the

success dilemma, by which companies continue to manage only current core competencies and fail to sustain growth and profitability. Not only as Management failed to consider other growth opportunities, going forward with the conventional casting recommended in the proposal may put USX in a position that limits its ability to reach to future market changes. For example, Kappmeyer knows that this was the last continuous casting investment which would be made at USX for at least a decade.

Kappmeyer needs to be certain that a modification of the current continuous casting proposal may not be better in order to ensure potential growth over the next decade. Not only that, but Kappmeyer is only looking 10-15 years into the future. The fact is that " USS's current 75% utilization rate of its strip production capacity was average for the industry and the sheet steel market was growing relatively slowly. At current growth rates there already was sufficient capacity in the industry to satisfy market demand for another 10-15 years." Although not a completely unmerited analysis, it is clear that successful companies, such as Johnson & Johnson, that expect long term growth need to look " 100 years into the future." USX does not appear to be doing that. In rationalizing the conventional continuous casting system, the case states that " it is unlikely that any new integrated greenfield mills could be justified in the "foreseeable future." Furthermore, " Kappmeyer determined that selecting which programs or technologies ought to be the focus of USS's future development efforts was an important corporate priority." That having been said, USX must still be prepared to react to or think ahead of its competition in the event that the " unlikely" events do happen. Furthermore, before signing the proposal, USX should have a more

concrete vision for the future. In this way, he could make changes to the proposal, if needed, to support the long term vision and mission.

If he signs the proposal immediately, USX could be limited to potential growth opportunities. It is better for USX to look ahead and ensure that any decisions today support that vision. In conclusion, USX has many challenges and complexities surrounding the implementation of the new technology at Mon Valley. Although it appears that the conventional casting system is the correct investment based on the analysis, Kappmeyer should hold off on signing the proposal until he has fully considered other investment and growth options that could increase profitability by increasing customer base or otherwise. Additionally, Kappmeyer should have a more clear direction of the company for the long term in terms of potential growth opportunities before signing the proposal, such that any decisions now are assured to support the long term mission of USX. This will better ensure USX does not become a victim to the success or growth dilemma and can become part of the 16% of companies that survive in the long term and perhaps included in the 9% that outperform the equity market averages over the next decade.