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What Works Case Study

WHAT WORKS: AKASHGANGA'S IT TOOLS FOR THE INDIAN DAIRY INDUSTRY

Using IT to increase efficiency
in rural dairy cooperatives



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EXECUTIVE SUMMARY

India has quadrupled its milk output in forty years, becoming the world's largest milk-producing nation, with a gross output of 84.6 million tons in 2001. It has achieved this on the strength of a producer-owned and professionally-managed cooperative system, despite the fact that a majority of dairy farmers are illiterate or semi-literate and run small, marginal operations; for many dairy farmers, selling milk is their sole source of income. More than ten million dairy farmers belong to 96,000 local dairy cooperatives, which sell their product to one of 170 milk producers' cooperative unions which, in turn, are supported by fifteen state cooperative milk marketing federations.

Despite this achievement, India's dairy industry is relatively inefficient and unproductive, with yields per cow less than one-fifth those of foreign producers who will soon have access to India's domestic market under WTO rules. Moreover, much of India's milk products are of relatively poor quality, a consequence of poor animal health, a polluted and unclean environment, and manual handling delays. The resulting poor quality prohibits Indian milk from being exported.

Pertinent to addressing this challenge is a small, entrepreneurial business, Shree Kamdhenu Electronics Private Ltd. (SKEPL), founded in 1996 with less than US\$11,000 to develop IT-based tools that could increase the efficiency and productivity of the Indian dairy industry at a grassroots level. SKEPL provides integrated solutions, marketed under the brand name of AKASHGANGA, that automate the milk collection process at local dairy cooperatives. The AKASHGANGA system not only minimizes handling and increases efficiency, but also increases transparency, and creates a basis for improving the quality of the milk produced.

BUSINESS MODEL

SKEPL's business model is centered on providing technology-based products and services to help milk cooperatives become more efficient and productive. The company provides complete IT-enabled solutions that automate the milk collection process at local milk cooperatives. Its high-end system, selling for about US\$3,300 (Rs 151,800)¹, incorporates an electronic weighing system, a milk analyzer to test milk quality, a personal computer, and accounting and management software. Compared to earlier manual procedures, the AKASHGANGA system is faster, more accurate, and more transparent. That means milk can be sent on to the cooperative union for processing more quickly, reducing spoilage; farmers can see for themselves the weight and quality of their milk via a display and printed receipt, increasing their trust in the cooperative process. In addition, farmers are paid immediately, rather than sometimes days later as under manual procedures; and local cooperatives need fewer employees and have better records and reports for planning purposes. SKEPL places an emphasis on delivering quality products and services as well as responsive and efficient after-sales service.

In just a few short years of operation, the AKASHGANGA brand has become quite popular in the Indian dairy industry, especially in the states of Gujarat and Maharashtra, where the bulk of the company's 600 installed systems are located. The company and its founders have received wide recognition for their efforts. Moreover, the company has been consistently profitable, and has recently raised additional investment to enable it to expand more rapidly. With only a small proportion of India's 96,000 local milk cooperatives using automated collection systems today, SKEPL's vast potential market is scarcely tapped. The company has also recently formed a strategic alliance with ICICI Infotech Ltd,² a large software consulting firm linked to ICICI Bank Limited, the second largest bank in India in terms of asset size. ICICI Infotech is in the process of developing an integrated supply chain management software system that will seamlessly connect milk societies, milk unions, and milk federations on a single technological

¹ Based exchange rate of 46 Rs:1 USD, September 8, 2003. Source: Yahoo Finance, <http://finance.yahoo.com/m3?u>

² <http://www.icici-infotech.com>

platform, and has chosen SKEPL as its development partner. ICICI Infotech will integrate its system with AKASHGANGA's solution at the local society level.

With the success of its basic model, SKEPL plans to incorporate Internet-based information and communication technology (ICT) into its products to facilitate online information exchange between local cooperatives and milk unions. In addition to featuring access to AKASHGANGA's dairy portal, the upgraded system will also enable farmers to exchange e-mail and obtain information in local languages about market prices of milk and dairy inputs, as well as general access to information about hospitals, government offices, educational institutions, and market prices.

DEVELOPMENT BENEFIT

Automating milk collection has brought demonstrable benefits to farmers and local dairy cooperatives, increasing efficiency, transparency and fairness, and speed of payment. Moreover, it enables faster processing of perishable milk, preventing spoilage, and provides the mechanism for capturing the historical information base that farmers and local cooperatives need in order to plan more effectively and make improvements in quality and yield. These in turn will be critical to the competitiveness of the Indian dairy industry and possibly the survival of its cooperative structure as it faces a growing threat from more efficient foreign producers. Transformation of IT-enabled automatic milk collection systems into networks that provide Internet-based information and communication services may, in the future, also help farmers improve their productivity and gain better access to government and commercial services.

KEY LESSONS

AKASHGANGA's success demonstrates the potential of information technology to impact livelihoods in poor, rural communities. AKASHGANGA's experience indicates that even illiterate or semi-literate people can adopt IT-based systems when they see tangible benefits and when the systems are deployed in purposeful, easy-to-use ways. SKEPL's experience also indicates that providing direct benefits and expanded opportunities to poor communities in developing countries can be profitable. AKASHGANGA, in tying its future to improving the productivity of its customers, will succeed to the extent that it can help transform the fortunes of rural dairy farmers, demonstrating the synergies between business and development goals.

WHAT WORKS: AKASHGANGA'S IT TOOLS FOR THE INDIAN DAIRY INDUSTRY

At a time when information technology was almost unknown in the villages of India, a group of seven dynamic, young entrepreneurs came together with the purpose of leveraging information technology for the use of rural dairy farmers. Though they had very limited seed money—about US\$10,900 (Rs 500,000)—they had over 50 years combined professional experience in dairying, engineering, and finance. Above all, they had the vision and commitment to developing tools that could increase the efficiency and productivity of the Indian dairy industry at a grassroots level. In 1996, they established Shree Kamdhenu Electronics Private Ltd. (SKEPL) as a private limited company.

SKEPL provides integrated solutions, marketed under brand name of AKASHGANGA (meaning “milky way” in Hindi), that automate the milk collection process in village dairy cooperative societies. The company’s products include an automatic milk collection system, an electronic weighing scale, a dairy information system kiosk, and a milk analyzer that tests for levels of fat and non-fat milk solids. SKEPL also offers accounting and milk procurement software, as well as consulting and maintenance services, to its customers. The company’s products and services are competitively priced, keeping in mind the limited purchasing power of its customers. SKEPL places an emphasis on delivering quality products and services as well as quick and efficient after-sales service. Currently, the majority of the company’s customer base is in the states of Gujarat and Maharashtra. Both states’ strong and well-organized dairy cooperative movements and active dairy cooperative membership base make them a logical choice for SKEPL’s focus market.

SKEPL has an office in Mumbai and operational headquarters in Vallabh Vidyanagar, a town located in the Anand district of Gujarat. SKEPL is privately owned by its founders, with a minority equity share owned by Aavishkaar India, a micro-venture capital fund focused on the rural sector in India. The company currently employs around 40 people and has been consistently profitable since 1997, its first full year of operation. In FY2003, it recorded a turnover of US\$207,000 (Rs 9,500,000) with a gross profit of about US\$7,630 (Rs 350,000), recording a return on equity capital in excess of 25%. Sensing future opportunities, the company doubled its capital expenditures in 2003.

ENTERPRISE ORIGINS

SKEPL was founded to satisfy an existing and unmet need in the rural Indian marketplace—that of automating milk collection processes to make them more efficient and to enable faster and more accurate payments to farmers. This particular need had gone unfulfilled largely because the market segment comprising local dairy cooperatives was ignored by larger companies, perhaps in part on the assumption that it would be difficult for rural and often illiterate farmers to accept and use high-tech solutions.

Sulax Shah, the originator of the concept, had earlier developed a simpler microprocessor-based application for an associate in the dairy industry that received enthusiastic interest from dairy farmers. Shah’s co-founders were attracted the prototype product because they believed the concept would be broadly applicable within the Indian dairy industry. The group quickly developed its first product, a microprocessor-based milk collection system that won first prize in a 1997 Agricultural Fair. A large initial order from Amul Dairy³ in the Anand district helped accelerate the growth of their new company.

Initially, SKEPL supplied microprocessor-based automatic milk collection systems. Although the functionality of these systems was restricted by limited data storage and reporting capabilities, they were very cost-effective and easy to operate. Gradually, the PC-based automatic milk collection system was introduced. To encourage the adoption of its technology and provide proof of the system’s utility and value, the company initially provided cooperative societies with a free trial of the system. This “loan” of the system was followed up with discussions about the benefits to the farmers and the dairy collection

³ Gujarat Cooperative Milk Marketing Federation, Amul, Web site, <http://www.amul.com>

societies. To date, the company has installed more than 600 systems, and is adding Web-based features, including communication modules, auditing capabilities, and access to a dairy portal to its solution.

The company and its founders have received wide recognition for their efforts. Shah received a Best Citizen of India award from the International Publishing House in New Delhi and, in 1999, SKEPL was awarded a certificate of appreciation by the National Dairy Development Board. The company won the International Institute for Communication and Development's ICT Stories Competition in 2001⁴ and was selected as a finalist for the Stockholm Challenge Award in 2002.⁵ Its efforts and contribution to rural India have also been acknowledged by several leading Indian agricultural universities and business schools.

MARKET OVERVIEW

The National Dairy Development Board (NDDB) was set up by the national government in 1965 with a mandate to strengthen and expand the cooperative dairy movement in India. NDDB began operation with the mission of making dairying a means to a better future for millions of grassroots milk producers. Since then, India has emerged as the world's largest milk-producing nation. Production has increased by approximately 4% a year, growing from 21.2 million metric tons in 1968 to 84.6 million metric tons in 2001—capable of supplying India's very large population with 226 grams of milk per person per day.⁶

Indian milk production, in contrast to other milk producing countries, is characterized by millions of small and marginal farmers, including landless milk producers for whom dairying is not only a business but also the main source of income. A majority of these farmers are illiterate or semi-literate. Nevertheless, the Indian dairy sector is organized as a producer-owned and professionally-managed cooperative system. As of March 2001, India's 96,000 local dairy cooperative societies (DCS) included more than ten million farmers and were integrated in a three-tiered cooperative structure (see Appendix 1). The DCS, a village-level organization of milk farmers, collects milk from members and sells the collected milk to a district-level cooperative union. Member farmers are paid on the basis of quantity of milk collected and its quality. The 170 cooperative unions process and market the milk collected from their respective DCSs. Fifteen state cooperative milk marketing federations support the cooperative unions in marketing and operations planning, providing services ranging from branding and advertising, to operations consulting on how much milk to process into various products such as curd and cheese, for example.

A village society, or dairy cooperative society (DCS), is formed by primary producers under the guidance of a supervisor or milk supply officer from the nearest cooperative district union (district-level cooperative that owns a processing plant). A milk producer (dairy farmer) becomes a member by buying a share of the society and agreeing to sell milk exclusively to that society. Society members elect a managing committee and a chairperson responsible for recruiting staff to manage day-to-day operations. Each society has a milk collection center where farmers take their milk twice a day, in the morning and in the evening. A society is typically located within five to ten kilometers of the villages supplying the milk. The number of farmers selling milk to these societies varies from 100 to 1,000 and daily collection varies from 1,000 to 10,000 liters per society. Farmers bring their milk to the cooperative in a variety of containers and cans, ranging in size from couple of liters to a capacity of more than a hundred liters. Daily milk sales in India's cooperatives total about 13 million liters.

⁴ <http://www.infodev.org/exchange/exch8/9exch8.htm>

⁵ http://www.challenge.stockholm.se/finalists_index.html

⁶ National Dairy Development Board Web site, <http://www.nddb.org>

The dairy cooperative movement has been central to the development of India's dairy industry. The inspiration for this movement was the success of the Khaira district cooperative milk producers' union—better known as Amul.⁷ Combining the traditional knowledge and industriousness of farmers with professional management, cooperatives aim to maximize farmers' profits and productivity, capture the milk and milk product markets, and provide member farmers with a variety of services such as veterinary first aid, basic healthcare for farmers, and animal husbandry services. An important factor in the success of the cooperative approach has been the involvement of the farmers in their own development. The institutional infrastructure, including the village cooperatives, milk unions, dairy and cattle feed plants, and state and national marketing, is owned and controlled by the farmers. Progressively linking producers with consumers, cooperatives have helped empower farmers and transform dairying into a means of development for India's rural people.

Though dairy cooperatives are found throughout India, the cooperative movement has been most successful in a few states, notably Gujarat. Gujarat's success can be attributed to a higher rate of farmer activism and more efficient political institutions. Over the years, states have developed popular dairy brands such as Amul (from Gujarat), Vijaya (from Andhra Pradesh), Verka (from Punjab), Saras (from Rajasthan), Nandini (from Karnataka), Milma (from Kerala) and Gokul (from Maharashtra). These brands have earned high degrees of brand recognition and customer confidence, especially within their respective states.

Global Challenges for the Indian Dairy Industry

The Indian dairy industry faces challenges from the international dairy market. Chief among these challenges is that India, as a signatory to the World Trade Organization (WTO), is obligated to open its milk and milk products markets to international dairy companies. Because the Indian dairy industry is characterized by relatively high costs in milk production, processing, and marketing, and relatively poor quality of milk due to unhygienic handling, this could potentially pose a significant threat to the industry and its farmers. In 1999, India imported 10,000 metric tons of milk powder, primarily from Australia, the European Union, and the United States. In 2000, the industry was threatened by the arrival of low-cost fresh milk from New Zealand. The imposition of a heavy import tax on milk in 2001 has given the domestic dairy industry some breathing space. However, the respite is temporary, as the tax is slated to be abolished before the year 2006, as per the WTO agreement.⁸

The cost of milk production in India is high in part because the average annual yield of Indian dairy cows is low—only 987 kilograms (kg) of milk, as compared to 6,273 kg in Denmark, 5,289 kg in France, 5,462 kg in the United Kingdom, 5,938 kg in Canada, 7,038 kg in the US, and 11,000 kg in Israel. An Indian dairy farmer gets paid about US\$0.16 (Rs 7-8) per kg. Milk is handled at several levels, passing from the farmer, to the local dairy cooperative society (DCS), and the union before it is pasteurized. The milk is then shipped to retail markets through various supply chain delivery mechanisms, ultimately reaching the consumer after several levels of “middlemen.” This multi-layered system not only poses hygiene issues, but each level of handling adds additional cost.

The high costs of domestic production is compounded by the fact that Indian dairy products cannot be exported to overseas markets due to their poor quality which results from poor animal health, a polluted and unclean environment, and manual handling delays. High costs and a limited market make the threat from low-priced, high-quality milk and milk products from international competitors particularly keen.

Addressing these challenges and increasing the competitiveness of the Indian dairy industry will require both improved technology and better management. The innovative use of appropriate technologies can help the industry produce high-quality products at a lower cost, while professional management can ensure a more optimal utilization of the industry's human and financial resources. Technology solutions

⁷ www.amul.com

⁸ Hegde, N.G. “WTO: Challenges for Indian Farmers.” *Yojana*, December 2001. Vol. 45: 34-35

will need to address the unique needs of India's dairy supply chain, which runs from its largest cities to its smallest, most remote villages, in an integrated and locally-relevant way. Because the Indian dairy industry supply chain extends from small villages where the milk collection happens to big cities where consumers buy dairy products, it necessarily involves people from very different backgrounds who often speak very dialects. Appropriate solutions need to be integrated in a way that can address these differences; for example, applications at the village-level will require a different language interface and customer support than applications and customer support for marketing and procurement executives of companies in India's larger cities.

BUSINESS MODEL

SKEPL's business model is centered on providing technology-based products and services to help milk cooperatives become more efficient and productive. The company provides complete IT-enabled solutions that automate the milk collection processes at local milk cooperatives. In addition, it provides weighing scales, milk analyzers, accounting and management software, and support services.

Automatic Milk Collection Systems

The traditional process of milk collection in India begins with dairy farmers bringing their milk to the local village-level dairy cooperative society where the milk is poured into metal buckets (aluminum or stainless steel) and weighed on a steel scale. After weighing, the fat content of the milk is measured using electronic testers. Once these measurements are completed, the transaction details (the quantity and quality of milk) are manually recorded in the dairy cooperative's paper register and on the farmer's membership card. Farmers are paid for the collected milk usually a day or two after it is initially sold; because the calculations for payment must be done manually from the data in the register, it typically occurs at a later time to avoid further delays while milk collection is going on and people are in line. Payments are made based on the information previously recorded on the farmers' membership cards. This process is susceptible to fraud, both in the initial recording of the milk quality and quantity and at the time of payment, because most of the farmers are illiterate and hence cannot read what was entered on their membership card. Automation of the measurements eliminates the potential for milk purchasers to misrepresent the quality of the milk and cheat farmers out of a fair price.

In the product development process, SKEPL spent a considerable amount of time researching the milk collection process. They focused not only on the functional aspect of the process but also on external factors such as the physical environment (hot, humid climates), and the human capacity of the society's staff. Based on their research, they developed appropriate systems to automate the collection process at the village cooperative society level that used simple technology and had a rugged design. For example, farmers can insert their identification card in any direction and it will be read—the card does not need to be swiped in only one particular direction. The system also designed to be user-friendly, requiring minimum keyboard inputs in the milk collection activities.

Product designers recognized that in order to maintain the freshness of the milk, the processing time needed to be reduced, so they designed the AKASHGANGA Automatic Milk Collection Systems (AMCS) to increase the efficiency and speed of the collection process. Observations of fraud and mismanagement on the part of the collection agents prompted the designers to create digital displays and printed receipts reflecting accurate weight and milk quality measurements.

Using the AMCS, the process of milk collection has changed significantly. Upon arriving at the village dairy cooperative society, farmers proceed to the receiving counter and insert their plastic identification card into the card-reader, which automatically reads his identification number. Farmers then pour the milk into a bucket on the weighing scale. The weight of the milk is displayed on a digital readout and that data is automatically transferred to the micro-processor or PC-based system (depending on which system the cooperative uses). Next, a five milliliter (mL) sample of milk is collected and passed through the fat testing machine. The fat content is also displayed and automatically transferred to the system.

Finally, the AMCS calculates the amount to be paid to the farmer based on the weight of milk and the fat content at the price specified by the milk union. This data is printed out on a receipt and handed to the farmer who takes it to the cashier and collects his money immediately.

The Automatic Milk Collection System provides several advantages over the traditional manual method. First, it speeds up the entire milk collection process, thereby reducing the spoilage of milk. Wait time for the farmers decreases from 45 to 10 minutes, on average—with farmers selling milk twice a day, this decreases the total amount of time spent from an hour and a half to just 20 minutes, saving over an hour's time each day. Second, the automated system is more transparent and minimizes the role of the collection agent, reducing the likelihood of mistakes or fraud. Far from just having economic consequences, automation frees the farmers from the burden of having to fear cheating or corruption in their daily business dealings.

Initially, the AKASHGANGA system was microprocessor-based, but later a PC-based system was introduced. Conceptually, the two systems are very similar, except that the PC-based system can hold more data, can integrate AKASHGANGA's accounting software, and provides additional flexibility that can easily accept new software products with enhanced reporting capabilities.

Weighing Scales

The electronic weighing scale manufactured by AKASHGANGA has a stainless steel base, a milk receiving pail which holds 10 kilograms, a large digital display, and load cells to compensate for temperature variation. It features an auto-zero capability (the scale is set to zero after each measurement) and an interface to transfer weight data from the weighing scale to the PC. Scales are available in capacities of five to 5,000 kilograms. SKEPL manufactures the scales at their manufacturing facility in Vallabah Vidya Nagar, Gujarat.

Milk Analyzers

AKASHGANGA added milk analyzers to their product line in early 2003. The introduction of this new product is an example of the type of innovation and forward thinking by the company's management team that will create a competitive advantage for AKASHGANGA. Launching new products that continue to meet the needs of dairy cooperative societies expands SKEPL's market share and increases customer satisfaction.

District unions buy milk from village cooperative societies and pay on the basis of weight and average non-fat solid (SNF) content of the milk. In contrast, village dairy cooperative societies pay farmers on the basis of the weight and fat content of the milk. This discrepancy in payment systems means farmers are paid less for their milk based on the fat-to-weight ratio than the district union pays village cooperatives for the same milk. The primary reason for the difference in the type of analysis used for payment appears to be the fact that equipment to measure non-fat solid (SNF) content has thus far been prohibitively expensive and unaffordable for village dairy societies. AKASHGANGA recognized this unmet demand and developed an affordable milk analyzer that is designed for fast and cost-effective analysis of milk. The milk analyzers measure the fat, non-fat solids, and protein composition of the milk.

As milk analyzers were only recently introduced to AKASHGANGA's market, sales have been limited so far. Using the milk analyzer requires village dairy societies to adopt a new payment structure, a decision which first must meet with approval by the various constituent dairy societies of the cooperative. Changing the entire payment structure will likely take some time before it is widely adopted. The company does, however, expect their sales to increase as village dairy societies realize the financial advantages of a more sophisticated payment formula that is consistent with the payment formula of the district unions.

Accounting and Management Software

AKASHGANGA has developed two software applications as part of their product portfolio.

Both software packages' user interfaces have been developed in local languages and have localization features, which makes it easy to port to any one of India's fourteen main languages. *Rojmel* software is targeted to meet the accounting and management needs of village dairy cooperative societies.

Functionality provided by *Rojmel* includes bookkeeping, user-defined report generation, profit and loss calculation, and forecasting. Raw Milk Receiving Docks (RMRD) software is marketed to district unions. This software provides district unions with information and analysis of district-level milk collection and other operations. Reports detail milk collections data on a per-session basis, trends of milk collection from different societies, employee time sheets, efficiency of operations, and more. RMRD also integrates different milk collection centers by providing a data-exchange and sharing capability.

COMPANY PROFILE

SKEPL is a privately owned company. Co-founders currently control 74% of the equity stake while the remaining equity is owned by Aavishkaar India Micro Venture Capital Fund.⁹ The fund invested US\$39,225 (Rs 1,800,000) in May 2003 to acquire its equity position.¹⁰

The board of directors at SKEPL is responsible for long-term strategy formulation and oversight of operations. It currently consists of the seven co-founders, although Aavishkaar has recently acquired a seat on the board (see Appendix 2 for organizational structure and Appendix 3 for management profiles). Senior management, which oversees daily operations, currently consists of four co-founders who serve as managing directors. This is expected to change as professional managers are hired in the near future.

Most of the company's hiring is done locally. New hires receive four to six months of training and shadow older employees prior to taking over independent responsibilities. Local hiring is critical as employees interact with local dairy farmers and village society officers, and hence knowledge of local dialects, culture, and geography is very important, especially for staff in marketing, installation, and support services. SKEPL has found that hiring local employees enables them to more easily establish close relations with the producer farmers, which in turn builds customer confidence in the company.

Product Development and Supply Chain

SKEPL devotes considerable effort to understanding customer needs and introducing or modifying product and service offerings accordingly. The company has been aggressive in introducing new technologies and concepts. For example, it was the first company to introduce a milk analyzer that automates measurement of non-fat solids content of milk. Organizational decision-making for new product first requires approval by the board of directors. Responsibility for design, development, and introduction of the new product is then assigned to one of the four managing directors.

All of SKEPL's products and services are developed and manufactured in-house, with the exception of the computers and the milk analyzers; components for the milk analyzers are imported from Europe and the computers are bought in Mumbai or Baroda. Most of the raw materials used are sourced locally in India with the bulk of the purchases made in the cities of Mumbai and Baroda; the company has established long-term relationships with most of its suppliers. A limited inventory (10-15 units) is maintained based on sales projections and season. Units are shipped directly from the factory to the installation sites.

Pricing, Promotion, and Branding

SKEPL customizes the Automatic Milk Collection Systems (AMCS) in a variety of configurations according to customer needs. The system is competitively priced taking into account comparable systems marketed by SKEPL's competitors as well as the purchasing power of their target customers. Though

⁹ www.aavishkaar.org

¹⁰ D'Silva, Jeetha. "Aavishkaar Picks Stake in Rural Tech Projects." *Times News Network*, May 16, 2003.

prices vary based on configuration and contract negotiation with customers, the following are representative prices:

Microprocessor-based AMCS without analyzer	US\$1,200 (Rs 55,000)
PC-based AMCS without analyzer	US\$1,910 (Rs 88,000)
PC-based AMCS with analyzer	US\$3,300 (Rs 152,000)

The company has aggressively marketed its integrated systems to milk societies, offering sales incentives such as a credit option (with payment periods ranging from one to three months) and free trials of the systems. Free trials are offered in order to demonstrate the value, convenience, and usability of the AMCS. The free trials not only prove effective at the installation site, but also increase visibility to neighboring societies who then purchase AMCS for themselves.

The company also makes efforts to ensure that current customers are satisfied. It provides intensive training in operating and maintaining its systems to two or three staff members at each customer dairy society. Maintenance and service requests from customers are attended to promptly by company engineers who use motorbikes to reach remote village areas.

The AKASHGANGA brand has become popular in the Indian dairy industry, especially in villages in the states of Gujarat and Maharashtra. The company has placed advertisements in magazines targeting the Indian dairy industry and has sponsored promotional events at dairy fairs in local communities. Customer referrals and word of mouth have also been very important to the company's brand recognition.

PARTNERS AND ALLIANCES

SKEPL recently announced an alliance with ICICI Infotech Ltd.,¹¹ a large software consulting firm in India, aimed at joint marketing and business development. ICICI Infotech is promoted by ICICI Bank Ltd., the second-largest bank in India in terms of asset size and one of the most tech-savvy. ICICI Infotech reported revenues of about US\$40 million (Rs 1.8 billion) in FY 2003.

ICICI Infotech recognizes the need for technology in the Indian dairy industry and is striving to use its advantage as a leading software development firm to create technology solutions that meet the needs of the industry. Currently, the company is in the process of developing an integrated enterprise resource planning (ERP)/supply chain management software system that will seamlessly connect milk societies, milk unions, and milk federations on one technological platform. ICICI has chosen SKEPL as its development partner and will integrate its system with AKASHGANGA's solution at the local society level.

This partnership has the potential to provide new revenue growth opportunities for SKEPL, as it will allow the company to leverage its own brand equity as well as the greater resources of ICICI. SKEPL may be able to leverage this relationship to expand into states where it lacks presence currently. At the same time, it also presents some potential risks. Namely, ICICI Infotech may later develop a system similar to the AMCS system and no longer need the partnership. There are some factors that would protect against such a development and work to SKEPL's advantage. First, ICICI Infotech does not currently possess in-depth domain expertise at the local dairy society level. SKEPL has gained this expertise by working with farmers for the last eight years. Second, ICICI Infotech would need a large initial investment in order to acquire the operational capability to support individual installations in villages spread across a vast geographical area. SKEPL's rural support network provides technical support in remote villages within hours of receiving a support request; it would be extremely hard for

¹¹ <http://www.icici-infotech.com>

ICICI Infotech to replicate this network. Additionally, the AKASHGANGA brand is very well-established among rural farmers and this gives SKEPL an advantage at the local cooperative level. If managed well, these same competitive advantages should create should a mutually beneficial alliance for both companies.

Aavishkaar, besides investing capital in the company, also appears to be playing a role as a strategic partner, bring experience, contacts, and advice. For example, based on its advice, SKEPL is restructuring its organizational framework and reviewing operational priorities. As mentioned previously, Aavishkaar may soon be represented in the board of directors of the company giving it additional influence in SKEPL's decision-making process.

COMPETITORS

Although several companies provide equipment to Indian dairy cooperatives, integrated solution providers like SKEPL are few. SKEPL's primary competitor is Rajasthan Electronics India Limited (REIL), a joint venture between the national government and the state government of Rajasthan. REIL, which provides electronic milk testers and automated milk collection systems, has a sizable presence in the northern states.

Competition in this market is based primarily on price and customer support. Different players dominate in different parts of the country. Of the roughly 2,500 automated milk collection systems installed in India, 600 are AKASHGANGA brand. The vast market potential—96,000 local cooperatives—and the lack of a major player in this rural sector bode well for the company.

CHALLENGES

SKEPL has faced several challenges in its operations including initial customer resistance, difficult physical conditions, and lack of infrastructure in rural India. SKEPL has used a practical design and innovative technology to address these challenges. The company invested time and resources up front in assessing the needs of the customer and then worked to develop a product that met those needs. The company has made considerable efforts to gain the trust of skeptical farmers by delivering a clear value proposition, simple solutions, and quality support.

A key challenge for SKEPL was the need to sell the AMCS system to village farmers who are often reluctant to adopt new products and services until the benefit is proven to them. AKASHGANGA has succeeded in overcoming this challenge with customer education and the free trial option, but has taken time to gain the level of customer acceptance that AKASHGANGA now has. In addition, although the AKASHGANGA system is competitively priced, cost is still a major factor for many local dairy cooperatives. Cooperatives are accountable to each of the farmer-members, so it is not easy for society employees to spend funds for major investments.

Physical environmental factors have also played a role in product development. Rural villages are dry and dusty and subject to widely varying weather conditions. For IT-based systems to function in these conditions, they must be ruggedly constructed. In addition, in many villages, the electric power infrastructure is unreliable. If there is a power outage during automated milk collection, all activity comes to a halt. At times, collection agents must revert to manual entry, leading to major disruption in the milk collection routines.

The technology of the original milk collection system was a simple DOS-based system (which has since been upgraded to a Windows version) comprising computer hardware and software, as well as milk weighing, testing, and interfacing equipment. The interface equipment consists of a microprocessor-based electronic unit that allows data about the milk to be transmitted from weighing and testing devices

to the PC. The data transmitted is also displayed using a digital readout connected to the testing equipment. The interface mechanism is innovative and cost-effective, and has the added advantage of making operations transparent to farmers.

To build on the success of its basic model, the company has plans to upgrade the system's existing functionality by incorporating Internet-based communication technology. The next generation of AKASHGANGA AMCS will add features that automate and integrate additional processes and functions at local cooperatives and facilitate online information exchange between local cooperatives and milk unions. SKEPL also plans to provide Internet access to dairy farmers as well, enabling them to exchange e-mail and obtain information in local languages about market prices of milk products and dairy inputs, as well as general access to information on local hospitals, government offices, and educational institutions.

Though SKEPL has thus far been able to develop products to satisfy customer needs at the grassroots level of the Indian dairy industry, it now faces the challenge of establishing itself as a mature company and charting out its growth strategy. To achieve sustainable revenue growth SKEPL must increase its customer base for existing products or launch new products. The challenge in increasing its customer base is that milk unions have significant influence in the decision-making processes of local cooperative societies, and unions are highly political organizations requiring considerable investments of time, sales effort, and possibly the use of well-placed connections. SKEPL will also need to scale up its support operations in order to expand into new areas of the country which, given the size of rural India, presents both a logistical and management challenge.

To fund its expansion plans, SKEPL has secured access to external capital. As mentioned earlier, it has entered into a partnership with a leading bank to gain greater access to customers as well as position its milk collection systems as a key part of an integrated supply chain management solution for the Indian dairy industry.

The development of the domestic dairy industry is also critical to SKEPL's success. The opening of the Indian dairy industry to international competition in the next few years will likely have a substantial impact on the Indian dairy farmers, and may affect the system's cooperative structure. It remains to be seen whether the Indian dairy industry will develop sufficient competencies in time to be able to compete with international competitors. Thus, the challenge for SKEPL is to position itself appropriately by becoming integrated in an expansive network of cooperatives, thereby making themselves an attractive partner for international players who may enter the Indian dairy industry. If SKEPL is successful, it will be well-situated to not only withstand but also benefit from the coming transformation in the Indian dairy industry.

Leveraging its relationships with dairy farmers and its reach into the rural areas to develop new products and services has the potential to create opportunities for expansion for SKEPL. This existing presence in rural areas may prove to be valuable as other companies, including multinationals, plan to target consumers at the bottom of the economic pyramid. SKEPL's existing network of customers and support teams will likely be a strong advantage to SKEPL's continued growth and retention of market share as competitors attempt to enter the market and are faced with building their own supply chain and customer base.

Management will be another challenge in SKEPL's next phases of growth. SKEPL was founded by motivated entrepreneurs who brought technical expertise and creative vision needed to develop a product appropriate and viable in low-income dairy markets. However, now that the organization has grown beyond the start-up phase and established itself as a major player in the still relatively untapped market for automatic milk collection systems, it will need professional management to guide it to growth. SKEPL's board of directors is aware of this need and has begun recruiting professional business managers.

KEY LESSONS

AKASHGANGA's experience has shown that private sector enterprises like SKEPL can play an important role in providing poor communities with the benefits of appropriate technology solutions and, importantly, that they can do so profitably. SKEPL has been profitable from the first year of operation. With the vast potential of the milk collection market still untapped, the company has room to expand and grow. It has thus demonstrated that there is a substantial viable market at the bottom of the pyramid for companies that can design products that address the particular needs and conditions of low-income consumers.

AKASHGANGA is an example of how information technology is being used as a catalyst for synergies between social development and business objectives. SKEPL demonstrates how the development benefits of improved efficiency and transparent and fair prices for dairy farmers can be combined with the business objectives of growth and profitability in a sustainable and mutually beneficial relationship. The company has demonstrated that with simple and appropriate systems designs and proper training, illiterate people from poor rural areas can learn to be users and managers of technology-based systems. Collection agents and dairy society staff are using Windows-based software and electronic systems provided by SKEPL with ease. In fact they are demanding further enhancements (such as additional reports) to the existing systems as well as new products and services (such as milk analyzers). The increased operational efficiencies and productivity that technology enables is welcomed in these rural areas. By automating the milk collection process, AKASHGANGA is enabling faster transportation of perishable milk to unions, preventing milk spoilage and creating higher milk yields. The system's procurement information and transaction history tools are helping local cooperatives to be able to better plan their operations.

AKASHGANGA also illustrates how innovative use of technology can have a profound impact on the daily lives of the common villager. Farmers are excited about receiving fair and transparent compensation for their products as well as more efficient service at milk collection centers. Immediate and system-calculated payments have increased farmer's belief in the cooperative system. In a cooperative social structure, the intangible "moral capital" of trust and confidence in the transaction process is an important consequence of AKASHGANGA's milk collection systems.

Human resource development has also been an important developmental benefit of SKEPL's operations. By hiring and training locally, AKASHGANGA has contributed to the development of human capital in rural areas. Unemployed youth have been able to earn livelihoods locally within their rural community instead of migrating to the big cities. Providing jobs at the local level, the company has provided stimulus to the local rural economy.

SKEPL's long-term vision is to be the IT backbone of the Indian dairy industry. Though this is an ambitious goal, SKEPL is well positioned to succeed in transforming the fortunes of rural dairy farmers, ensuring its own continued profitability in the process.

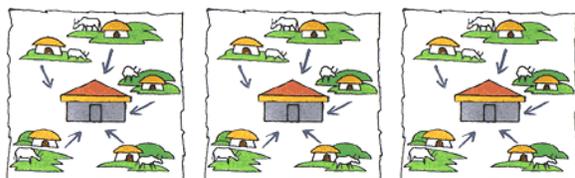
APPENDIX 1: Cooperative Structure of the Indian Dairy Industry¹²



State Federation (Cooperative Milk Marketing Federation)

Made up of all the cooperative milk producers' unions in a state, a state federation is responsible for marketing the milk and milk products of member unions. Some federations also manufacture feed and support other union activities.

District Union (District-Level Cooperative Union)



Owned by dairy cooperative societies, a district cooperative milk producers' union buys all its member societies' milk, then processes and markets the milk and milk products. Most unions also provide a range of inputs and services to local dairy cooperative societies and their members, including feed, veterinary care, and animal husbandry, to sustain the growth of milk production and the cooperatives' business. Union staff train and provide consulting services to support dairy cooperative society leaders and staff.

Village Society (Dairy Cooperative Society [DCS])



Village dairy cooperative societies (DCS) are formed by individual milk producers or dairy farmers. Any farmer can become a member by buying a share and committing to sell milk only to that society. Each society has a milk collection center where members take milk every day. Each member's milk is tested for quality with payments based on the percentage of fat and non-fat solids. At the end of each year, a portion of the society's profits is used to pay each member a patronage bonus based on the total quantity of milk processed.

¹² Adapted from "The Anand Pattern" (www.nddb.org/aboutnddb/anandmodel.html)

APPENDIX 2: Management Profiles¹³



Standing (Left to Right): Nilesh Shah, Alpesh Shah, Sulax Shah, Sachin Shah
Seated (Left to Right): Vipul Shah, Gaurang Shah, Ujval Parghi

Sulax Shah has over 15 years of professional experience in the fields of electronics and information technology. Sulax conceptualized the core concept of automatic milk collection systems. His interests include design and development of microprocessor- and microcontroller-based systems. Sulax heads the SKEPL board of directors and is also responsible for new product development, production, and technical support services.

Alpesh Shah has a background in electronics and instrumentation and is Chief Executive Officer of SKEPL. Alpesh possesses broad experience in business management and oversees company operations.

Ujval Parghi, a commerce graduate from Mumbai University, is a co-founder and director of the company. At SKEPL, Ujval oversees marketing, public relations, and human resources functions. Ujval played a key role in SKEPL's winning entry in the International Institute for Communication and Development's ICT Stories Competition in 2001.

Sachin Shah is a commerce graduate from Mumbai with degrees in software applications and systems management. As SKEPL's IT director, Sachin is responsible for design, development, integration, and software support.

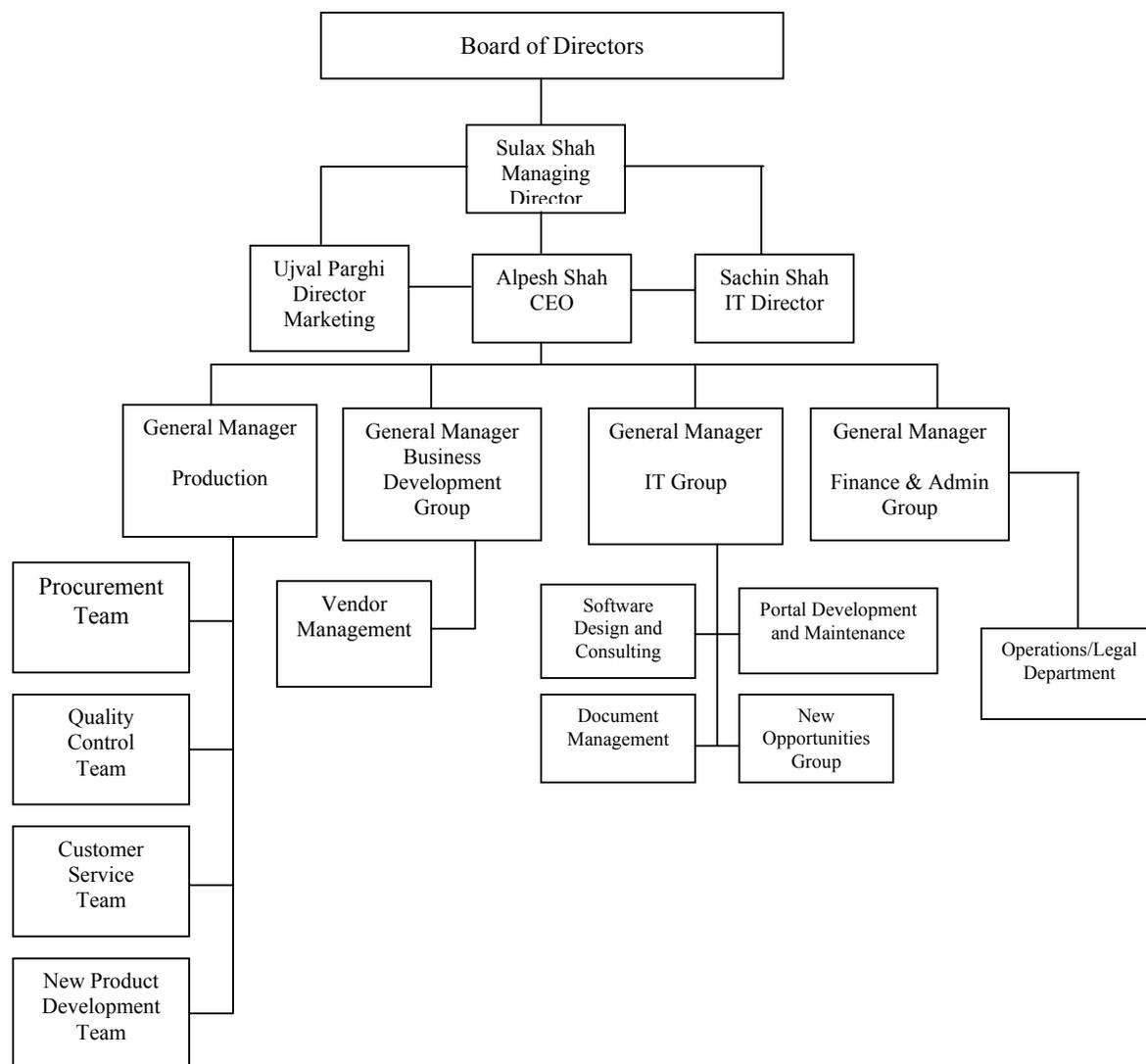
Gaurang Shah is a certified chartered accountant with over nine years of experience in the accounting and finance industry.

Nilesh Shah is a commerce graduate with over eight years of experience in information technology, primarily software development.

Vipul Shah is an electronics engineer with over eight years of experience in the hardware industry.

¹³ Adapted from SKEPL's business plan

APPENDIX 3: Organizational Structure¹⁴

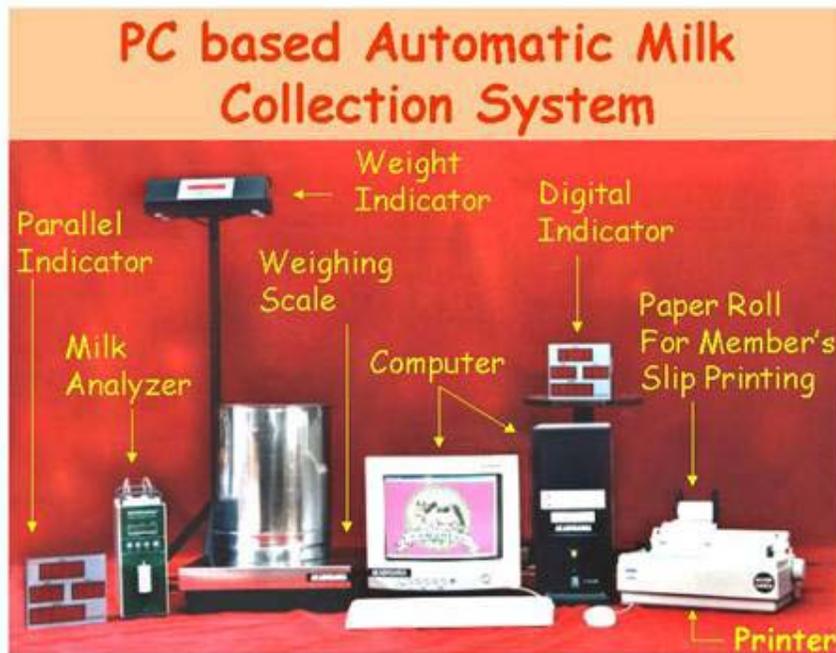


¹⁴ Adapted from SKEPL's business plan

APPENDIX 4: Products¹⁵



Microprocessor-Based Automatic Milk Collection System (AMCS)



PC-based Automatic Milk Collection System (AMCS)

¹⁵ Photo Credits: SKEPL's Business Plan

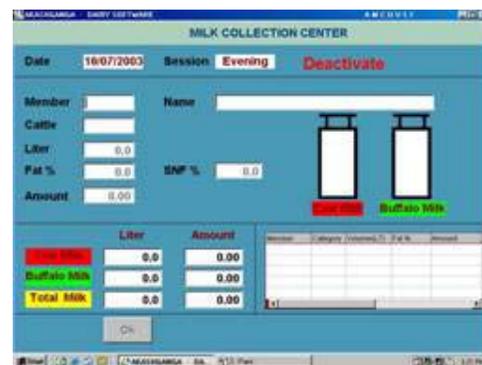
APPENDIX 4 (Continued): Products



Electronic Weighing Scales



Milk Analyzer



Screenshots of Milk Collection Software (English Version)