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Amy Blitz,

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Case

Lessons from the steel industry: if you can't compete on price, innovate your way to value-added differentiation

Amy Blitz

Amy Blitz is a strategy consultant specializing in innovation and adaptive business models and a lecturer at Babson College where she teaches economics and strategy (www.amyblitz.com). As head of strategy research at the IBM Institute for Business Value from 2005 to 2009, she led a series of projects on strategy and innovation. Her *Strategy & Leadership* article "Beset by the digital revolution successful retailers embrace technology that enhances customer value" appeared in Vol. 44, No. 6.

Threats from low cost competitors – populist foot-stamping notwithstanding – are a fact of markets, a trend likely not just to continue in coming years but to accelerate. It might be China today but it could be another country or company or technology or any number of new disruptions tomorrow. The fundamental strategic question then – for business leaders everywhere – is how best to compete when competing on price alone is not a realistic option.

The steel industry provides a useful guide. Particularly hard hit by falling prices, the steel industry has seen a glut in markets due in large part to China's increased production by 540 percent from 2000 to 2014.[1] This, together with a general drop in world demand post-2008, has hobbled many in the industry. In the U.S., former giant Bethlehem Steel died in 2003 and US Steel, once a global leader and a bellwether of the U.S. economy, has struggled, ranking 24th in world steel production by 2016.[2]

Differentiate to best low-cost threats

During the same period, however, Korea's POSCO has managed not just to survive but to thrive. The question is how? Privatized in 2000 just as China began flooding markets with cheap steel, POSCO has successfully pivoted from competing on price to competing on innovation. It introduced new revenue-generating offerings as well as innovative cost-saving processes while also improving its environmental footprint and overall performance. Ranked 4th worldwide in terms of production, and named the world's most competitive steelmaker for seven straight years by World Steel Dynamics,[3] POSCO has also been listed on the Dow Jones Sustainability Index for 12 years in a row and has ranked first in the steel industry on this index for two years.[4] POSCO has achieved these results via extensive Six Sigma and related innovation initiatives that drive collaboration not just among employees but also among customers, suppliers and other strategic partners. This strategy has proven both adaptive and sustainable.

The takeaway: even in a mature, seemingly commoditized sector like steel, opportunities to compete on the basis of value-added differentiation exist.[5] Here, Six Sigma and related operational strategies to drive innovation have been fundamental to what is known in the firm as the "POSCO Way."

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POSCO's success story

As brief background, the South Korean government established POSCO in April 1968, as part of a broader national industrial strategy to rebuild its economy, which was then still recovering from years of devastation under Japanese colonial rule from 1910 to 1945, the ravages of WWII, followed soon after by the Korean War in the 1950s. The latter left South Korea with an enemy to the North and an economy in ruins. Self-sufficiency in iron and steel was deemed critical to Korea's broader economic development. With backing from the Korean government plus \$119 million in loans and grants from the U.S. and \$54 million in credit from the Export-Import Bank of Japan, as well as technical assistance from Nippon Steel and other corporations, POSCO was launched.[6]

Effectively a state-run company, POSCO completed its first production line in 1973, with an annual capacity of 1.03 million tons of crude steel. By 1983, the company built Pohong Works, with capacity for 9.1 million tons of crude steel per year. Two years later it began construction of Gwangyang Works, completed in 1992 with an additional 11.4 million ton capacity. When the 1997 Asian financial crisis hit, however, the Korean government began restructuring its industrial policies, including its role at POSCO. Its first move was to announce plans to privatize POSCO, a plan initiated in December 1998, when the government sold all of the shares then held by Korea's Ministry of Finance and Economy. Seven months later, in July 1999, the state-run Korea Development Bank sold some of its shares, as the government's stake fell to just 12.84 percent, with privatization completed by October 2000.[7]

Unfortunately for POSCO, this coincided with China's emergence as a steel powerhouse, with lower priced steel than POSCO could compete against. Long protected from market forces, POSCO now faced serious competitive threats. To address this, POSCO launched a series of innovation initiatives – starting with internet-based ERP and related IT systems, followed by Six Sigma, then Quick Six Sigma (QSS) and now POSCO's own QSS+. Drawn from extensive research and experimentation in the field of operational improvement, POSCO's innovation initiatives have trained people throughout the organization to continually search for and implement solutions that meet customer needs profitably, optimizing costs as well as value to customers.[8] These programs have led to effective collaboration throughout the company's extended enterprise – employees, customers, suppliers and other strategic partners – and have generated levels of efficiency, productivity and profitability that consistently exceed industry averages, even after the 2008 global financial crisis that hurt so many companies in steel and other sectors worldwide.[9] How has POSCO done all of this?

POSCO's innovation process

STEP 1: Foster internal collaboration

POSCO first focused on internal processes, taking measures to drive collaboration among employees by breaking down barriers – social, organizational, operational and technological. A key initial step here was to upgrade the company's IT, introducing ERP and other internet-based systems to manage and coordinate information. These early process innovations – completed by 2002 – reduced by 50 percent or more such key metrics as delivery times, inventory turnover, time spent on budget planning, and the total

number of work procedures.[9] Next, to further drive collaboration throughout the organization, POSCO introduced Six Sigma and related programs designed to establish common approaches, terminology and fact-based decision-making for managing operations. POSCO also used these programs to integrate company-wide projects and establish cross-functional processes.

There was some resistance at first. For example, highly educated specialists from R&D initially resisted the idea of working with teams from manufacturing. To help break down such barriers, POSCO established a clear vision for the company with specific goals to motivate employees to work together. Quarterly “Innovation Conferences” were then used to discuss and build consensus on innovation plans, as were weekly meetings or “rumblings,” as they were called. In addition, POSCO held team-building events and festivals, combined with intensive Six Sigma training programs and projects that required cross-functional collaboration. By 2005, these approaches were further refined, as POSCO recognized two main categories of innovation – continual vs radical.

For the continual types of innovation, POSCO moved from traditional top-down decision-making to a new Quick Sigma approach. Quick Sigma emphasizes dynamic, non-hierarchical, field-based problem-solving to address continuous innovation needs. To drive this, field experts were actively trained, cultivated and recognized as leaders, empowered to act on fast-moving decisions in the field. At the same time, POSCO kept its more traditional approaches – top-down, R&D-led, statistically engineered – for developing radical, or discontinuous, types of innovations. As one measure of the success of these efforts, POSCO has regularly led the industry in labor productivity,[10] and cross-functional collaboration has become a well-established norm.

STEP 2: Collaborate with customers

The next step was to promote collaboration with customers. Instead of using marketing or salespeople to research customer needs, as was traditionally done, POSCO began sending engineers to work directly with customers to identify areas of opportunity for specialized, differentiated, high value added steel products. This was POSCO’s “solution marketing” approach. The engineers then returned to POSCO and worked with teams from manufacturing and other divisions to translate customer needs into viable solutions. In shipping, for example, POSCO has developed rust-resistant steel that is impervious to salt water. And currently, POSCO is working on a next generation “green” solution for shipping. By 4th quarter 2017, POSCO is set to deliver to Hyundai Mipo Dockyard a 50,000 deadweight ton carrier that can use liquefied natural gas (LNG),[11] a cleaner option than conventional oil-based fuels. Key here is the use of a new type of steel that POSCO has developed – high in manganese, with strong cryogenic properties that allow the safe transport and storage of LNG even in extreme cold.

Another industry POSCO has focused on is automotive. Here, POSCO has collaborated with various automakers to develop new varieties of high-grade steel, including some that paint adheres to well and others that are particularly strong, thin and lightweight, allowing for increased speed and fuel efficiency. One such variety was co-developed with Renault Samsung and uses magnesium – the thinnest, lightest and strongest material available for cars today, 30 percent lighter than aluminum. As of 2015, it is being used by Porsche for the roof of its 911 GT3 RS, a sports car that has been breaking speed records.[12] Other promising areas for POSCO include electric vehicles and hydrogen-powered cars, where

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“POSCO introduced new revenue-generating offerings as well as innovative cost-saving processes while also improving its environmental footprint.”

weight is also a critical factor. In addition, POSCO has been collaborating extensively with Renault Samsung toward other innovations, including a doughnut-shaped fuel tank for cars that use liquefied petroleum gas (LPG), another relatively clean option compared with traditional fuels.

STEP 3: Drive innovation throughout the supply chain

Next, POSCO began working with its suppliers to promote innovation throughout the company's supply chain. One area of focus has been “green” technologies and processes aimed at reducing costs by lowering energy consumption and water usage while also mitigating pollution and POSCO's overall environmental impact. A major success here has been the co-development with Siemens VAI of “Fine.” Launched at Pohong Works in 2007, Finex is an iron making process that eliminates the need for coke-based blast furnaces, lowering not just emissions but also upfront capital requirements and ongoing operating costs, all contributing to POSCO's relatively strong profitability since then. Today, POSCO's collaborations have expanded to include hundreds of first, second and third tier suppliers. And these supply chain partners participate in QSS, QSS+ and other such sessions to establish cohesive innovation strategies and practices, and to set performance outcomes through joint benefits sharing programs.

Enabling these collaborations are a variety of technology solutions POSCO has invested in to coordinate information sharing and knowledge management throughout the enterprise, including suppliers. In addition, POSCO provides financial support, including low interest loans, to help suppliers with short-term collaboration projects. As of 2009, 699 affiliated firms had received US\$469 million for these.^[13] POSCO has also benefitted from Korean national policies that encourage the emergence of innovation ecosystems in key industries. For example, the Korean government supports R&D investments in large firms like POSCO on the condition that these firms then commit to buying specific amounts of goods and services from Korean SMEs. Here, POSCO, with the Korean government's support, has played a crucial role in helping to build innovation capabilities throughout an extensive network of SMEs while at the same time strengthening its own position in ever more competitive global steel markets.

STEP 4: Establish strategic partnerships with leading innovators

POSCO has also developed strategic partnerships with leading innovators beyond steel, in part to stay ahead of the curve in IT, communication and other potentially game changing technologies. Since 2011, for example, POSCO has partnered with Google to develop a “Smart Workplace,” connecting social media, mobile devices, cloud computing and other technologies to improve operations, logistics, energy use and safety. Among other results, time spent on decision-making has been cut by over 60 percent.^[14] Today, POSCO is studying best practices in “Smart Manufacturing” from Siemens, GE and BASF, and is adapting these for steel. Using “smart sensing,” “smart analytics” and “smart control,” POSCO now collects data from production sites in real-time, then analyzes the data to better predict production processes, and finally harnesses the findings toward resolution, machine learning and ongoing optimization. For example, wearable sensors alert workers to dangers such as gas leaks, while sending data to control centers so the problem can be resolved. Sensors that allow for continual analysis and learning are also used for defect

tracking throughout production, while 3D virtual factories help simulate and improve processes from new product development through production. And these are just the first wave of what is expected to be a sweeping industrial revolution in coming years.

Guidelines for enabling a differentiation strategy throughout the enterprise

- Anticipate low-cost competitors – build a culture of innovation throughout the enterprise to stay agile and adaptive, and promote both continuous and radical types of innovation.
- Break down internal barriers – social, organizational, operational and technological – among employees and drive collaboration among cross-functional teams.
- Stay close to customers – include R&D teams in solutions-oriented marketing, and enable them to work closely with customers and others throughout the enterprise to identify and address unmet market needs with new value-added offerings.
- View suppliers as partners – collaborate with suppliers to deliver solutions to customers while continually searching for ways to reduce costs to customers as well as to the environment.
- Think outside your industry – cultivate partnerships with leading companies in other sectors such as tech to stay ahead of the innovation curve in your own industry.

Consider business model innovation – beyond POSCO's approach, consider adapting not just processes and offerings but the overall business model, as IBM did in the 2000s by shifting to B-B consulting and related strategies, shedding its B-C PC market when hit by Dell on price and Apple on differentiation. (See *Three ways to successfully innovate your business model* by IBM authors Edward Giesen, Saul J. Berman, Ragna Bell and Amy Blitz in *S&L* Vol. 35 No. 6, 2007).

Going forward

U.S. business leaders should expect disruptions in the macro environment to not only continue but to accelerate in coming years, with threats from agile, innovative, low cost competitors to be an ongoing threat to existing business models. Whether such threats will come from China or another country or company or technology or other disruptors, the key strategic lesson here is: if competing on price alone is not a realistic option, companies should pivot to focus on value-added differentiation. This case shows how POSCO managed to identify and address a host of unmet customer needs, introducing new revenue-generating offerings as well as cost-saving new processes while also improving the company's environmental footprint, making it a desirable partner for customers concerned about having a socially responsible supply chain. POSCO has achieved these results by creating a culture of innovation that embraces both continuous and radical breakthroughs. And this culture extends beyond POSCO's walls, driving collaboration among employees as well as with customers, suppliers and other strategic partners. This approach has proven both adaptive and sustainable, offering lessons for any company faced with low cost competitors.

There is good news and bad news in all of this. The good news is that opportunities for potentially game-changing innovations in steel and other mature industries are growing

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“POSCO has partnered with Google to develop a “Smart Workplace,” connecting social media, mobile devices, cloud computing and other technologies to improve operations, logistics, energy use and safety.”

today. Some of the most potentially game-changing advances are in areas such as robotics, artificial intelligence, the internet of things, big data and automated supply chains. This so-called “fourth industrial revolution” is expected to transform manufacturing processes by incorporating ever more “smart” approaches to managing the entire supply side of the global economy, while transforming as well global demand for goods, as smart phones, social media, data analytics and other advances allow for ever smarter, faster responses to changing customer needs. There are also big problems to solve, including climate change and rising inequality, posing not just vast societal threats but also opportunities for creative business leaders. But, there is bad news too: failure to keep up is not a viable option, nor is clinging to the past via tariffs and isolationism. As Christopher Walken’s character in the 2001 movie *Joe Dirt* intoned with ironic obviousness, “the past is passed, the future is now.”

Notes

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9. For comparative assessments over time, see World Steel Dynamics and Dow Jones rankings. For performance trends, see POSCO’s 2016 SEC filing, <http://pdf.secdatabase.com/240/0001193125-16-652989.pdf>. From this, the *Financial Times* highlighted an 88 percent jump in second-quarter net profit, see: “Steel rebound sends Posco’s profits soaring,” *Financial Times*, July 21, 2016.
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Corresponding author

Amy Blitz can be contacted at: ablitz@babson.edu

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