Northwestern Kellogg School of Management

KE1199

November 22, 2021

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Inspiral:
A Contrast in Operations Strategies

"No luce esperanzador" means "It does not look hopeful" in Spanish. That is what Eduardo Morel, the director of the Tapa Rosca Inspiral screw cap company, said after reading a business report about the Zakrętka Group, a Polish competitor, planning to build a new plant in Chile. With its Warsaw plant—one of the most efficient screw cap factories in the world—Zakrętka had become a leading manufacturer of aluminum closures for spirits and wine in Poland. The success in its home market had not yet translated to the South American market because of the lack of a local plant and sales force, but the business report indicated that this circumstance could change.

Morel wondered what impact a new local Zakrętka plant would have on Inspiral's screw cap plant in Maipu, a town about 9 miles (15 kilometers) southwest of Santiago's downtown. He asked his associate Anna Ruiz, a recent MBA graduate, and Luis García, the new plant manager at Maipu, how serious a threat they believed the new Polish plant would pose to Inspiral. Morel wanted the pair first to analyze the situation to determine whether Inspiral needed to change its operations strategy and then to prepare a proactive plan to mitigate any potential threat.

The Screw Cap Industry

Screw caps were are mechanical devices made to close or seal containers such as bottles, cans, jars, or tubes to preserve their contents by providing a barrier to outside contaminants. As screw

 This case was prepared by doctoral candidate Alejandro Hernandez De La Lanza and Professor Jan A. Van Mieghem. The authors are grateful to Eduardo Morel for many discussions and to Professor Gary Pisano for his inspirational case "American Connector Company (A)," # 693-035, (Harvard Business School, October 1992; revised December 1992).

caps could be twisted on and off the "finish" on a bottle or container, they provided an alternative to cork for sealing wine bottles. (See **Exhibit 1** for examples of various screw caps types.)

These integral devices could be made from several materials, including metal (mainly aluminum), plastic foam, and cork or rubber. Because screw caps were used in a variety of products and industries, companies that used the devices called for different materials and specifications. Tin, polyethylene, polyvinylchloride, and aluminum were among the materials used most frequently. Aluminum was the material of choice for wine bottles, and aluminum screw cap configurations varied with a wine's quality and price. Screw caps for the wine industry normally twisted onto a wine bottle via a metal skirt. Customers valued the screw cap's practicality, as it was easy to open and close, and it reduced wine oxidation and cork taint.

The Wine Industry

The main wine producers were located in Europe, South America, and North America. Italy (18%), France (17%), Spain (15%), the USA (10%), Argentina (4%), and Chile (4%) accounted for about two-thirds of the total worldwide production.[1] South America, mainly Argentina and Chile, thus accounted for almost 10% of the global output. **Exhibit 2** shows global wine production by main producers.

Information analyzed by the market research company Transparency indicated that the global market for metal caps and closures would see an expected compound annual growth rate of 5.2% during the coming few years.[2] In the annual closure survey conducted by *Wine Business Monthly*, around 40% of the vineyards surveyed declared they used screw caps, among other closures.[3] Most respondents used more than one type of closure because they produced different types of wines. **Exhibit 3** indicates that the screw cap was the solution that showed the highest growth since 2004. The 3% to 5% annual growth rate of bottled wine production was captured mainly by screw caps and technical cork, whereas the market for natural corks and synthetic closures was stagnating.

As each type of screw cap had its own set of designs and specifications, vineyards tended to have different suppliers. Standard designs were more popular among large vineyards, which bought screw caps directly from larger manufacturers for their productive capacity, as well as the services and lead time they offered, in addition to their products' functional quality. Large vineyards negotiated long-term contracts for standard screw caps with multiple vendors, although they had exclusive single sourcing for some screw caps. For these exclusive contracts, vineyards tended to evaluate and certify the quality of their provider.

1 "The First Estimates of 2020 World Wine Production," International Wine Organization, October 2020, accessed December 3, 2020, http://www.oiv.int/public/medias/7542/en-oiv-oiv-press-conference-october-2020-press-release.pdf.

2 Inform Transparency Market Research, September 2019, accessed December 3, 2020, https://www.transparencymarketresearch.com/pressrelease/caps-closures-market.htm.

3 Cyril Penn, 2020 WBM Closure Survey Report, *Wine Business Monthly*, November 2020, accessed December 3, 2020, https://www.winebusiness.com/wbm/?go=getDigitalIssue&issueId=12355&dataId=237890.

In contrast, small- and medium-sized vineyards, with a focus on the best price-to-design-quality ratio they could find, preferred custom-produced designs. They also bought directly from multiple (usually smaller) manufacturers because they valued the direct relationship. Although they usually stayed with the same suppliers for a long time, they did not commit to long-term contracts.

The Zakrętka Group

The Zakrętka Group was founded in 1990 in Poland and quickly became an international leader in the production of aluminum closures for spirits and wine. Its main facility in Warsaw employed 25.

Even though the group made a variety of products, the "closures" division represented 99% of its net revenue (about US$800 million). This included wine closures (accounting for 63% of the closures division production), spirits closures (20% of the division), roll-on closures (10% of the division), and pharmaceutical closures, among others.

Several aspects characterized Zakrętka as an international leader. The organization was a benchmark company known worldwide primarily for its policy of continuous business development and technological innovation. Zakrętka was capable of modifying and optimizing designs to economize on raw materials and to streamline manufacturing. Features not viewed as added value for the client were discarded. In addition, Zakrętka's competitive strategy was based on an efficient manufacturing process across its divisions and products without much emphasis on product innovation. As one former manager of Zakrętka described it: "First, we learn how to make other companies' star products and equal their products' quality. Then, as we know our market, we eliminate features that our customers don't want. Therefore, we compete with cheaper prices [because] our manufacturing process is simpler."

However, Zakrętka's strategy was more than that. As the company excelled in its knowledge of the regional market, it could adapt designs for different segments. Another essential part of Zakrętka's strategy was maintaining close relations with the largest aluminum companies in Europe.

The heart of its operations was its Warsaw plant, a high-volume dedicated facility with highly specialized equipment and labor that was efficient in the use of raw materials yielding a low scrap rate of less than 1.5%. "We know that our clients value high-quality products at a good price," a former Zakrętka director said. "Our manufacturing excellence is the foundation of our low cost position and the hallmark of our strategy."

Most of the plant's decisions were made by the Production department. Its head was responsible for the plant and additional warehouses and reported directly to the company president. As the latter relied more on Production, the Sales and Marketing departments were not allowed to modify production schedules or promise clients a different delivery time. Even when a client would ask for an unscheduled delivery, Production would typically not adjust its schedule.

The Warsaw Plant

During the early years of the company, Zakrętka planned to build a production facility capable of achieving mass production that would result in high gross margins in the closures segment. This vision called for one large, centralized plant with high-end technology. This would allow for an automated process and a continuously operating plant reaching full asset utilization, with minimal scrap and high-quality, low-cost products.

The board chose Warsaw, Poland, as the site for the plant that began operations in 1997. The city offered several advantages, including proximity to one of Europe's largest suppliers of aluminum (the most expensive cost component in the final product). Warsaw was also close to major customers (in France, to the largest wine producer, and in Russia, to the biggest vodka producer).

The operations strategy was to focus on high-volume demand and to produce huge batches. The Warsaw plant was designed to make a maximum of 800 million sc (screw caps) per year, assuming full asset utilization during scheduled operating hours. Last year's output was 700 million sc at a gross margin of 50%. The vast majority of the plant output, 90%, was sold in the domestic market (Western and Central Europe), and only 10% was sold in Asian markets near Europe. To avoid start-up and shut-down costs, the plant operated on a continuous, 24/7/330 basis: 24 hours a day, seven days per week, 330 days per year.

To implement this strategy, all functional departments coordinated but were subordinated to the plant operations:

Plant. The Warsaw plant was organized along four production lines. Each line was dedicated to manufacturing one type of closure: for wine, spirits, roll-ons, and pharma. This product-line focus allowed great specialization and optimization.

Each line was capable of processing high volumes by relying on its automated process (which allowed a synchronized operation) with process steps in close physical proximity to one another. This layout minimized materials handling and resulted in small batches of work in progress (WIP) on each line.

Because of its proximity to Zakrętka's most important clients, the plant could deliver product to long-term customers daily. Constant deliveries allowed Zakrętka to keep little raw material inventory (averaging five days) and, therefore, only a small warehouse within its facilities.

Process Design. To operate the Warsaw flow process continuously with high utilization of its highly automated lines, the company required a "pre-process" to assure smooth operation. Zakrętka spent considerable time analyzing, understanding, and optimizing all process steps. The result was a streamlined operation with almost zero waste. The plant ran literally like a well-oiled machine: Everything was specified and coordinated before a process began. Material and operator movements, the tolerance in each product and process, and the allowed quantity for supplies inventories—all were synchronized.

The plant layout was arranged around the idea of having as little waste as possible. For example, only a small area of floor space was designated for inventory, intentionally configured to prevent product accumulation. Each line was independent of the others and had product-specialized equipment for coloring, printing, shaping, and finishing each batch of screw caps. Moreover, all equipment was arranged "in-line," i.e., in one continuous straight line from the reception of raw material to packaging.

Even though the plant relied on automatization, managers were reluctant to take a chance on new technology if that meant changing an old proven process. That did not mean that the company didn't pay attention to technology development. Every process technology was built by Zakrętka and coordinated by the Technology Department. The latter oversaw the coordination and management of the activities throughout the plant and was responsible for achieving every department's common goals.

Each piece of machinery was subject to a rigorous quarterly repair and maintenance schedule. As soon as the equipment was flagged as becoming outdated, the Engineering and Production departments would replace it to avoid possible failures and downtime in the plant. To further prevent unplanned downtime, equipment typically was run below its maximum-rated speed.

Products. The company strategy required economy in raw materials. Much thought was put into designing a product that was easier to manufacture and used less material. During the past couple of years, the plant produced only 72 separate stock-keeping-units, a modest number for a facility of its size.

The low product variety resulted in less manufacturing complexity and longer production runs. It also allowed the Design Department to engage in "value engineering" by identifying and implementing material cost-saving changes without reducing quality and performance (**Exhibit 4**).

Suppliers. Zakrętka maintained close relationships with key raw material suppliers. The company had rigorous standards for determining with whom it would work. After a supplier was certified to meet its high-quality standards, Zakrętka would use its products without further inspection. Quality was not only improved by Zakrętka but also by every one of its suppliers, each of which was encouraged to improve its own quality during regular meetings with Zakrętka's Quality Control Department.

Production. With low product variety and the Production Department's complete control over the manufacturing schedule, the company planned long runs (typically about one week) as frequently as possible to avoid changeover costs.

With continuous just-in-time production, the flow time from pulled raw material to finished product added to finished goods inventory averaged two days. However, the company still held an average of 60 days' worth of finished goods inventory.

Workforce. As the company increased automation, fewer direct production workers were needed. Moreover, the number of supervisors in charge of specific activities around the plant also

was declining. Furthermore, the company didn't offer on-site support because its clients could rely on the quality of its standard products.

Even though salaries exceeded market rates to attract highly-skilled people, the company was known for high turnover after the five-year tenure mark. During their first year, employees were expected to rotate among three different areas, so that none would be specialized in a particular process and would be able to assist wherever needed. All production workers followed the same onboarding process to solve most tactical problems in each manufacturing line.

The number of employees dedicated to support the operation (i.e., accounting, production management) was relatively low because of the plant's policy of continuous business development and technological innovation (**Exhibit 5**).

Inspiral

INESA was one of the first local manufacturers of screw caps in Chile. Initially, the company expanded quickly in the local region, achieving a 55% market share by 2015 in the domestic wine sector and 21% in South America, focusing on Chile, Argentina, and Brazil. It wasn't until 2017, after more than 40 years of experience in screw cap manufacturing and technical customer support, that the company was acquired by RMD Group and started a new path to consolidation in the international market.

After a rebranding in 2018, Inspiral was born to express the company's future strategy on innovation and internationalization. Along with Ramondin (one of RMD Group's capsule manufacturing brands), Inspiral was a specialist in packaging, designing, and producing a complete portfolio of fastening products for wine, champagne, and spirit bottles. The quality strategy called for RMD Group to "have an integrated management system to ensure compliance with policies on quality, food, environment, occupation health and safety, and corporate social responsibility."[4] The group was rated among top players in terms of quality.

The company went beyond industry-standard designs and focused on high-quality products manufactured to customer needs. These custom-made orders represented 40% of the company's total production volume.

Inspiral configured its operations to emphasize a value proposition that included a wide product variety based on each client's needs, focused on the speed and timeliness of service delivery and availability, as well as on highly responsive technical support. Providing these "customized engineering solutions" meant that employees worked closely with some of the larger accounts to understand their unique needs and to adapt designs and production per those particular needs.

4 Inspiral website, accessed December 1, 2020, https://www.inspiral.com/en-us/about/.

The Maipu Plant

Inspiral's principal plant near Santiago de Chile started operations in 1982 to serve the regional industry. In its early days, the plant had an annual capacity of only 340 million screw caps. As demand for screw caps increased, capacity had to grow. After several expansions, the rated capacity (during scheduled operating hours) reached 600 million sc per year, and Maipu employed 104. Last year, the Maipu plant produced 420 million screw caps at a gross margin of 43%.

The plant maintained the excess capacity to provide quick customer response and in anticipation of longer-term forecasted growth in demand. The Maipu plant targeted an average 85% capacity utilization; the remaining 15% provided safety capacity to provide quick turnaround time to unplanned customer orders. Manufacturing ran two shifts per day, six days per week, 300 days per year. (See **Exhibit 6** for productivity comparisons between the Maipu and Zakrętka plants.)

Because the Latin American market was expecting many political—and, thus, market—changes, the Maipu plant had no major plans to make new investments in new technology or additional capacity. Carlos Silva, the company's production director, explained the decision: "Although we have made some important investments in production equipment whenever we saw an opportunity to improve quality or productivity, with these market conditions, we have not upgraded some of our most important equipment. This could quickly hurt our production and therefore our clients."

The Maipu plant's product portfolio, which included customized products, exceeded 500 screw cap variants. The facility could accommodate several types of screw caps for wine, water, and spirits bottles of varying sizes. The offerings came in 32 standard colors in three main categories: Premium Tin, Prestige, and Basic.* The Premium Tin screw caps allowed full customization, including multiple top custom embossing options, spray or offset printing, silk printing, and special seals. Prestige featured a wide selection of finishes and custom side decoration, whereas the Basics were standard plain caps made-to-stock to offer immediacy and simplicity for most urgent demands.

The demand for Inspiral's caps was highly concentrated, with the company's five main customers representing almost 80% of its total. Although its primary selling market was Chile, 27% of Maipu's output was exported. Some 70% of volume came from multi-year contracts.

The Maipu plant was functionally organized around four production areas: feed and color lithography, printing, shaping, and finishing. The exact screw cap process sequence depended on the needs of the client, but the typical flow was as follows:

The process started in the lithography area with a batch of thin, 3-foot(1-meter)-square sheets of aluminum passing through a feeder. Lithography then applied to each sheet a varnish

* Inspiral had different screw cap sizes: 30mm x 60mm, 30 x 50, and 30 x 24 (30 refers to the standard bottle diameter of wine and water bottles, and 60, 50, or 24 to the length of the screw cap); 25 x 43 (small wine bottles, e.g., those served on airplanes); and 31.5 x 24, 31.5 x 44, and 31.5 x 54 (31.5 is the standard spirits bottle diameter). As the company personalized many of its caps, it had more than 500 variants, counting special personalization for each customer.

(for coating, coloring, or priming). Next, the conveyor belt put as many as 1,200 sheets into a long oven, where the varnish dried at 190 degrees Celsius (374 degrees Fahrenheit) for about 20 minutes. Exiting the oven at an average rate of 4,000 sheets per hour, the sheets were palletized, and the batch was either returned for another run through lithography* or was put into temporary storage. Lithography was the most difficult and costly process step of the process, representing up to 35% of the production cost. Efficiency would have required large batch sizes that favored standard screw caps, a circumstance that was challenging with smaller, customized orders. The output of lithography was kept in temporary storage, a WIP of sheets waiting to be further processed. Inspiral had some contracts that required lithography to use the customer's optimal batch size and to keep colored sheets in inventory to provide those customers with an immediate response in emergencies.

After lithography, in the second step, a top printing machine applied the customer-specific design onto the aluminum sheet. The third step, shaping, used a punch press that cut about 90 caps out of one sheet, at a rate of about five sheets per minute. Exiting the puncher, the caps were formed but didn't yet have the correct dimensions. A stretching press then completed two cold-forming steps that first achieved the length and then the diameter requested by the customer. The fourth and last production step applied the finishing decorations specified by the customer. Three varnish lines took care of final coloring, four printers decorated the caps, and one top embossing machine applied the requested finishing. A profile-and-jointing machine formed the cap and made a cut. A polypropylene liner was inserted into a cap to ensure it was waterproof. A completed batch was then sent to packaging.

Maipu was the only "complete factory" in Chile. It handled the entire production process, whereas its competitors only localized the final three process steps. The facility was highly product-flexible and could handle both small custom and large (often standard caps) batches.

Manufacturing in close proximity to its domestic customers allowed the company to be very responsive by offering flexible and short delivery times. Inspiral also was the only local player that offered on-site technical service staff. Even though it came with additional costs, this local service provision manifested the company's customer-centric focus. By providing "customer solutions," Inspiral won market share over its competitors.

Although the production plan for a given day was supposed to be frozen 24 days in advance, this seldom happened, as the production schedule was changed to produce key clients' orders

* Lithography applies varnish or paint on one side of the sheet per pass. Hence, the first pass applies a food-grade coating (to protect the consumable container content from the metal) on the "inside" (the metal sheet side that will become the inside of the cap). Next, the sheet is returned to lithography for additional "outside" passes. If the outside cap retains the aluminum silver color, no coloring pass is needed, and the outside primer (a protection varnish needed by every sheet to lubricate and protect the sheet during subsequent punching operations) is applied in a second pass. If the outside cap does require coloring, then paint is applied during at least one pass. On average, Inspiral runs two passes per color, although some colors need three or four passes to achieve the right tone. After the color passes, the outside primer is applied in a final pass. Thus, silver caps require two passes through lithography, and colored caps up to six passes. When varnish or colors are changed, the litho machine must be cleaned; this changeover takes about 90 minutes, which forms the main operational cost. In fact, the changeover time is sequence-dependent and varies from 30 minutes (i.e., from varnish to black) to three hours (i.e., from black to yellow).

within weeks, or even days. As Emilia Soto, manager of the Quality Department, put it: "We are so focused on the customer that our production schedule must accommodate customer changes. As a customer-centric production company, we know that a long-term prediction of demand is virtually impossible. So our production department relies on our marketing and sales team."

The average process flow time for a batch of screw caps was four days for standard models but could rise to 14 days for highly customized screw caps. Some product lines were run 24/6 (three shifts per day, six days per week), but most had much lower utilization. The plant maintained a finished-goods inventory of 25 days, on average, and raw-materials inventory average of 30 days. This provided a source of competitive advantage to Maipu because it allowed a swift response to urgent customer batch orders and maintained flexibility, which was vital, as aluminum suppliers were far away. (See **Exhibit 7** for a comparison of manufacturing costs between Zakrętka's Warsaw plant and Insprial's Maipu plant.)

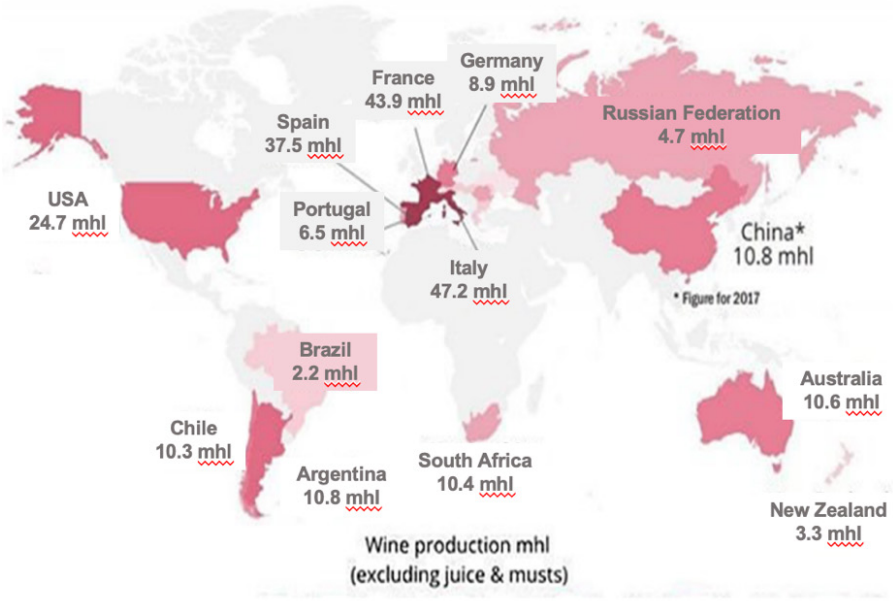
What to Do?

Morel wondered how the rumored entry of Zakrętka into Chile would impact Inspiral, so he asked Anna Ruiz, his associate, and Luis García, the Maipu plant manager, for their opinions. Ruiz replied that if Zakrętka were to build in Chile a plant like the one in Warsaw, the Polish company could drive Inspiral out of business. Therefore, she said, Inspiral should change its operations strategy by not waiting to see if Zakrętka could replicate the Warsaw plant in Chile. She urged proactivity by changing Inspiral's operations to match Zakrętka's.

García looked doubtful and responded that it wouldn't be easy for Zakrętka to replicate its Warsaw plant in Chile. In fact, he thought the Polish company's new plant would have to be different if it were to offer custom caps. He noted that Inspiral had been estimating the cost of custom screw caps to Zakrętka. (See **Exhibit 8** for the cost indices of plants in Chile and in Poland.) Based on that analysis, Garcia said, Inspiral should identify specific proactive improvements the company could take. This would mitigate the threat of Zakrętka—and might even discourage the Polish company from building a plant in Chile. Garcia recommended to Morel that Inspiral should look at its plan before considering a radical change to the company's strategy.

Exhibit 1: Screw Cap Examples

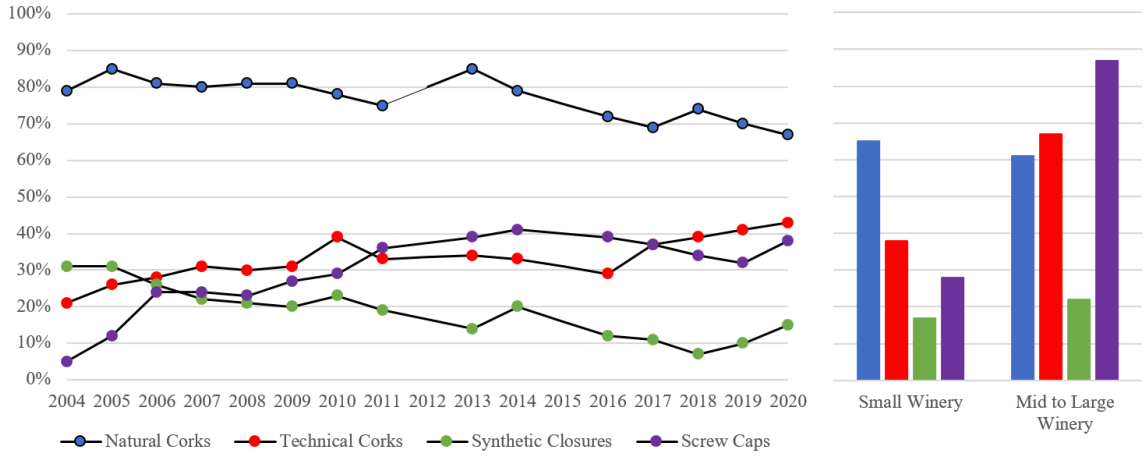
Exhibit 2: Global Wine Production—Main Producers



Source: International Wine Organization, "First Estimates of 2020 World Wine Production," 2020.

Exhibit 3: Screw Cap Trends

Survey question: Please indicate what type of closures your winery currently uses on 750 ml bottles.

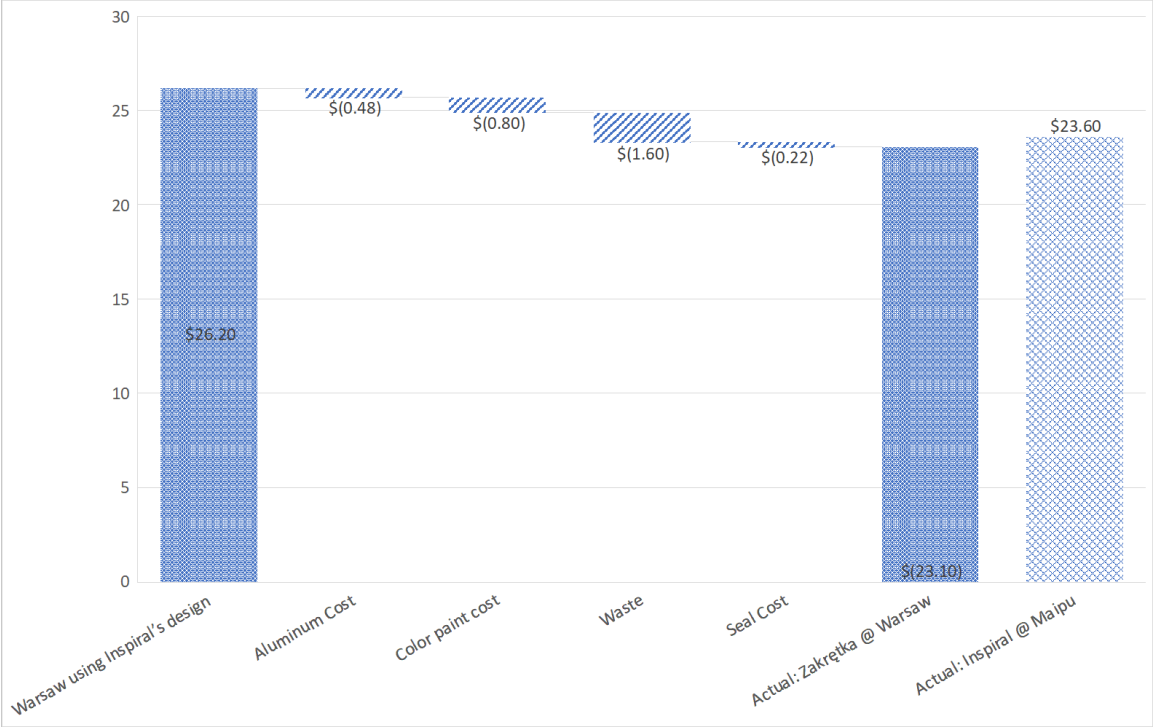


Source: Cyril Penn, 2020 WBM Closure Survey Report, *Wine Business Monthly*, November 2020, accessed December 3, 2020, https://www.winebusiness.com/wbm/?go=getDigitalIssue&issueId=12355&dataId=237890&recentArticleRedirect=true

Exhibit 4: Analysis of Material Cost Savings

Hypothetical material cost if the Warsaw plant were to mimic Inspiral's Maipu plant

(US$ per 1,000 screw caps)



Source: Company documents.

Explanation of changes that resulted in material cost savings:

- Aluminum: The Warsaw plant enjoyed a quantity discount with its top supplier in its long-term contract. Moreover, the Engineering Department used a different, cheaper aluminum composition that did not affect product performance or durability.
- Color Paint: As its manufacturing process used large batches, Warsaw had fewer changeovers and needed less cleaning of color feeders, thereby reducing color paint consumption.
- Waste: By reducing changeovers and using no spray at all, Warsaw greatly reduced defects and scrap rates, attaining the company's goal of having less than 2% of scrap in each process. This waste reduction led to material costs savings throughout the process.
- Seal Cost: Without compromising the product, Zakrętka modified the polypropylene liner design by reducing its thickness so that any unnecessary material was eliminated.

Exhibit 5: Comparison of Labor Use

	Warsaw 25 Employees	Maipu 104 Employees
Indirect Labor		
Control	12.0%	13.5%
Technology Development	12.0%	3.8%
Materials Handling	8.0%	8.7%
Mechanics[a]	16.0%	14.4%
Direct Labor	52.0%	59.6%
Total	**100.0%**	**100.0%**

[a] Also operated machines following the lean Total Productive Maintenance (TPM) methodology.

Source: Company documents.

Exhibit 6: Productivity Comparisons

	Warsaw 25 Employees	Maipu 104 Employees
Production of screw caps[a]	700	420
Screw caps per employee[a]	28	4
Fixed Asset Utilization (%)		
Plant Not Operating[b]	5.7%	42.9%
Non-Scheduled	11.8%	17.1%
Process Failure	1.2%	3.8%
Preventive Maintenance	2.6%	1.0%
Process Changeover	2.7%	5.7%
Quality Losses	3.1%	4.2%
Effective Utilization	**72.9%**	**25.3%**

[a] In million of units per year.

[b] Assumes maximum available time of 24 hours/day, 350 days/year (8,400 hours). Equal to (350 – days plant is operating)/350. Warsaw works three shifts; Maipu, two shifts.

Source: Company documents.

Exhibit 7: Comparison of Manufacturing Costs

Zakrętka versus Inspiral
Cost of Goods Sold
(US$ per 1,000 screw caps)

	Warsaw	Maipu
Total Raw Material	23.10	23.60
Aluminum	*16.20*	*16.30*
Other Raw Material	*6.90*	*7.30*
Total Labor	4.13	11.93
Direct Labor	*3.30*	*6.70*
Indirect Labor	*0.83*	*5.23*
Energy	2.40	3.40
Depreciation	2.10	5.97
Others	6.20	7.30
Total Cost	**$ 37.93**	**$ 52.20**
Gross Margin	50.0%	43.0%

Source: Company documents.

Exhibit 8: Cost Indices—Chile/Poland

Expense Item	Index
Aluminum	1.0
Other Raw Material	0.9
Direct Labor	0.4
Indirect Labor	0.4
Energy	0.7
Depreciation	1.0
Others	1.0

Source: Company documents.