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Keurig

Nick Lazaris waited patiently at the stoplight, knowing he had plenty of time to make the early meeting at his Wakefield, MA office. This morning, Lazaris—President and CEO of Keurig, Inc.—would bring his top management team (**Exhibit 1**) up to date on problems developing in the company's relationships with two critical vendors. The problems had already caused delays in the full roll-out of Keurig's revolutionary coffee brewing system.

Whenever he wondered if the term “revolutionary” was a bit too strong to describe his company's products (**Exhibits 2 and 3**), he usually found quick re-affirmation of the potential impact the new system—which according to the company's slogan could produce “coffee house taste by the cup.” Lazaris grinned when he saw the driver of the car next to his fumbling with a biscotti and a large cup of coffee from Starbucks while talking on a cellular phone. He liked to bring up anecdotes such as this to illustrate the vast potential he foresaw for his company. “Ten years ago, that guy would have had one cup from his Mr. Coffee at home and then another from the office coffee pot when he got to work,” said Lazaris. “Now, he goes out of his way to spend a couple of bucks each morning—on something that he used to get for just a few cents, mind you.” Keurig sought to ride the wave created by Starbucks and capitalize on America's growing love for premium coffee.

It was Spring of 1998, just over a year since Lazaris had assumed the role of President and CEO at the now six-year-old company. When he was hired in early 1997 by the venture capitalist who headed Keurig's board, he inherited a company that had missed several internally generated deadlines for completing key aspects of its strategic plan. Keurig had segmented America's \$15 billion market for coffee and associated products into three main segments. The firm was already behind schedule in launching its two-pronged campaign into the commercial segments: office coffee services and food-service establishments. Eventually Keurig hoped to launch a version of its product to cater to the third market segment, the consumer market. Since most coffee was consumed at home, the market was very tempting, but the company wanted to make sure it established a strong brand and product reputation before tackling the complex consumer market. The home version of the Keurig brewing system was still probably three years away.

Lazaris and his management team knew they had only a limited number of chances to win over office coffee system distributors, major food retailing establishments, top-tier coffee roasting companies and other industry collaborators whose “buy-in” would be essential in rolling out Keurig's unique product. As he pulled into the parking lot at his office, Lazaris' mind was swimming

Professor Paul W. Marshall and Research Associate Jeremy B. Dann prepared this case. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

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with all of the issues he would be dealing with that day and in coming weeks. "It's too early in the morning to think about this stuff," he mused. "I need a cup of coffee."

The Founding of Keurig, Inc.

In 1992, Ian Greenwood, an engineer in the electronics industry, approached Peter Dragone, his friend and former college roommate, about a new technique for brewing coffee that he was developing. Dragone, who received his MBA from Harvard Business School in 1985, was at the time working for the Chiquita banana company. Greenwood thought Dragone's formal business training and food industry experience would complement his own product engineering abilities. The concept Greenwood wished to turn into a business was centered on creating portion packs of premium coffee. The coffee inside would stay fresh because nearly all the oxygen would be removed through special packaging techniques (not yet developed at the time). Each pack held its own filter and was enclosed by a foil lid. The portion pack concept held the promise creating a way to brew coffee much more precisely and consistently than any method available at the time. "He came to me with a mock-up made out of a used yogurt cup. So, I started to create a business plan," said Dragone. Greenwood, perusing a Dutch-English dictionary, spotted the word "Keurig"—Dutch for "excellence"—and chose it as the name of the new company. The modified yogurt cup (and its more refined later versions) was dubbed the "K-Cup."

Greenwood would serve as President and CEO of the nascent venture, while Dragone would be the Chief Financial Officer. The partners started presenting their ideas to coffee-maker manufacturers such as Westbend and Grindmaster in late 1992. They sought to find an experienced manufacturer with strong distribution channels who might be interested in collaborating with them. "We got absolutely nowhere because, 1) they did not believe that we could create a coffee-maker, and 2) they thought we were crackpots," recalled Dragone, tongue-in-cheek.

Greenwood had soon created a makeshift coffee-maker to prove that the portion pack concept actually worked. Dragone continued to fine-tune the business plan, gaining critical input from experienced entrepreneurs and venture capitalists after he presented the concept to the MIT Enterprise Forum. He also discussed the plan with representatives of the Northeast Office Coffee Association, a trade organization composed of distributors, equipment manufacturers and other companies involved in marketing coffee and services to businesses. The partners needed to determine whether they would work with existing distributors servicing the office market or create their own channel employing a direct mail fulfillment program.

In late 1993, Greenwood and Dragone began to seek financial backing from venture capitalists. They met with Larry Kernan, a 1979 HBS graduate. Kernan was with MDT Advisers, a financial management company responsible for the Memorial Drive Trust, the \$1 billion pension fund of Arthur D. Little, a consultancy based in Cambridge, MA. As a part of its holdings, MDT Advisers managed a \$100 million venture capital fund focusing on high technology, communications and consumer products. "These guys were not ready for prime time," recalled Kernan. "Their machine leaked all over the conference table; it could barely make coffee." The Keurig partners planned on producing their own branded line—True North Coffee—and showed Kernan an example of a K-Cup with a True North logo emblazoned on its foil seal. Not convinced of the technical feasibility or the economics of the business model, Kernan told Greenwood and Dragone that his firm would pass on the deal.

Rebuffed in their first attempt to get VC funding, the duo again sought out industry partners to help them realize their plans. They scheduled another round of meetings with manufacturers of

consumer coffee-makers. Greenwood and Dragone also met with several premium roasters whom they thought might appreciate quantum leap in product freshness and consistent brewing the K-Cup would represent. “Both the appliance manufacturers and the roasters were extremely positive about the quality of the coffee the K-Cup produced,” said Dragone. “But the appliance guys were convinced we could never produce large quantities of K-Cups economically and the roasters were convinced we would never get the coffee-maker to work flawlessly.”

By early 1994, Keurig had received a small investment from the Food Fund, a VC firm specializing in food-related products. The company used the money to create a handful of higher quality brewer prototypes. In late 1994, Dunkin’ Donuts, an international chain selling donuts, bagels and other breakfast pastries, agreed to purchase two prototype brewers for \$15,000. The chain had been trying to grow its sales of premium coffees, but was finding it difficult to do so because the distinct flavors of specialty blends were degraded when brewed in the same machine. Because of the K-Cup brewing technique, Keurig’s system would allow Dunkin’ Donuts to offer a variety of fresh coffee choices without any mixing of flavors. In addition, the chain was seeking a coffee brewing system appropriate for non-store settings such as kiosks, often staffed by only one person at a time. Dunkin’ Donuts thought that Keurig’s system—which featured short set-up times and quick brewing—was promising for this sort of retail outlet.

Keurig had also developed a promising relationship with Green Mountain Coffee Roasters, a premium coffee producer (**Exhibit 4**). Greenwood met Stephen Sabol, Green Mountain’s Vice President of Sales, at a food products trade show in late 1992. “When I met Ian, he had no drawings or samples, really. But my gut feeling told me that there could be a lot of rewards for my company if we could be a partner with Keurig as it developed its system,” said Sabol. As Keurig upgraded its plans and prototypes, Sabol’s interest in working with the fledgling venture increased. By 1994, Keurig and Green Mountain were working on a research and development partnership. Although Greenwood pushed the roaster to produce the “True North” brand for Keurig, Sabol insisted that his company’s participation hinged on employing the Green Mountain brand. “We were not at all interested in a private label arrangement,” said Sabol. “We only wanted to work with them if we were producing a high-end product using our own name.”

New Funding, New Management

In late 1994, Keurig reopened a dialogue with MDT Advisers about obtaining funding for their company. The venture capitalist from the Food Fund who had placed the earlier investment asked Larry Kernan if he would like to participate in the next round of funding. “With the Dunkin’ Donuts project, the Green Mountain arrangement, more reliable prototypes and a patent application in the pipeline (**Exhibit 5**), this was starting to look like a real company,” said Kernan. “From what we heard, it seemed most of the kinks had been worked out and these guys could be in production in three to four months if they received funding.”

In April 1995, MDT and the Food Fund were the major investors in a \$1 million equity round of financing that gave them a combined 45% stake in Keurig. However, at the closing meeting, some complications arose. “It was unlike anything I had dealt with during all of my time in venture capital,” said MDT’s Kernan. “Peter Dragone pulled me aside and said that he and Dick Sweeney [a product development consultant who was slated to join Keurig full-time when funding was finalized] were having doubts about Ian’s abilities to run the company going forward.”

“It wasn’t a power play,” recalled Dragone. “Ian was a *fantastic* idea guy, but he wasn’t a businessman. Dick and I just didn’t believe he could be a good manager for a \$1 million investment.” The deal went forward with the management structure intact, although the discussion with Dragone

put Kernan—Keurig’s new chairman—on guard for potential problems. Greenwood chafed under the new arrangement and often disagreed with Kernan on what the firm’s priorities should be. After several months of being stonewalled on information requests and seeing little in terms of tangible achievements toward a product launch, Kernan began to investigate making a change at CEO. While hearing a great deal from Keurig employees about how Greenwood’s product ideas were key to the company’s future, he heard little in support of Greenwood’s management skills. In the late summer of 1995, Larry Kernan asked Ian Greenwood to step aside as CEO in favor of Peter Dragone. Greenwood became Keurig’s chief engineer, assigned to devote all of his time to the development of a reliable brewer and a packaging line capable of mass producing K-Cups.

“MDT was very afraid of Ian bolting, because he was still key to recovering their investment. We really tried to go out of our way to keep him happy,” said Dragone. Greenwood immersed himself even more in refining the technical aspects of the brewer and K-Cup packaging line. However, he still wanted to pursue certain “pet” development projects in spite of resistance from the growing group of Keurig engineers and product design consultants working on the effort. “Ian was a really clever guy and his concept was great,” said Sweeney, who was collaborating with Greenwood on key design projects. “However, he wanted to try all kinds of things which would have been really difficult to execute, just because of basic physics. I mean, gravity isn’t just a good idea, it’s the law.”

At the beginning of 1996 an additional \$1 million was raised from MDT and the Food Fund, bringing their ownership share to 58%. At the time it was obvious that Keurig was going to miss its projected window for bringing its system into operation. Greenwood’s adaptations to the products were not panning out. Keurig management, MDT and Green Mountain had been targeting a summer 1996 launch date, but neither the brewer nor the packaging line were going to be ready. In January 1996 the Board decided to make Sweeney head of engineering, charged with the task of getting the brewer and K-Cup line ready for market. At the same time Greenwood was moved into an R&D role. However, Sweeney and his new engineering team found Greenwood difficult to work with. In June of 1996, after conferring with MDT, Dragone made the decision to fire Greenwood.

More New Management

In the late summer of 1996 Peter Dragone approached Larry Kernan to discuss the possibility of his stepping aside as CEO. “Peter was a high energy guy...a straight shooter...great for the company,” said Kernan. “I think he had lost some of the confidence in his ability to lead Keurig, given the missteps and delays to date. We agreed that it might be good if he move on and we bring in another person to head the company.” Kernan initially asked Dragone to take the position of CFO when a new Keurig CEO was tapped, but Dragone wanted the new leader to feel he had free rein, without one of the founders looking over his shoulder.

Kernan led Keurig’s search for a new CEO. He knew it would be a critical decision, in that Keurig probably only had one more shot to bring its system to market. The board of directors decided the new CEO should have experience in the consumer products industry, preferably with a marketing background. “We talked to nine candidates. We saw some really talented folks. There were quite a few out-of-work executives from the consumer small appliance industry thanks to ‘Chainsaw’ Al Dunlap’s work at Sunbeam,” recalled Kernan.

Keurig had retained the Onstott Group, an executive search firm, to manage the search for a new CEO. Trying to think “out of the box” about additional candidates, the head of the firm, Joe Onstott, remembered an executive for whom he had performed searches in the past. Feeling there might be a good fit, Onstott gave Nick Lazaris a call. Lazaris was then a division vice president for Office Specialists, responsible for the company’s \$12 million technical staffing operation. From 1989-95, he

served as President and CEO of M.W. Carr, \$20 million manufacturer and importer of high-end picture frames. "He was not at all a natural candidate," commented Kernan. "Nick was definitely not as *externally* focused as we thought we might have liked. He didn't have the sales and marketing background we were looking for. But he did a lot of research...he assessed possible strategies. His interviews were very impressive." Lazaris came on board as Keurig's CEO and President in February of 1997. Dragone remained for three months to help ensure a smooth transition.

One More Shot at the Market

Missteps and missed deadlines caused some to doubt if Keurig's system would ever be rolled out in a major way. In December of 1996, MDT and the Food Fund put an additional \$1.7 million into Keurig, making them owners of 75% of the company's equity. "I thought we had one more chance to get this thing off the ground, so we stopped, retrenched and invested even more," said Kernan. "You never like to 'throw good money after bad,' but there was one thing that kept giving us confidence: *everyone* who took part in our prototype pilot programs *loved* the coffee."

As Lazaris took the reins as CEO, he and the board of directors spent a great deal of time refining Keurig's overall business model and reassessing what the company should concentrate on going forward. In early 1997, Keurig decided to outsource more of the development work on both the brewer and the packaging line. The company would still have their own engineers devoted full-time to each product, but they would serve as liaisons with the outside design firms. Lazaris also cemented the plan to license the firm's technologies on a non-exclusive basis to coffee roasters who would market K-Cups under their own brands. Keurig had considered launching its own line of branded coffee under the True North label, but management decided to forge alliances with premium roasters because of their prestige, channels, manpower and marketing experience. The company made Green Mountain its first partner, structuring an agreement by the end of 1997 whereby Keurig would own the K-Cup packaging lines and earn back a licensing fee for each K-Cup produced. "We were excited about the business model we were developing. Licensing would give us four to five cents per K-Cup of almost pure profit and very little downside risk," said Lazaris. However, the decision to follow the licensing rather than private label model led to some unforeseen problems when Keurig tried to raise additional equity capital. "Some of the other V.C. firms we talked to said they value early stage companies at multiples of *sales*. Our licensing plan gave us good profits and cash flow, but lower sales."

Customers, Channels and Distribution

Chris Stevens had been brought on as Keurig's Vice President for Sales and Marketing in February 1996. Stevens had been hired in anticipation of a rapid product roll-out. However, since neither the brewer nor the packaging line were ready for widespread usage, he conducted a number of customer studies at Boston-area businesses. Ian Greenwood had ordered several hundred prototypes of a flawed brewer design some months before; the company's engineers under Dick Sweeney's direction corrected the defects in a few dozen so that they could be used in the study. K-Cups were "mass-produced" by a labor-intensive, makeshift assembly line also created by Sweeney. "We were making K-Cups in the back of our office, using a clothes iron to adhere the foil seal onto the top. It wasn't pretty," said Sweeney.

Stevens used all of the K-Cups and functional brewers he could get to gain more information on how end customers would receive the product. Keurig grouped its potential customer base into three main categories: office users, food service establishments and households (**Exhibits 6 and 7**). The

company decided to focus its early efforts on offices and food service establishments for two reasons. First, the brewer Keurig was developing would be priced above \$1000, much more than consumers were used to spending on even prestige kitchen appliances such as espresso machines and bread-makers. As it stood, Keurig's development staff and contractors were already scrambling to bring a high quality commercial version to market and developing a consumer model in parallel would tax the firm's limited resources. Secondly, Keurig thought establishing the system in the commercial marketplace would greatly aid a later launch in the consumer segment. People used to having a number of choices of high quality coffees at their workplace or in restaurants would be more likely to purchase a less expensive household version when it was finally rolled out.

Office Coffee Systems (OCS)

Stevens placed units in office environments around the city of Boston and would frequently discuss the system's performance with the office/facility manager in charge of coffee service. Test locations included Thomas H. Lee, Goldman Sachs' Boston office, a Toshiba manufacturing facility and the Executive Education building at the Harvard Business School. According to Stevens:

We had so many questions about the way people would react to the units in an office setting. Would they want to wait 30 seconds for the cup of coffee instead of pouring it immediately from a pre-brewed pot? Would they figure out how to use the machine? Would people see the benefit of the flavor variety? Also, would office managers be willing to pay a premium for the coffee? According to my findings, the answer to all of these questions was a resounding "Yes."

Office managers viewed the Keurig system as a tangible benefit they could provide to enhance the workplace. "Usually, it's difficult for office managers to please anyone. The copier's broken...you're out of paper clips...the computer network's down. This was a chance for the office manager to be a hero," commented Stevens. Anecdotal information from office managers supported Keurig's assertion that if premium coffees were offered, even the most coffee-conscious employees would use the brewer in the break room rather than running out for a cup at Starbucks or another retail establishment. Stevens also gathered data concerning the importance of one of the unique characteristics of his company's system: flavor variety. Each of the eight flavors offered in Keurig's merchandising display represented between 11-15% of the total demand at any site on average.

Stevens maintained that low wastage, portion-pack brewing and easy clean-up/maintenance would help OCS customers earn back much of the premium they would pay for coffee brewed in Keurig's machines. After distributors took their 80-100% mark-up on the sale of K-Cups, they would be sold to offices for 40-50 cents per serving. This compares to a price of about 12.5 cents per brewed cup for the regular packaged coffees offices currently used. However, approximately one-third of coffee brewed in an office environment wound up "down the drain" because it was brewed incorrectly, became stale or was simply jettisoned in favor of a different blend. In addition, support employees—usually making around \$15 per hour—often spent as much as 30 minutes per day making coffee and cleaning the brewer. Finally, because the coffee and filters used in traditional OCS units were interchangeable with products used in consumer brewing systems (Mr. Coffee, etc.), employees sometimes took packaged coffee and brewing supplies home.

Keurig's products—both the brewers and supplies of K-Cups—would be sold to offices by one of an assortment of regional distributors. This segment of the U.S. coffee market was serviced by approximately 1,700 OCS distributors with sales of at least \$1.4 million each. One-third of those distributors enjoyed sales over \$2.5 million. OCS distributors would usually purchase brewers from a manufacturer and then provide them free of charge to clients if they committed to an office coffee

service contract. Sometimes other arrangements—such as rental or lease programs for the machines instead of free placement—might be brokered depending on the customer's coffee consumption patterns. Typically, distributors spent approximately \$400 on the brewers. Keurig foresaw marketing its brewer at a price point around \$1000. Distributors would also offer an array of supporting products such as displays and vending machines, which allowed offices to charge 25 or 50 cents for a K-Cup.

"We're going to be working closely with the distributors on how they should position the Keurig system with OCS customers," said Stevens. "The sales process isn't going to be a quick hand-off. It will be more like a 'Fuller Brush' sale [a reference to a company which sold its products door-to-door, relying heavily on demonstrations]." Stevens likened the demonstration to a "keg party," where distributors of Keurig's coffee system would bring pastries, biscotti and other food and drinks. The demo would be designed to appeal not just to the office manager, but also to the employees who would be utilizing the system. Keurig would urge distributors to leave a machine in the office for a few days so that the office manager could judge the potential impact of the new brewing system.

Food Service

Concurrent with its effort to penetrate the OCS market, Keurig was also making a strong push to get its brewing system into restaurants, convenience stores and other establishments. In 1995 Keurig received negative feedback from Dunkin' Donuts—a chain which sells more coffee per store than Starbucks—about the prototypes it purchased. They had commented that they could not reach the "taste profile" they were looking for, and they were concerned that the brewing process took too long given the volume of coffee sold between 7 and 9 a.m.

Despite this early setback, some within the company felt that Keurig had underestimated the potential of this market and should invest even more resources in pursuing it. Keurig was investigating the type of food service establishments that would be most likely to purchase its brewing system. "The more we thought about it, it seemed that restaurants with fairly low coffee sales could be a strong market for us," said Lazaris. "An International House of Pancakes—with its 'never empty cup of coffee'—has next-to-no wastage and always has fresh coffee brewing because of the extraordinary volumes they do at their peak hours." Keurig's technology featured single-serve brewing on demand, allowing restaurant concepts with lower volumes to brew coffee *after* they had received an order, saving time and decreasing wastage. In addition, food service establishments might be able to charge a premium because of the higher quality and the flavor assortment. By early 1998 Keurig and Green Mountain were demonstrating the Keurig system to a number of food service chains with high coffee sales but peak demand profiles different than Dunkin' Donuts'. Companies like Ben & Jerry's Ice Cream and The Great American Cookie Company committed to test-programs.

In this market segment, brewers and coffee were usually sold to foodservice distribution companies and then placed in restaurants under a variety of financial arrangements: purchase, lease, long-term service contract, etc. Some of the distributors that served this segment were multibillion dollar giants; examples included Sysco and Alliant (a Kraft spin-off). They operated in markets all over the country and offered broad product lines of food, drinks, equipment and consumables/disposables. Roasters like Green Mountain sometimes sold their products directly to restaurant accounts. Smaller regional players were not as prevalent as they were in the OCS market.

Another critical segment of the foodservice market included accounts such as grocery chains and convenience stores, which could either be free-standing or associated with gas stations. Such establishments had long sold brewed coffee to customers, but with the increasing popularity of premium coffees, they had started offering greater variety in recent years. Currently most

convenience stores employed a process where an employee would brew one or two flavors of coffee at a time on a commercial brewer costing \$400-500. Instead of leaving the brewed coffee on the heating element, the employee would place it in a specially designed carafe that helped retain heat and flavor. The store required at least one carafe—each priced between \$60-90—for every flavor variety it wished to offer.

Consumer Segment

While the company had begun to formulate some preliminary plans for entering the consumer market, even the most optimistic projections had them launching a line several years down the road. MDT Advisers originally figured a consumer version of the K-Cup and brewer would be ready two to three years after the initial investment. “We all saw the potential of the consumer market from the beginning. It was a key to the deal,” said Larry Kernan. “But we also feel we have an incredible business model on the commercial side, and we want to make sure *that* is executed well. I think we’re looking at 2001 at the earliest for the household version.”

The vast majority of coffee consumed in the U.S. is drunk at home. Folgers, Maxwell House and Hills Brothers were among the most popular brands; all were owned by multibillion-dollar international packaged goods companies. Most coffee marketed by the American megabrands was sold pre-ground in metal coffee cans, but some of the brands had produced individual portion packs similar to tea bags. These microwavable portion packs cost consumers approximately 25 cents each. Premium roasters such as Starbucks controlled a small, but growing, segment of the market for coffee consumed in the home. To gain more market share in the supermarket channel, Starbucks had recently formed an alliance with Kraft Foods. Many specialty coffee roasters were planning to sell some version of their premium coffees in supermarkets and other retail outlets.

By the late 1990s, over 80% of the coffee made at home was brewed in automatic electric drip coffee-makers, with a much smaller percentage made in percolators, espresso machines and other machines. Nearly 16 million coffee-makers were sold in the United States each year. Electric drip coffee-makers usually cost between \$25 and \$70. However, certain low-end models would sell for as little as \$10 and high-end manufacturers such as Krupps offered units for as much as \$150. Keurig management knew that developing a brewer in the \$100-150 range would be a huge engineering challenge. Selling large numbers of such brewers might be an even higher hurdle. “The expensive espresso machines, bread-makers, waffle irons and juicers people have collecting dust at the back of millions of kitchen cabinets work against us,” quipped Lazaris.

Marketing channels for a consumer version of the brewer and K-Cup also presented new puzzles for the company. In the OCS and foodservice markets, customers signed contracts for complete systems, which include the provision of both equipment and coffee. In the consumer markets, the choice of which brewer to purchase was totally disconnected from the choice of which coffee to buy and where to buy it. Keurig had thought of a number of options for selling brewers and K-Cups, including department stores, gourmet clubs, specialty coffee stores, direct sales events and the Internet.

Coffee Competitors

Although Keurig’s management felt its coffee packaging and brewing concept was unique enough to distinguish it in the marketplace, they faced competition from several larger companies. Each was already selling brewing systems that also represented significant upgrades over the \$400-500 electric

drip brewers currently in millions of office break rooms and restaurants. Among the stronger competitors offering advanced product and service offerings were:

Filterfresh: Headquartered in Westwood, MA, Filterfresh was the \$60 million American subsidiary of a Canadian food and drink manufacturer. Filterfresh's system kept fresh ground coffee in covered chambers inside of its brewing machine. When a user wished to brew an individual cup of coffee, a few grams of the coffee grounds would be injected along with hot water into a brewing cell. While this was a significant taste upgrade over traditional drip systems, some in the industry maintained although the cup of coffee was "freshly brewed," it was often made from ground coffee that had grown stale in the hopper due to exposure to oxygen and humidity. Each of Filterfresh's brewing units was sold to franchisees for \$2000-2500. Since the brewer's introduction in the late 1980s, the company had placed 40,000 units in the U.S. and Canada (90,000 worldwide). Keurig estimated the cost of a brewed cup of Filterfresh coffee to be 29 cents.

Café System 7: This line of brewing systems was marketed by Crane National Vendors, based in St. Louis, MO. The machine contained three hoppers that could be filled with different types of coffees or hot chocolate mix. The unit was also capable of making cappuccino, espresso and mochaccino. Like the Filterfresh system, the machine's brewing and storage chambers needed to be cleaned frequently to avoid odors and mold. In the previous five years, Crane had sold over 17,000 of its \$2500 machines. It was estimated that the full brewed cost of a cup of coffee was 22 cents.

Flavia: The pioneer of portion-pack brewing technology in the late 1980's, Flavia was a division of American food giant M&M/Mars. Although it was a very successful brewing system in Europe, it had only been introduced in the U.S. in 1996. Since that time, the company had sold 2,000 of its \$1200 brewers in a limited marketing campaign focused on the eastern seaboard. Flavia sold a wide variety of coffee blends and flavors in foil packs that included the coffee filter. According to Keurig management, Flavia's portion packs held 6-6.8 grams of coffee and were originally designed to produce a six-ounce serving, the size popular in Europe. Several varieties of tea and a chocolate drink were also available for the system. Flavia's machine took 23 seconds to brew a cup of coffee and then deposited used packets in an internal waste chamber. Including the lease price of the machine, the full cost of an eight ounce cup of Flavia coffee was around 39 cents (the machines sold in the U.S. were adjusted to pump two more ounces of water through the portion pack). Keurig management was impressed by the reliability of Flavia's brewer. However, Keurig did not see Flavia as the fiercest of competitors. "We've met a lot of their people at trade shows," said Lazaris. "While they're very talented, most of them are just rotating through various Mars divisions. They don't necessarily have the entrepreneurial passion for the coffee business...and certainly not the sense of desperation we have. This product is *everything* for us."

Trouble Brewing: Keurig's Suppliers Disappoint

Development of the K-Cup Packaging Line

In late February of 1998, Lazaris journeyed to Minneapolis to meet with a consortium of investors interested in investing up to \$4.5 million in Keurig's next round of equity financing. The capital from this round of investment would be split almost equally among three main areas: equipment/tooling for the commercial market, developmental programs for the consumer market and working capital. Lazaris was very pleased with the progress as the series of meetings were coming to a close. He was almost certain Keurig's story had impressed the investor group, most of whom had experience in the

food industry (several large packaged food companies were headquartered in Minnesota, and this investor group included a number of top executives).

After two days of meetings, Lazaris was preparing to fly home to Boston on Friday when he received a phone call from Mike Moore, CEO of Manufacturing Technology Systems (MTS), the Boston, MA-based company which was developing the packaging line for the mass production of K-Cups. Moore asked to meet with Lazaris on Saturday morning to discuss some urgent matters. At the Saturday meeting Moore informed Lazaris that his company would not ship the first completed packaging line—finished just days earlier—until it received an additional \$180,000 payment on top of the \$700,000 fixed price development and production contract for the first unit. Moore explained that the machine had cost MTS far in excess of what had been planned and that the increased costs were caused by Keurig's design modifications during development. "I told Mike he was making absolutely *the* wrong decision. I told him that I would have to inform my board about this and that it would be hard to do business together in the future," said Keurig's CEO. Lazaris offered to go to arbitration as provided for in the MTS-Keurig contract, but Moore refused. According to Lazaris, Moore felt that control over the machine gave him considerable leverage. Lazaris knew he could not let MTS delay the delivery of the first unit, which was already supposed to be on-site at Green Mountain.

During the next week, Kernan and Lazaris were able to broker an agreement where MTS would ship the packaging line with the proviso that it would be disabled after one month if no understanding was reached on the additional payment. While their goals were the same, this was a stressful time for the relationship between Kernan and Lazaris because of their different approaches to the problem. "Larry spent a great deal of time working with me on this...it was a high pressure situation. He was really upset. Larry saw it as an ethical issue and was not about to submit to extortion to solve a short term problem," said Lazaris. "But as management for the company, we had a different perspective because our futures were invested in Keurig, and we were more willing to negotiate a middle ground so we could move forward with the product launch." Moore sensed the divide between Kernan and Lazaris, taking advantage of it in order to drag out the negotiations. Kernan took the lead in the final discussions and agreed to make a payment to MTS in exchange for immediate control over the machine.

After the packaging line was delivered to Green Mountain and installed in March, Keurig needed to quickly order two more packaging lines to support the installed base of brewers they projected for the next eight months. Without additional K-Cup manufacturing capacity, Keurig's distributors would not be able to satisfy customer demand, leaving the system's roll-out in jeopardy. As soon as Moore had held back delivery of the first packaging line, Sweeney started a search to identify alternative vendors. Because the packaging line was still in a working prototype stage, there was no assurance that another vendor could complete the next two lines on-time and on-budget.

Despite the rocky relationship with MTS, Keurig left open the possibility of contracting with them for the next two lines before making the switch to another vendor. Moore expressed to Lazaris a strong interest in building more packaging lines. While the first machine was initially quoted at \$550,000, MTS proposed to build future machines for \$900,000 each. Lazaris knew that price was not even close to the other quotes that Sweeney had obtained. After being informed that they were too high to even be considered, MTS later revised its bid down to around \$700,000. In its amended bid, MTS asserted that it was the only company which could deliver the machines in the time frame required by Keurig. The original Keurig-MTS contract made all intellectual property associated with the development of the packaging line the property of Keurig. Although Lazaris' firm controlled the plans, any new vendor would still have to conduct a great deal of reverse engineering of the first packaging line in order to successfully execute the project. Lazaris knew that if he changed suppliers,

a great deal of time would be lost as the new company came up the learning curve. In April Keurig management assessed their sourcing options going forward if they did not stay with MTS.

Pilgrim: Located in Boston, Pilgrim was a well-respected and relatively large producer of specialized industrial machinery, including packaging lines. While Pilgrim's references were excellent and their interest level was high, some Keurig managers were hesitant to award the contract to them because they lacked an internal machine shop. If non-standard parts had to be ordered from an outside machine shop, the production process could be delayed. Pilgrim bid \$575,000 for each machine. Lazaris estimated that delivery timetables for new packaging units would be pushed back two months because Pilgrim would need to develop engineering schematics and purchase some new production equipment.

Quantum Industries: Though experienced in developing packaging solutions for the food industry (they developed the packaging line for Act One microwave popcorn among other products), Minnesota-based Quantum had lost a great deal of business recently. The lost accounts had negatively impacted the company's financial stability and forced layoffs. Quantum did, however, possess a large production facility and operated its own machine shop. Its Owner/President had taken a personal interest in the packaging line and had traveled to Green Mountain with two engineers to assess the scope of the project. In its proposal, Quantum stressed that it had the engineering talent to not only reverse engineer the first packaging line, but also the space to build several machines simultaneously. Quantum bid \$500,000 for each machine, but would take three months longer than MTS to deliver the next automated production line. Some Keurig managers were reluctant to award the contract to them because of their financial instability and the fact that they were located 1500 miles away.

Amalgamated Technologies: Another Minnesota company with experience in the food industry, Amalgamated's factory usually buzzed with activity. Their capabilities, reputation and cutting edge equipment garnered them a great deal of business. In initial conversations, however, Keurig management did not feel that their modest potential first order—two units over the next six months—generated a great deal of excitement at Amalgamated. They bid \$525,000 for each machine and would take four months longer than MTS to produce and deliver the next packaging lines.

Kernan and Lazaris also needed to assess how the MTS issues would impact the new round of funding they were trying to complete by June. Several months of work had been spent attracting the Minnesota investors, and Keurig could not afford another delay in either its fundraising or the roll-out of its packaging system.

Brewer Brouhahas

As the first K-Cups rolled off of Green Mountain's new packaging line, Lazaris and Sweeney became very concerned about the quality of the brewers its supplier—Vandelay Industries—was producing. Keurig had estimated that each packaging line could support around 1500 brewer placements, assuming an average of 43 cups per brewer per day. The roll-out schedules for brewing units and packaging lines were totally linked to each other. In addition, Keurig needed to maintain its timetable if it wished to continue to develop its network of distributors and premium roasters.

Vandelay, based near Wellesley, MA, was a designer and manufacturer of precision oceanographic instrumentation. The company was searching for new types of projects because of cutbacks in the defense industry. On the initial order of 1000 units, brewers were passing through Vandelay's final quality checks with loose screws and parts literally falling out. Sweeney was concerned about the defect rate since repairing brewers in the field would cost \$50-100 per service

call. In addition, Keurig management felt their supplier was trying to squeeze additional money out of the project beyond its initial low bid. Vandelay consistently approached Sweeney about getting additional money per unit any time there was any alteration in the product or manufacturing process. When the supplier submitted its bid for the next order of 1000 units—needed by the fall—its price per unit increased significantly. “They went from \$789 per machine to a bid of \$825. This wasn’t exactly the ‘learning curve effect’ we’d been hoping for,” said Sweeney.

As soon as Sweeney had finished identifying alternative packaging line vendors, he was on the road searching for a new contract brewer manufacturer. During this process Keurig was approached by another possible manufacturer, one which had heard about the brewer project from a member of the Minnesota investment group. Lakeland Instruments, located in Rochester, MN, was a manufacturing operation started by former IBM employees to take on outsourced projects for their former company. Most of the company’s work emphasized technology products such as disk drives, cellular telephones and medical instruments. Lakeland Instruments also owned a *maquiladora* plant in Mexico. Lakeland bid \$680 per brewer and stated that it had the capabilities to easily support over 10,000 brewers per year. But even with that volume, Keurig would only be 3% of Lakeland’s volume. Some of Keurig’s management was concerned that Keurig would not get Lakeland’s attention if there were problems in the roll-out.

As alternatives to Vandelay and Lakeland, Sweeney had identified a contract manufacturer in Poughkeepsie, NY that had similar capabilities to Lakeland, but also possessed its own sheet metal fabrication shop. The company, Pilla Manufacturing, had experienced financial difficulty recently. As a highly leveraged and thinly traded public company, Pilla was in desperate need of sales to cover the fixed expenses of its facilities and machinery. Pilla quoted \$700 per unit but made it clear they would lower the bid if that was what it would take to get the business.

Lazaris and Sweeney were extremely disappointed in Keurig’s relationships with its main suppliers. “We either needed to get our current suppliers to approach us like we were partners for the long-haul, or make a change,” said Lazaris. “We felt like these guys just didn’t get it. Didn’t they see that this could all turn into something huge eventually?”

Exhibit 1 Keurig Senior Management Team (as of Summer 1998)*Nicholas Lazaris: President/CEO and Board Member*

Nicholas Lazaris, age 47, has been President/CEO and Board Member since February 1997. From 1996 to 1997 he was Division Vice President of Office Specialists, responsible for the Tech Specialists division, a \$12 million contract technical staffing company. From 1989-1995 Mr. Lazaris was President/CEO and Board Member for MW Carr, a \$20 million upscale picture frame manufacturer and importer. From 1985-1989 Mr. Lazaris worked in a variety of positions for Barry Wright Corporation. (\$200 million NYSE diversified manufacturer) including Division VP Marketing, Division VP Finance and Corporate Director of Business Development. From 1977-1985 Mr. Lazaris served in a variety of positions for the State of West Virginia including Chief of Staff for Governor John D. Rockefeller IV for four years. From 1975-1977 he worked as a CPA for Ernst & Young. He received his BS from MIT in 1972 and his MBA from Harvard Business School in 1975.

Christopher Stevens: Vice President, Sales and Marketing

Christopher Stevens, age 45, has been Vice President Sales and Marketing since February 1996. From 1995-1996 Mr. Stevens was Executive Director of The Sports Museum of New England, a nonprofit institution, and from 1994-1995 he was Vice President of Sales for the Consolidated Group, a third-party insurance administrator. From 1991-1994 he worked as Executive Vice President and General Manager for United Liquors, Ltd. From 1982-1991 Mr. Stevens worked for Anheuser-Busch, Inc. as Division Manager of the New England Division. From 1975-1982 he worked for Procter & Gamble. Mr. Stevens played for the Belgian Professional Basketball Club from 1974-1975. He received his BA from Notre Dame in 1974 and completed the Executive Education Program at Columbia Business School in 1994.

Richard Sweeney: Vice President, Operations and Engineering

Richard Sweeney, age 50, is co-founder of Keurig and, after being involved at Keurig on a part-time consulting basis from 1993 to 1996, he became Vice President Operations and Engineering in January 1996. From 1991-1996, Mr. Sweeney operated Liberty Resources, Inc., a manufacturing management consulting firm. From 1986-1990, he was Vice President Manufacturing for Canrad-Hanovia Inc., a manufacturer of scientific and UV lighting. From 1981-1986, Mr. Sweeney worked as Vice President Manufacturing for V-M Industries, a manufacturer and importer of upscale consumer appliances including espresso machines. From 1970-1980, Mr. Sweeney worked in various manufacturing management positions for White Machine Company. He received his BS from NJIT 1982 and his MBA from Fairleigh Dickinson University in 1986.

Source: Keurig Business Plan.

Exhibit 2 Keurig Products



K-Cup being inserted into brewing chamber (above)

Keurig Brewer (left)

Keurig's eight varieties of coffee with plastic K-Cup display (right).



Exhibit 3 Description of Keurig Products and Technology*Keurig K-Cups*

The K-Cup is a pre-measured coffee portion pack containing on average 9.5 grams of freshly roasted and ground coffee and a conical shaped filter paper that holds the coffee. The current K-Cup container is a nonproprietary plastic cup comprised of three layers of co-extruded-thermoformed plastic. The inner layer of plastic is FDA certified polyethylene, the middle layer is oxygen impermeable EVOL plastic, and the outer layer is polystyrene for structural stability. The filter is welded to the upper rim of the cup, filled with the appropriate amount of coffee based on bean type, purged with nitrogen to reduce oxygen content to below 3% to preserve freshness and extend shelf life, and then sealed with a metal foil and plastic lid.

The K-Cup seals in the freshness of freshly roasted and ground specialty coffee by preventing oxygen and moisture contamination via the impermeable EVOL layer of plastic. The quantity of coffee and the grind vary with each type of offered coffee to maximize flavor as determined by quality control specialists (“cuppers”). The expected shelf life for K-Cups is six months. An individual K-Cup is used to produce a 10-ounce cup of coffee.

Keurig contracted with Manufacturing Technology Systems, Inc. (MTS) of Boston, Massachusetts in February 1997 for the design, development and production of a K-Cup production line capable of producing 100 K-Cups per minute. The unit has passed acceptance testing in Boston and was installed at Green Mountain Coffee Roasters in Vermont in March 1998.

The roaster’s K-Cup cost structure is currently estimated at 13 cents for coffee, packaging materials and direct labor.

Keurig Brewers

The Keurig commercial market brewer is a compact, counter-top unit measuring 10 inches wide, 16 inches tall and 19 inches deep. Its four key subassemblies insure that the 30-second brewing process maximizes the taste profile of each K-Cup variety. The subassemblies include the following: (1) water heating and storage in preparation for brewing; (2) hot water pumping to generate Keurig’s unique pressurized brewing process; (3) the brew head servosystem which engages, punctures, injects hot water and extracts brewed coffee from the K-Cup and then disposes of the K-Cup automatically; and, (4) the printed circuit board which provides the machine intelligence to operate and monitor the performance of the Keurig brewer.

Exhibit 4 Profile of Green Mountain Coffee Roasters, 1998

Revenues: \$55.8 million

Assets: \$24.6 million

Employees: 321

Market Value: \$25.8 million

Publicly traded on NASD since 1993, symbol GMCR.

Green Mountain produces over 60 varieties of coffees. It distributes its products (coffees and accessories) through both wholesalers and direct mail programs. The company has over 5,000 wholesale customers such as supermarkets, convenience stores, restaurants, hotels and specialty food shops. Mobil convenience stores account for 16% of Green Mountain sales. Other large customers have included Hannaford Brothers supermarket, Delta Airlines and Business Express Airlines. Green Mountain operated several retail establishments until they were closed in 1998.

Green Mountain employs roasting software to ensure product quality, with a specific program for each flavor and type.

Green Mountain Income Statement
\$ Millions

Fiscal year ending September	1997	1996
Sales	42.9	33.4
COGS	27.2	20.6
SG&A	13.7	10.6
Other	0.2	0
Total Expenses	41.1	31.2
Interest Expense	-0.5	-0.4
Income Taxes	-0.3	0.3
Income After Taxes	1.5	1.4

Source: OneSource.

Exhibit 5 Patent for Keurig Brewing Technology



United States Patent [19]

[11] Patent Number:

[45] Date of Patent:

[54] BEVERAGE FILTER CARTRIDGE

[75] Inventors:

[73] Assignee: Keurig, Inc., Waltham, Mass.

[21] Appl. No.:

[22] Filed:

[51] Int. Cl.³ A47J 31/24; A47J 31/14

[52] U.S. Cl. 99/295; 99/302 R;

[58] Field of Search 426/77, 82, 473, 477,
426/479, 482, 435, 112, 433; 99/279, 295, 300,
302 R, 302 P, 304, 306, 307, 316, 317, 321

[56] References Cited

U.S. PATENT DOCUMENTS

240,402	4/1881	Gee .	
346,278	7/1886	Halstead .	
370,141	9/1887	Hobbs .	
845,968	3/1907	Murray .	
1,168,544	1/1916	Newlin .	
1,302,483	4/1919	Vierling .	
2,997,940	8/1961	Pecoraro et al. .	
3,199,682	8/1965	Scholtz .	
3,260,190	7/1966	Levinson	99/295
3,403,617	10/1968	Lampe	99/295
3,579,351	5/1971	Wege et al.	426/82
3,615,708	10/1971	Abile-Gal .	

3,754,463	8/1973	Vernooy	99/302
3,971,305	7/1976	Daswick	426/77
4,204,966	5/1980	Morgan, Jr. .	
4,321,139	3/1982	Auclair .	
4,417,504	11/1983	Yamamoto .	
4,584,101	4/1986	Katsoka	426/82
4,859,337	8/1989	Woltermann .	
4,981,588	1/1991	Poullalion	426/77

Primary Examiner—Robert W. Jenkins
Attorney, Agent, or Firm—Samuels, Gauthier & Stevens

[57] ABSTRACT

A beverage filter cartridge includes an impermeable pierceable base having a predetermined shape and an opening at one end; a self-supporting wettable filter element disposed in the base sealingly engages with the opening in the base and has a form different and smaller than the predetermined shape of the base so that the filter element diverges from the base and divides the base into two sealed chambers, a first chamber for storing an extract of the beverage to be made, and a second empty chamber for accessing the beverage after the beverage outflow from the filter has been made by combining a liquid with the extract; and an impermeable pierceable cover sealingly engaged with the opening in the base to form an impermeable cartridge.

16 Claims, 4 Drawing Sheets

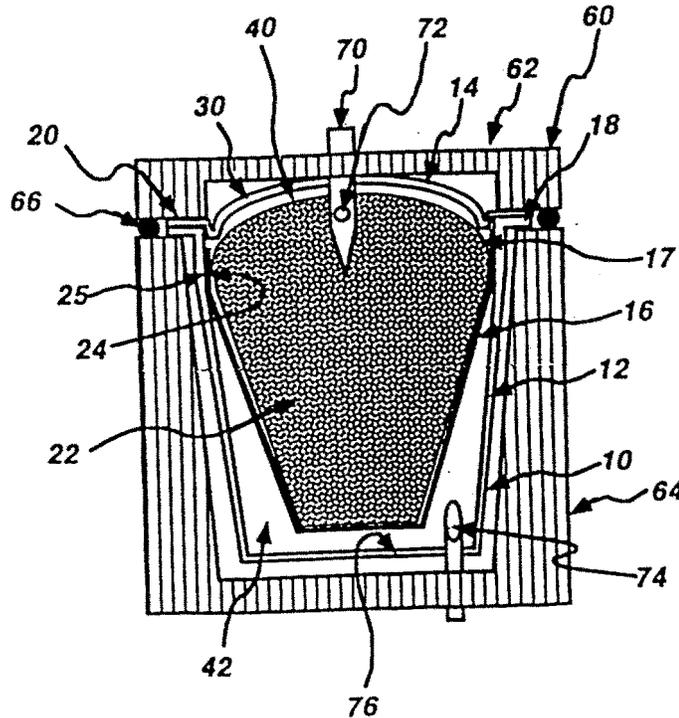


Exhibit 5 (continued) Patent for Keurig Brewing Technology

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a combination of polystyrene, ethylene vinyl alcohol and polyethylene. There is a self-supporting wettable filter element disposed in the base and sealingly engaged with the lip or rim of the base. The filter element may be made of a lightweight, two-phase heat sealable paper of cellululosic and synthetic fibers. The synthetic fibers may be PVC or polypropylene so that they are compatible with the material of the base and are therefore easily sealed to the base using heat, ultrasonic energy or microwave energy. In addition, the material of the filter is such that the filter is totally self-supporting. Even when it is wetted, it will not collapse or sag against the inner walls of the base. The filter can have the shape of a cone, a truncated cone, or a triangular prism which fans out and blends into a circular base. The filter is smaller than and non-congruent with the base so that it diverges and divides the base into two sealed chambers. In the first chamber there is stored the extract of the beverage such as coffee that is to be made, and the second chamber has a substantial empty volume for accessing the beverage outflow from the filter after the beverage has been made by combining liquid with the extract. This enlarged volume of the second chamber enhances the filter flow since the filter is not in contact or in any way blocked by the walls of the base, and water can flow through the entire filter surface. In addition it provides ample room so that a penetrator which perforates the base will not injure or sacrifice the integrity of the filter itself. There is an impermeable pierceable cover which is sealingly engaged with the opening in the base to form a complete impermeable cartridge. The cover, which is made of the same material, also has a flange or rim or lip which extends radially outwardly and engages the mating rim on the base. The cover is typically domed convexly outwardly, so that for example when coffee is piled in the cartridge in the form of a typically rounded mound, the placement of the cover does not displace the coffee powder so that it leaks or sprays outwardly and degrades the quality of the seal along the flanges. In addition, the convex shape provides an increased rigidity for the cover so that it provides resistance to produce a clean penetration when a needle or other penetrator is inserted through it into the first chamber. It is through this penetration that the hot water is delivered to the coffee. The penetration in the base provides the exit for the liquid coffee to be dispensed.

There is shown in FIG. 1 a cartridge 10 according to this invention which includes base 12, cover 14, and filter 16. Base 12 includes opening 17 and outwardly facing flange rim or lip 18 similar to the rim 20 on cover 14. Base 12 has the shape of an inverted truncated cone, as does filter 16, which contains coffee powder 22.

Filter 16 can be drawn or formed as a monolithic structure or may be made in a pattern and then rolled and sealed such as at seam 26. Filter 16 is sealingly engaged at its edge 24 with the adjacent surface 25 of base 12. Cover 14 may have a domed portion 30, as seen more clearly in FIG. 2, which extends outwardly beyond opening 17 and rims 18 and 20. This domed shape 30 not only nicely accommodates the rounded top 32 of the coffee 22 in filter 16, but it also provides an extra measure of rigidity for cover 14 so that it can present a firm opposition resulting in a clean penetration from a needle or other penetrator in an automatic brewing machine or other type of machine. The seal formed between filter 16 and base 12 creates two chambers, chamber 40 in which coffee 22 is stored, and chamber

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42 which receives the outflow from filter 16. Chamber 42 is produced by the fact that filter 16 is smaller and divergent, although often similar in shape to base 12. This larger chamber 42 enhances the outflow from filter 16 and also provides ample room for a penetrator to penetrate base 12 without puncturing filter 16. Although filter 16 is shown as a truncated conical structure, this is not a necessary limitation of the invention, as it might as well be what might be generally called a triangular prism, filter 16a, FIG. 3A, having sloping sides 50, 52, a reduced apex 54, and a generally circular base 56. In an alternative form, filter 16b, FIG. 3B, may take the form of a cone whose reduced apex 54b is simply the tip of the cone. In either case the apices 54, 54b would be spaced from the bottom of base 12.

Cartridge 10 is well adapted for use in an automatic machine such as a coffee brewing machine where it will be delivered to and gripped in a housing 60, FIG. 4, which has an upper part 62 and a lower part 64 sealingly engaged at seal 66 by a portion of the machine not shown. Part 62 includes a penetrator or needle 70 which penetrates domed cover 14 to provide pressurized hot water through hole 72 to coffee 22 in filter 16. A second penetrator or needle 74 is pushed through the bottom 76 of base 12 to receive the outflow of the coffee beverage and dispense it to a cup or container.

Although specific features of the invention are shown in some drawings and not others, this is for convenience only as some feature may be combined with any or all of the other features in accordance with the invention.

Other embodiments will occur to those skilled in the art and are within the following claims:

What is claimed is:

1. A beverage brewing apparatus comprising:

a housing having a first component defining a brewing chamber with an access opening, and a second component which may be opened to afford access to said brewing chamber via said access opening, and which may be closed to coact in sealing engagement with said first component to close said access opening;

an impermeable pierceable cartridge removably received in said brewing chamber via said access opening, said cartridge being internally subdivided by a filter element into first and second cartridge chambers;

a beverage extract contained in said first cartridge chamber;

liquid inlet and outlet means extending through said housing into said brewing chamber to penetrate through said cartridge into communication respectively with said first and second cartridge chambers; and

means for injecting liquid into said first cartridge chamber via said inlet means for combination with said beverage extract to produce a liquid beverage, said filter element being adapted to accommodate passage therethrough of said beverage into said second cartridge chamber for outflow through said outlet means.

2. The beverage brewing apparatus of claim 1 wherein said cartridge comprises a base having a predetermined shape and an open end, said filter element being disposed in said base, sealingly engaged with said open end and having a form different and smaller than said predetermined shape of said base so that said filter element diverges with respect to said base to divide said

Exhibit 5 (continued) Patent for Keurig Brewing Technology

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base into first and second cartridge chambers; and a cover sealingly engaged with said open end.

3. The beverage brewing apparatus of claim 2 wherein said cover is domed convexly outwardly.

4. The beverage brewing apparatus of claim 2 wherein said base and cover include mating flanges coacting in sealing engagement to define an exterior rim surrounding said cartridge.

5. The beverage brewing apparatus of claim 4 wherein said rim is held between the first and second housing components when said second housing component is closed.

6. The beverage brewing apparatus of claim 2 wherein said inlet and said outlet means penetrate said cartridge when said second component is closed.

7. The beverage brewing apparatus of claim 2 wherein said filter element and said base are both generally truncated non-congruent cones.

8. The beverage brewing apparatus of claim 2 wherein said filter element is generally a cone shape and said base is generally a truncated cone shape.

9. The beverage brewing apparatus of claim 2 wherein said filter element is a triangular prism with a circular base and said base is a truncated cone shape.

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10. The beverage brewing apparatus of claim 2 wherein said base is made of polystyrene, ethylene vinyl alcohol and polyethylene.

11. The beverage brewing apparatus of claim 2 wherein said cover is made of polystyrene, ethylene vinyl alcohol and polyethylene.

12. The beverage brewing apparatus of claim 2 wherein said filter element is made of lightweight two phase heat sealable paper of cellulosic and synthetic fibers.

13. The beverage brewing apparatus of claim 12 wherein said synthetic fibers are PVC or polypropylene.

14. The beverage brewing apparatus of claim 2 wherein filter element terminates in a reduced apex portion spaced from the bottom of said base to accommodate penetration of said outlet means into the lower portion of said base without subjecting said filter element to penetration.

15. The beverage brewing apparatus of claim 1 wherein said liquid inlet means protrudes through said second housing component, and said liquid outlet means protrudes through said first housing component.

16. The beverage brewing apparatus of claim 1 wherein said filter element is arranged within said cartridge to avoid penetration by said inlet and outlet means.

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Exhibit 6 U.S. Market Sizes for Coffee and Brewer Sales

All figures are in billions of dollars per year unless otherwise noted.

		Coffee Type		Brewing Equipment	
		Commodity	Specialty		
Consumer Channels**	Supermarket	\$3.50 B	\$0.64 B	\$ 0.45 B 90,000 K installed base 15,000 K units/year	
	Gourmet food stores	*	\$1.56 B		
Commercial Channels***	Food service	\$3.86 B	\$1.50 B	\$0.09 B 1,700 K installed base 170 K units/year	
	Office coffee	\$2.33 B	\$0.26 B		
	Vending	\$ 1.35 B	*		\$0.11 B 377 K installed base 38 K units/year
TOTAL	\$11.04 B	\$3.96 B	\$0.72 B		

* Connotes insignificant amount.

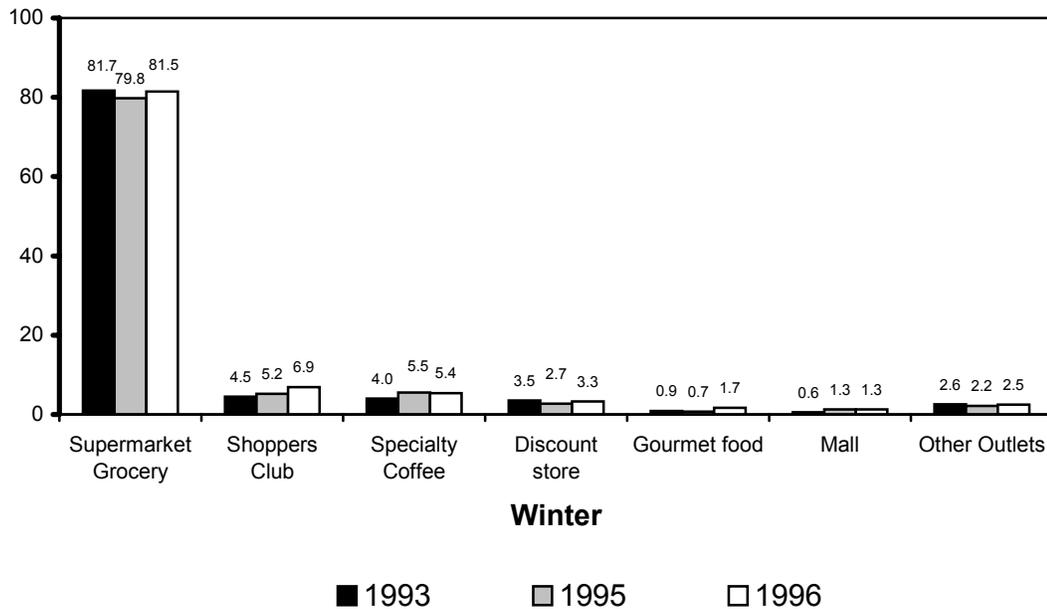
** Retail prices. In form of packaged coffee grind or beans.

***Retail prices. In form of brewed coffee.

Source: Keurig Business Plan

Exhibit 7 U.S. Coffee Purchase and Consumption Statistics

Percentage of Customers Buying Packaged Coffee from Each Location

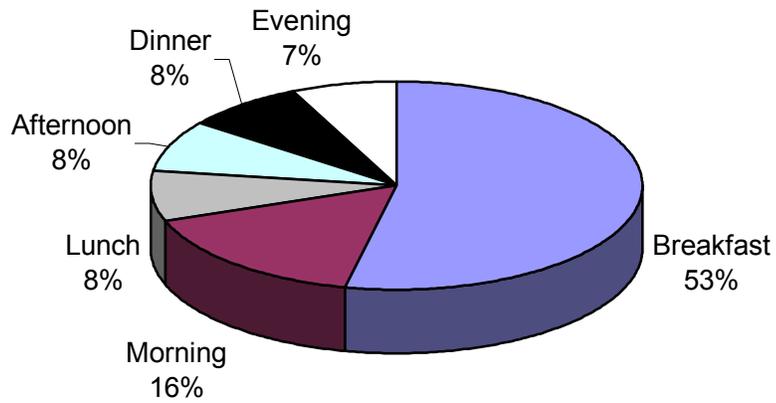


Source of Coffee by Geographic Region—1996 Winter

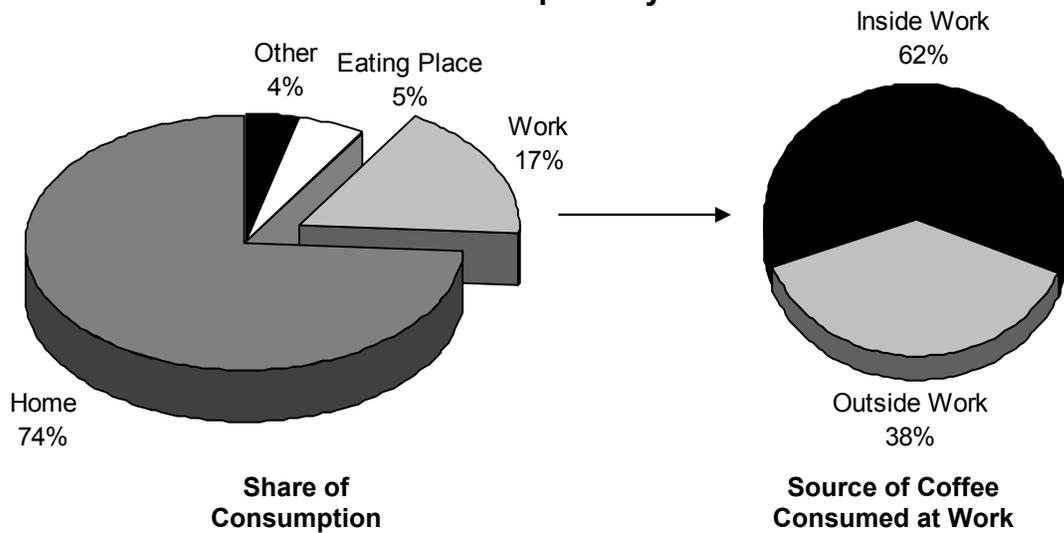
	Total U.S.	Northeast	North Central	South	West
Supermarket/grocery	81.5%	80.7%	84.2%	85.1%	73.9%
Specialty coffee store	5.4	5.6	3.7	3.0	10.5
Shoppers club	5.9	3.7	2.7	4.6	13.4
Discount store	3.3	2.1	3.9	3.4	3.6
Gourmet food store	1.7	1.1	1.2	1.8	2.6
Mail	1.3	1.1	2.6	0.7	1.0
Other outlets	2.5	2.5	1.5	2.5	3.4

Exhibit 7 (continued) U.S. Coffee Purchase and Consumption Statistics

Coffee Consumption By Time of Day



Coffee Consumption by Place*



* Number of servings.

Source: Keurig Business Plan.