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Bergerac Systems: The Challenge of Backward Integration

Introduction

In July 2010, Ian Wyckoff, CEO of Bergerac Systems, scribbled a few notes about his latest meeting with a group of veterinarians. These were his customers, and they provided direct feedback on their latest experiences with Bergerac's diagnostic instruments for animal care. The feedback was always valuable, although on this visit it was not entirely positive.

The customer feedback was fresh in Wyckoff's mind as he returned to the proposal he had started reviewing that morning. It summarized the "make vs. buy" analysis for OmniVue cartridges conducted by his director of planning, Bob McCarthy. McCarthy recommended that Bergerac build a cartridge fabrication unit within its own plant rather than acquire GenieTech, one of the company's two current cartridge suppliers.

The decision between in-house development and external acquisition was critically important. Bergerac was growing fast—averaging 17% annually since 2007—but it remained a small player with limited resources in a very competitive market, and Wyckoff was determined to avoid a costly mistake. He had to make a decision quickly, as the supply of OmniVue cartridges had been inconsistent in recent months. Indeed, the veterinary practice that Wyckoff had just visited had recently been frustrated by a temporary stock-out at their distributor. To maintain Bergerac's growth trajectory, it was imperative for potential customers to have full confidence in the company's ability to deliver on its promises. Furthermore, the contract with the other cartridge supplier, Elsinore Plastics, would come up for renegotiation in August 2010—a mere three weeks away.

Market Overview: Evolution of Pet Diagnostics

In 2010, veterinary spending in the United States was expected to be $13 billion, having grown 7% to 8% per year over the prior decade (see **Exhibit 1** for data on U.S. veterinary spending). Several factors drove this growth. First, pet ownership had increased steadily since the late 1980s, rising 6 points to more than 62% of households. Nearly 73 million U.S. households had one or more pets, and the average

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number of pets per household had increased. These households accounted for over 86 million cats and 78 million dogs. Second, the trend of pet "humanization" had increased owners' willingness to pay. More pet owners were empty-nesters, single, or childless, and increasingly they viewed their animals less as backyard inhabitants and more as family members. In fact, surveys showed that more than two-thirds of owners thought of their pets as family or children. These owners were more invested in the welfare of their animals, spending more on premium grooming services and organic pet food, for example. This trend also affected spending for veterinary care, with owners willing to spend more for screening, wellness programs, and expensive procedures to prolong life.

A third factor in growth occurred on the supply side: an increase in the sophistication and availability of veterinary care. Technology transfer from the human side of the healthcare industry had gained momentum in the 1990s. This led to better equipment, a broader range of treatments and procedures, and more veterinary specialists to meet the demands of owners committed to the best possible care for their pets. Practices that offered a fuller range of veterinary services delivered better patient care and generated more revenue per client.

The Market Shift to In-Clinic Diagnostic Equipment

One aspect of the change in veterinary care was the adoption of in-house lab equipment. This market had long relied on outside reference labs to perform both routine and complex tests. The shift to in-house equipment was positive for customers, pets, and veterinarians because customers no longer had to wait a few days for results and schedule follow-up visits to the veterinarian. Point-of-care testing also enabled better patient care—results were available immediately for interpretation, diagnosis, and intervention. Blood, chemistry, and blood gas analyzers enabled veterinarians to conduct tests for a range of purposes, including preventative care, pre-anesthetic and geriatric screening, hypo- and hyperthyroidism, and critical-care. For general screening—such as cholesterol, diabetes, or hypothyroidism—immediacy led to better compliance with prescribed care, and thus better patient outcomes. Likewise, pre-anesthetic tests armed veterinarians with more complete information prior to invasive surgery. The immediacy of test results provided by in-house equipment was particularly important for critical-care situations. For example, a cat that had ingested toxic chemicals and faced kidney failure would not have the time for a reference lab test; confirming its condition and beginning treatment had to take place at the clinic if it was to survive.

For veterinarians, the business case for in-house lab equipment was also compelling. On average, veterinarians recommended diagnostic tests two to three times every day. Practices that could test on-site captured the full revenue from this service, rather than redirecting it (or most of it) to an outside reference lab. In addition, many veterinarians found that having the equipment led to a higher volume of testing because customers were more amenable to a test that would not require a follow-up visit. Adoption of in-house diagnostics had been somewhat slower at smaller veterinary practices. However, larger practices, such as Banfield veterinary centers in PetSmart, were increasingly likely to offer in-house diagnostics, thereby making it more important for small and medium practices to keep pace.

Wyckoff was enthusiastic about the opportunity created by these trends:

> The confluence of factors reshaping pet care has us very excited about our prospects. We see growing demand from pet "parents" and vets committed to better patient outcomes *and* driving the growth of their own practices. We are confident market growth will be strong. There are nearly 30,000 veterinary practices in the U.S., and surveys suggest that only 40% have adopted in-house lab equipment. As penetration increases, we think we can capture share, particularly with products and pricing that work well for small and medium practices.

Industry analysts projected 8 to 10% annual growth for the in-house diagnostics market in North America over the next five years.

Company Background: Bergerac Systems and OmniVue

Founded in 2001 and based in Parsippany, New Jersey, Bergerac developed, manufactured, and marketed in-house diagnostic equipment, focusing on household pets. The company's first product was the HemaVue, an automated cell counter that delivered a complete blood count in just minutes. In 2004, the company also added a line of disposable test kits for rapid diagnosis of diseases such as heartworm, giardiasis, and Lyme disease. The most important milestone came in mid-2006 when Bergerac introduced OmniVue, a diagnostic instrument that provided chemistry, electrolyte, immunoassay, and blood gas analysis (see **Exhibits 2** and **3** for Bergerac financial statements).

The OmniVue instrument was used at the point-of-care in a veterinary clinic, enabling veterinarians to run a wide range of tests on their animal patients. The veterinarian would take a small sample of blood or serum and place it into a test cartridge, which was then inserted into the OmniVue for analysis. Cartridges were proprietary to Bergerac Systems, and cartridges were designed for specific animals and tests. Results were available in less than 10 minutes, allowing the veterinarian to provide a diagnosis and, if necessary, make a treatment decision.

OmniVue delivered highly accurate test results and was simple to use. In smaller clinics, the veterinarians themselves processed the results; many larger clinics employed lab technicians, who handled OmniVue with ease after minimal training. OmniVue's small physical footprint (it sat on a tabletop and occupied just one square foot) and the competitive pricing of both the instrument (average price of $9,500) and its test cartridges (average price of $9.25) made it very attractive, particularly to small and medium-sized veterinary practices. Bergerac had sold over 750 OmniVue analyzers in its first 12 months and had significantly increased its analyzer sales in each of the following years. The projected size of the installed base by the end of 2010 was 7,500 analyzers in veterinary practices across North America.

Bergerac's research and development team continued to work toward new innovations. The next product concept with a targeted launch date of 2013 was OmniVue Mobile, which would be a lighter, streamlined instrument that worked with smaller cartridges. A segment of veterinarians offered house calls, and this product would enable them to conduct diagnostic tests during visits. Bergerac had a small direct sales force of 20 reps, but primarily marketed its product through a network of veterinary distributors that typically carried a broad range of equipment and supplies for practices.

Bergerac versus the Competition

Bergerac vied with three major competitors in the veterinary diagnostic instruments market. Idexx Laboratories, Inc., was the industry leader and boasted the largest product line, the best-established distribution network and sales force, and a strong brand name. It had the largest installed base, and its comprehensive, integrated suite of diagnostic instruments and veterinary practice software made its customer relationships quite "sticky." Its Catalyst Dx chemistry analyzer, launched in late 2008, provided accuracy comparable to reference labs and could run multiple patient samples simultaneously, making it particularly well suited for high-volume practices. Abaxis, Inc., was Idexx's primary competitor, with products that delivered comparable results but were slightly more cost-effective and considered easier to use, particularly compared with prior generations of diagnostic instruments. Abaxis introduced its VetScan VS2 in 2008, and its ease of use meant there was no need for a trained lab technician—reducing overhead for veterinary practices. Heska Corporation offered a

similar set of products as those of its larger competitors, as well as a line of pet vaccines and pharmaceuticals. Its products were generally considered lower-end in quality and less innovative than that of its competitors.

Bergerac System's OmniVue product offered practitioners the same level of "reference lab"—quality and accuracy. It was very user-friendly, requiring virtually no training, and its small physical footprint made it convenient for practices with space limitations. It also featured self-calibration capabilities, and its quality control had been recognized for its accuracy in flagging compromised patient samples. The price points for the OmniVue instrument and the cartridges were slightly below the comparable Abaxis system, giving veterinarians a lower cost-per-use. This had helped Bergerac Systems gain traction among veterinarians adopting in-house equipment for the first time.

Production Process: Parsippany Plant

Manufacturing at Bergerac Systems was divided into two separate operations: instrument production assembled and tested the HemaVue and OmniVue diagnostic systems, while cartridge manufacturing produced the single-use cartridges used for each test. The operations were physically separated, but both were located at the Parsippany plant.

Instrument production

Production of the HemaVue and OmniVue instruments was an assembly-line operation. Bergerac Systems designed or specified all key components and sourced them from a range of third-party contract manufacturers. Critical components included microprocessors, a spectrophotometer, and a variable-speed motor. Because total unit volume was modest and a significant investment was required to qualify contract manufacturers, Bergerac Systems relied on long-term, single-source suppliers. Components and sub-assemblies were staged along the assembly line, and production operated on a single shift. Each finished unit was put through extensive quality testing to ensure that it met product specifications. Although the instruments were produced for use with animals, rather than humans, Bergerac Systems adhered to FDA regulations for Good Manufacturing Practices required for medical devices.

Cartridge production

Each test for the OmniVue required a single-use cartridge designed for a specific animal and a specific panel of tests, such as albumin, creatinine, glucose, and many more. The cartridge comprised two injection-molded plastic pieces—a base and a cover. Once assembled, the base and cover created a series of chambers into which the blood sample flowed. Within each chamber was a specific chemical reagent that would initiate a reaction with the blood, which the OmniVue could then analyze. Cartridge production took place in a sterile clean room where the chemical reagents were prepared, placed in separate chambers, and freeze-dried to remove all moisture. The lyophilization, or freeze-drying, process placed the reagents in a stable state. The base and cover plastic components were then welded together, and the cartridge was sealed in an individual foil package.

Bergerac Systems sourced its reagents from over a dozen third-party chemical suppliers, most of them located in the northeastern United States. The injection-molded plastic parts came from two suppliers—GenieTech and Elsinore Plastics. GenieTech, located outside Hershey, Pennsylvania, provided approximately three-quarters of Bergerac's cartridge needs, while Elsinore Plastics, based in Lowell, Massachusetts, provided the rest.

Decision: Backward Integration Opportunity

Since 2008, Bergerac had been exploring the opportunity to begin its own production of cartridge components. Backward integration could potentially solve the supply issues that had plagued the company. Plastics suppliers such as GenieTech and Elsinore faced a very competitive, fragmented market with very low margins. Most suppliers had little buying power and depended on petrochemicals as a key input, and were thus vulnerable to oil prices and supplies. The volatility and unprecedented spike in petrochemical pricing in the last three years had created significant challenges for the industry. Furthermore, the uncertain economic environment following the financial crisis of 2008 had made demand forecasting difficult for plastics suppliers and their customers. Capacity constraints for GenieTech and Elsinore made it difficult to respond to unexpected demand spikes, leading to occasional production delays.

Such unreliability made it challenging for Bergerac to optimize its cartridge production, leading it to carry more inventory of parts and finished goods than Wyckoff would have liked. In early 2010, simultaneous delays from both plastic parts suppliers led to a shortage of the comprehensive wellness test cartridge. The ability to control the supply of plastic components had obvious appeal. If the company pursued this strategy, it needed to decide whether to buy or build this new capability.

"Buy" opportunity

Relations between Bergerac and GenieTech had always been friendly. When Wyckoff broached the possibility of a merger, he found a receptive audience, as the GenieTech founder and owner was interested in retirement. For a purchase price of $5.75 million, Bergerac would acquire 8 molding presses, each equipped with 10 cavity molds (so that each press would produce 10 cartridge bases or covers at a time) and operating with a 75-second cycle time. An experienced labor force, including supervisors and machine operators, would come with the acquisition. Bob McCarthy's analysis suggested that with 90% uptime over 3 shifts and a 5-day working week, 4 molding presses could meet Bergerac's current cartridge parts needs. He estimated that Bergerac Systems' business already accounted for approximately 50% of GenieTech's revenue, and the remaining molding presses could be used for outside business, some of which GenieTech had on a long-term contractual basis. Acquiring GenieTech would reduce overhead and lower costs by nearly 26 cents per unit. McCarthy found that the payback period of the "buy" option would be nearly five years.

"Build" opportunity

As an alternative, McCarthy had also studied the possibility of making the plastic components in-house at the Parsippany plant. Bergerac would require only 4 molding presses to meet its needs, rather than the 8 offered by GenieTech. Another advantage of this option was that the company could acquire newer machinery with shorter 70-second cycle times, slightly more efficient use of raw materials, and machine uptime of 95%. The initial set-up would require time for installation and testing of the equipment, as well as hiring and training of additional staff. Once this set-up was complete, however, McCarthy found that the "build" option would save 57 cents per cartridge unit compared to today, with a payback of approximately 16 months.

Wyckoff pondered McCarthy's recommendation to build the cartridge parts production capability in-house (see **Exhibit 4** for the proposal and analysis). He had lost many nights of sleep over the supply challenges of cartridge parts, and backward integration would enable Bergerac to control its own destiny. Was McCarthy's case convincing? Was the timing right? Did he have the managerial resources to handle such a move? What was the best long-term decision for the company?

Exhibit 1 Veterinary Care Spending Data

	2008	2009	2010	2011F
Veterinary care spending ($B)	11.1	12.04	13.01	14.11
Annual growth		8.5%	8.1%	8.5%

Source: American Pet Products Association

Note: Veterinary care spending excludes over-the-counter medicines.

Exhibit 2 Income Statement ($ in thousands)

Year ended December 31st	2009	2008	2007
Revenues	$ 66,248	$ 56,044	$ 48,200
Cost of revenues	26,109	22,008	18,362
Gross profit	**40,139**	**34,036**	**29,838**
Operating Expenses			
Research & development	6,020	4,464	4,176
Sales & marketing	17,784	16,272	14,256
General & administrative	4,952	4,248	3,960
Total Operating Expenses	**28,756**	**24,984**	**22,392**
Income from Operations	**11,383**	**9,052**	**7,446**
Interest and other income (expense), net	(576)	(432)	(360)
Pre-Tax Income	**10,807**	**8,620**	**7,086**
Income tax provision	4,191	3,362	2,764
Net Income	**$ 6,616**	**$ 5,258**	**$ 4,322**

Exhibit 3 Balance Sheet ($ in thousands)

At December 31	2009	2008
ASSETS		
Current Assets		
Cash and cash equivalents	$ 20,187	$ 16,842
Short-term investments	12,047	12,218
Accounts receivable	12,931	10,724
Inventories	9,210	8,191
Prepaid expenses and other current assets	1,628	1,132
Total Current Assets	**56,003**	**49,107**
Long-Term Assets		
Plant, property, and equipment, net	9,117	7,014
Intangible assets, net	1,954	2,082
Other assets	559	408
Total Long-Term Assets	**11,630**	**9,504**
Total Assets	**$ 67,633**	**$ 58,611**
LIABILITIES and STOCKHOLDERS' EQUITY		
Current Liabilities		
Accounts payable	5,392	4,525
Accrued payroll and other liabilities	2,838	2,534
Warranty reserve	559	543
Total Current Liabilities	**$ 8,789**	**$ 7,602**
Long-Term Liabilities		
Warranty reserve	1,354	1,192
Notes payable, less current portion	5,582	4,525
Total Long-Term Liabilities	**$ 6,936**	**$ 5,717**
Stockholders' Equity		
Common stock	34,884	34,884
Retained earnings	17,024	10,408
Total Stockholders' Equity	**$ 51,908**	**$ 45,292**
Total Liabilities and Stockholders' Equity	**$ 67,633**	**$ 58,611**

Exhibit 4 Analysis of Backward Integration Options

		GenieTech		In-House
Labor - Cartridge				
Supervision	$236,500	*Production coordinator, 3 foremen*	$242,100	*Production supervisor, 2 foremen*
Direct / Indirect Labor	260,700	*12 machine operators @ ~$22K*	230,500	*6 machine operators @ ~$30K, plus profit-sharing bonus in line with current compensation structure*
Benefits and Taxes	646,400		614,400	
Total Labor	**$1,143,600**		**$1,087,000**	
Raw Material (RM) Costs - Cartridge				
Cost per lb, delivered	$2.45	*Avg cost, Q1/Q2 2010 for specialty PMMA*	$2.45	*Avg cost, Q1/Q2 2010 for specialty PMMA*
Yield (RM lbs per 1000 units)	320	*Current RM requirement*	310	*3% reduction in RM waste with new machines*
Total cartridges (units)	4,687,500	*2010 EOY estimated installed base x 2.5 cartridges/day*	4,687,500	*2010 EOY estimated installed base x 2.5 cartridges/day*
Lbs for annual demand	1,500,000		1,453,125	
RM Costs - Cartridges	**$3,675,000**		**$3,560,156**	
Labor and Raw Materials - Reagents				
Average cost per cartridge	$1.15		$1.15	
Total cartridges (units)	4,687,500		4,687,500	
Labor and RM Costs - Reagents	**$5,390,625**		**$5,390,625**	
Overhead				
Rent / Floor Space	$255,000	*Current rental of 25K sq ft, incl office space*	$147,900	*Allocation of 10K sq ft at Parsippany plant*
Depreciation	315,400	*8 presses @ $275K + $320K aux equip, 8-year straight-line depreciation*	378,800	*4 presses @ $490K + $645K aux equip + $425K installation, 8-year straight-line depreciation*
Utilities	482,400	*Incl 8 presses @ 50 kw x 24 hrs x 5 days x 50 weeks x ~$0.20/kwh*	411,100	*Incl 4 presses @ 75 kw x 24 hrs x 5 days x 50 weeks x ~$0.23/kwh*
Insurance (Equipment)	54,900		32,800	
Repairs & Maintenance	213,200		57,100	
Maintenance, Repair, & Ops Supplies	108,900		45,700	
Variable Overhead	329,700	*Controller, billing, sales order clerk, and warehouse manager*	–	*No incremental cost; all functions performed by current Parsippany staff*
Total Overhead	**$1,759,500**		**$1,073,400**	
Contingency	–	*No allowance required for ongoing operation*	90,000	*Includes allowance for consulting engineer @ $7.5K/month*

Exhibit 4 Analysis of Backward Integration Options (cont.)

	GenieTech		In-House	
Comparison of Cost per Unit				
Labor	$1,143,600		$1,087,000	
Raw Materials	3,675,000		3,560,156	
Reagents Costs	5,390,625		5,390,625	
Overhead	1,759,500		1,073,400	
Contingency	–		90,000	
Annual Operating Cost	**$11,968,725**		**$11,201,181**	
Annual Production of Cartridges	4,687,500		4,687,500	
Cost per Unit	**$2.553**		**$2.390**	
Current Cost per Unit, Delivered	$2.960		$2.960	
Cost per Unit, Bergerac	$2.703	*Includes delivery costs (transportation, fuel, handling) of $0.15/unit*	$2.390	*No delivery required*
Savings per Unit	$0.257		$0.570	
Annual Savings @ Current Production	**$1,204,688**		**$2,673,819**	
Capital Requirements				
Acquisition Price	$5,750,000	*Based on 5x EBITDA multiple*	–	
Machinery & Equipment	–		$3,182,000	
Molding Machines Cost	–		375,000	*Estimated cost for new Hitachi molding machine*
Molds	–		115,000	*Cartridge cover and base molds for each molding machine*
Number of Molding Machines	–		4	
Installation Cost	–		$425,000	*Quoted installation cost*
Auxiliary Equipment	–		645,000	
Contingency	–		152,000	*Allowance of 5% of total capital investment in equipment*
Building & Building Equipment	–		425,000	
Total Capital Requirements	**$5,750,000**		**$3,607,000**	
Savings per Unit	$0.257		$0.570	
Break-Even Volume	22,373,541		6,323,470	
Annual Production Volume	4,687,500		4,687,500	
Payback Period, Years	**4.8**		**1.3**	