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Driscoll's: Harnessing Digital Technology to Deliver Delight

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Soren Bjorn, executive vice president of Driscoll's of the Americas, thought about how the company's approach to quality had changed as he drove to his office in Watsonville, California, on an overcast morning in November 2016. The rainy weather, while welcome in the drought-stricken region, meant that local strawberry harvests were ending earlier than usual. Production would shift to ranches in Southern California, Mexico, and Florida for the next five months.

As the market leader in the \$6 billion U.S. fresh berry market, Driscoll's worked with over 400 independent growers in the U.S., Mexico, Chile, and Peru to deliver a year-round supply of strawberries, raspberries, blackberries, and blueberries to 400 customer delivery locations.¹ Growers licensed Driscoll's proprietary varieties and grew the fruit to tight quality specifications. Most berries were picked by hand and packed in the field into uniquely identified consumer packs, quickly cooled to 33°F at a nearby cooling facility, and immediately sent in refrigerated trucks to distribution centers operated by retail and foodservice customers. Time to market and strict temperature control were essential to ensuring the quality of the more than one billion berry clamshells shipped by Driscoll's in 2015.

Increasingly, Driscoll's depended on sensors, smart systems, data warehouses, and proprietary analytics to monitor and improve product quality and to engage directly with consumers, who were invited to submit comments on every pack of berries they purchased. This was part of a farm-to-fork initiative known as the Delight Platform that had been underway since 2012. Underpinned by a full-chain traceability system, the closed-loop system provided near real-time feedback on product quality and was constantly evolving to address new issues. Applications to date ranged from monitoring the temperature of trucks in transit to using historic internal data combined with market and weather information to build predictive models of field-level quality risk.

The objective of the Delight Platform was to focus all members of the supply chain on achieving the company's mission of delighting customers with consistently great berries. Bjorn wondered how much further they could go:

Technology is allowing us to push the quality envelope. We now have data to show retailers how they are doing and to share with growers to help them improve. We have gotten much closer to the consumer; I wonder how much closer we can get? And how do we get the farm worker engaged? They make the ultimate delight decision when they decide which berry to pick. Imagine what we could accomplish if we could connect the end of the chain to the beginning and then get out of their way.

The Berry Boom

Driscoll's had benefited from and also helped drive the strong growth in U.S. fresh berry consumption that had been underway since the late 1990s. With some of the highest antioxidant levels of any fresh fruit and no need to peel or cut before eating, berries sat at the intersection of health and convenience, two important consumer trends. New berry varieties with improved flavor and appearance and better production economics had been developed by public universities and private research programs, where Driscoll's was the leader. Increasing domestic production and imports provided year-round availability of high-quality fruit. As a result, U.S. per capita consumption of fresh strawberries had grown from 4 pounds in 1998 to about 8 pounds in 2015, while per capita consumption of blueberries had increased from 0.2 pounds to 1.6 pounds during the same period.² Total fresh berry consumption grew from 4.9 pounds per person in 2000 to 9.3 pounds per person in 2014.

In 2016, fresh berries were the largest U.S. retail produce category by dollar sales and one of the fastest growing (up 7.6% over the prior year). Mainly comprised of strawberries (47% of dollar sales), blueberries (26%), raspberries (15%), and blackberries (9%), retail berry sales totaled more than \$6 billion in the 52 weeks ending on October 30, 2016, and topped apples, the next largest category, by nearly \$2 billion.³ (See Table 1 for more information on the category.) Given their popularity with consumers, fresh berries could be a differentiator for a retailer, although "shrink"⁴ could be a problem if the fruit was not handled properly.

Table 1: Retail Berry Category (52 weeks ending on 10/30/2016)

	Value (\$ MM)	Change vs. Previous Yr (%)	Volume (lb MM)	Change vs. Previous Yr (%)	Price (\$/lb)
Berries	6,155	7.6	1,720	3.2	3.58
Strawberries	2,920	4.6	1,113	1.2	2.62
Blueberries	1,601	9.7	347	8.4	4.61
Raspberries	911	7.9	130	-2.3	7.01
Blackberries	536	15.9	89	13.7	6.02
All other	185	17.4	41	16.8	4.51

Source: Compiled from IRI projected food store sales data.

The U.S. was the world's largest strawberry producer and California was the largest producing state, supplying about 80% of the strawberries consumed in the country in 2016. (California also produced other berries.) Most strawberry production was concentrated in the Oxnard and Ventura areas of Southern California and along California's Central Coast. (See Exhibit 1 for a map.) Other major commercial berry-producing areas by total production volume included Florida (strawberries), Oregon (blueberries, raspberries, and blackberries), and Washington, Georgia, and Michigan (blueberries).⁵ Even with rising demand, many U.S. berry growers were finding it difficult to obtain field labor (hand-harvesting berries was backbreaking work) and seeing higher land prices, generally rising production costs, and increased competition from lower-cost imports from Mexico. This had reduced margins and forced some consolidation, with small independent growers the hardest hit.⁶

Imports of fresh berries from Mexico and Chile into the U.S. had grown significantly over the last decade as major U.S. shippers formed partnerships and invested in these regions in order to provide year-round availability for consumers and to take advantage of lower production costs.⁷ Mexico accounted for nearly all fresh strawberry, raspberry, and blackberry imports and about 8% of fresh blueberry imports.⁸ Chile supplied over half of fresh blueberry imports, which came in controlled-atmosphere container ships that extended product shelf life. Other blueberry imports came from Canada, Argentina, and Peru, where production area was expanding.⁹

Besides Driscoll's, leading fresh berry companies in the U.S. included Naturipe Farms LLC, a sales and marketing partnership between four fresh berry growers: Chile-based Hortifruit S.A., Michigan Blueberry Growers, Munger Farms, and Naturipe Berry Growers. Production was spread across North and South America, allowing Naturipe Farms to provide a year-round supply of blueberries, strawberries, raspberries, blackberries, and cranberries.¹⁰ Well-Pict Berries, based in Watsonville, California, was formed in 1969 and sold conventional and organic strawberries year-round and seasonal raspberries produced from 100% proprietary lines.¹¹ Dole Food Company Inc., the world's largest producer and marketer of fresh fruit and vegetables, sourced, grew, processed, marketed, and distributed over 200 products, including bananas, pineapples, strawberries, salads, and fresh and frozen juices marketed under Dole and other brand names, in more than 90 countries. The company was founded in 1851 and taken private in late 2013 by CEO David Murdoch.¹² Other berry suppliers included shippers, grower-shippers, and small and medium-sized independent growers.¹³

Globally, fresh berries were increasingly popular with consumers. The EU market for blueberries, raspberries, and blackberries was predicted to grow by at least 7% a year and strawberries by 2% a year through 2020. Analysts noted that Europe would benefit from improved supply chain alignment and higher quality and availability.¹⁴ In China, the market for high-quality berries was being boosted by higher incomes in urban areas and a growing interest in health. Imports had increased to satisfy demand, although logistics were challenging due to the country's size and underdeveloped cold chain. In early 2016, Driscoll's and Australia's Costa Group formed a joint venture to begin berry production in China's Yunnan Province. The JV built on the two companies' six-year-old partnership in Australia, which had grown to be the leading marketer of blueberries, raspberries, strawberries, and blackberries in the country.¹⁵

Driscoll's Background

Driscoll's heritage traced back to the 1870s, when Joseph "Ed" Reiter and R.O. "Dick" Driscoll grew the first strawberries in California's Parajo Valley. After identifying a special variety that produced large, bright red and exceptionally sweet berries, the two first cousins formed a company in 1904 to produce and market fruit under the Banner Berry Farm brand.¹⁶ Raspberry production was added in 1937. Seeing the value that could be created through proprietary lines, Reiter and Driscoll, along with several other growers, established The Strawberry Institute in 1944 to conduct private breeding of berry plants.¹⁷ This was an unusual move at the time, as most plant breeding was done by university breeders who released their lines to the public.

With varietal development underway, the company added new growers to expand capacity and extend the production season. Driscoll Strawberry Associates was founded in 1950 as an independent cooperative that sold fresh California strawberries under the names of the different farms. In 1966, Driscoll Strawberry Associates and The Strawberry Institute merged, forming a grower-owned company (no longer a cooperative) dedicated to research, breeding, production, sales, and distribution. Participating growers continued selling under their own names until the 1970s, when they began shipping under a common "Driscoll" label. A distinctive yellow carton was introduced in the 1980s, marking the first attempt at branding berries in stores.

In 1989, the company made a fundamental change in strategy, led by Chairman J. Miles Reiter (grandson of Joseph). “In one transformational meeting, the board decided it wanted to be a consumer-facing brand rather than a trade brand and that it would sell all four berries (strawberries, raspberries, blackberries, and blueberries) year round,” Bjorn explained. Blueberry and blackberry production was added and the company began working with farmers in Florida, Mexico, and Chile to provide berry supply when California was out of the market. To stand out on grocery shelves and provide a flat surface for a label, Driscoll’s developed the produce industry’s first plastic “clamshell” in 1990, ultimately revolutionizing the way berries and other fruits and vegetables were packaged. International activities expanded with sales to Europe and, more recently, to Asia.

In 2016, Driscoll’s had operations in 18 countries across five continents and distributed berries to 500 global customers (mainly food retailers and foodservice distributors) in 50 countries. Annual sales, which had grown consistently since the change in strategy, were around \$3 billion. In the U.S., Driscoll’s held the top market share in raspberries (about 84% of dollar sales in retail food stores), strawberries (about 35%), and blackberries (about 44%); its market share in blueberries, which it entered later and so far depended on public varieties, was around 13%. Importantly, Driscoll’s berries commanded price premiums over the rest of the market ranging from 4% to 44% depending on the berry and time of the year. Organics made up 15% to 20% of sales, although Bjorn noted this could be much higher if more supply was available. The family-owned company did not publish financial results. Driscoll’s mission, vision, and values are shown in Exhibit 2. In November 2016, the company changed its legal name from Driscoll’s Strawberry Associates to Driscoll’s, Inc., to reduce confusion between its corporate brand and identity.

Driscoll’s Business Model

Driscoll’s business model was built on proprietary varieties produced by licensed independent growers, a carefully managed supply chain, and disciplined marketing. Revenues from berry sales were divided between the company and growers in a pre-agreed proportion.

Research and development. Driscoll’s was one of the few berry companies with a dedicated R&D program for variety development. Each year, the 100-plus members of Driscoll’s R&D

department studied thousands of potential plants and flavor-tested more than 500 selected varieties from test plots around the world. Berries had to be flavorful, attractive, and hardy enough to ship well and arrive fresh at the store, while the berry plants needed to be resistant to diseases and pests and adapted to different growing locations. Typically it took five to seven years to produce a seedling ready for commercial production. The average life span of a berry variety was about three years. Driscoll's patented varieties were available only to Driscoll's licensed growers.

A major objective of R&D was to extend the availability of great-tasting and high-quality fruit. "Blackberries and blueberries are the most seasonal for us," remarked Group Supply Chain Vice President Scott Komar. "In September and October, for example, blackberries look great but often taste terrible. Consumers buy them and then get turned off so they don't buy blackberries again for a long time. We call that a category killer. Driscoll's job is to solve that problem through breeding and new production methods. The unsolicited emails I get that say they can extend shelf life by two weeks with a new pack are the easiest to answer. That's not what we are about. We are about freshness!" Driscoll's R&D successes included growing winter raspberries in Southern California rather than flying them in from Chile and replacing some Chilean blueberries with production in Mexico, where shipping took three days by truck instead of three weeks on a boat.

Growers. To achieve consistent year-round supply for the U.S. and Canada, Driscoll's contracted with between 400 and 500 independent growers spread across several major growing regions. (See Exhibit 3 for berry production schedules and Exhibit 4 for production characteristics of different berries.) Licensed growers received plants from Driscoll's nurseries and were required to deliver all fruit produced on those plants back to the company. Growers were responsible for adhering to federal, state, and local food safety regulations and for using good agricultural practices (GAP). Driscoll's Quality Assurance (QA) and Food Safety departments were comprised of 65 employees who monitored fruit quality and worked with farmers to ensure that the standards of Driscoll's global food safety program were met. Ranches also were inspected regularly by independent auditors.

During harvest season, growers picked up empty clamshells from the "cooler" (a cooling facility owned by Driscoll's or a third party) each morning and their field crews handpicked

the berries that were ripe. Driscoll's independent grower base employed more than 115,000 farm workers who typically were paid based on the "pieces" (e.g., trays or boxes) they picked each hour.¹⁸ Filled clamshells were placed on trays and returned to the cooler that afternoon.¹⁹ At the cooler, berries were palletized and inspected for quality. Four clamshells were removed from every pallet and evaluated. Quality was measured on a 100-point scale, with deductions for deficiencies such as shape or soft fruit. Scores for a week might be 85, 75 (average), and 65. These scores were used in Driscoll's Pay for Quality (PQ) system. If the score was below 60, the fruit was rejected for the Driscoll's brand, although it could be sold under another label that Driscoll's controlled.

Weekly revenues from sales of berries produced in a growing area, less the cost of packaging and Driscoll's share, went into a "pool" which was reduced by any quality claims for berries that customers rejected. The pool was paid out to growers in approximately 21 days based on the quantity and quality each grower delivered. For example, if Driscoll's sold a tray of 8/#1 (eight 1-pound containers) strawberries for \$12 and the cost of the packaging was \$2, then Driscoll's share was \$1.80 (18% of the remaining \$10) and \$8.20 went into the growers' pool. When the pool was distributed, the top-quality growers might receive \$8.50 a tray, average growers \$8.20, and the lowest quality \$7.90. "The growers that get the most are the ones that grow the best fields and do the best job of managing their fields," Bjorn explained. "They are measured relative to one another, which drives everyone towards higher quality."

Supply chain. Berries were very vulnerable to field heat, which reduced the time they remained in top condition. Driscoll's built state-of-the-art cooler facilities near all of its farming regions to get the berries in from the field and chilled as quickly as possible. At the cooler, berries were immediately placed in refrigeration tunnels to bring them to the optimal storage temperature (33°F), which could take from 45 minutes to 2.5 hours. The pallets were wrapped for stability and loaded onto refrigerated trucks, which delivered them to retailers' or foodservice companies' distribution centers (DCs) or directly to stores. Most berries were shipped FOB (i.e., the customer organized and paid for transportation). Some berries were sent to wholesale markets (also known as terminal markets), where they could reach high-end restaurants.

Marketing. Driscoll's worked with food retailers to develop programs to grow the berry category and build demand for Driscoll's-branded berries. This might include special displays

and price promotions during the year. The price Driscoll's received for berries fluctuated throughout the year based on the total amount of fruit available to customers, reflecting typical fresh produce supply-demand dynamics. Driscoll's sometimes shipped berries to wholesale markets to help balance supply. The total amount of fruit on the market also impacted "acceptability"; for example, if raspberries were in short supply, retailers would accept fruit in poorer condition than when supply was abundant. "At Driscoll's, we have the discipline to protect our brand," Bjorn remarked. "If the berries coming in from a ranch do not meet our quality specs, then they are not sold under the Driscoll's label – even if we could get a high price for them. We would prefer not to sell lower quality berries at all, but most of our customers insist on having fruit throughout the year. We have another label, Berry Valley, to satisfy those customers.

From Traceability to Delight

In the mid-2000s, the U.S. fresh produce industry was roiled by a number of serious food safety incidents,²⁰ prompting industry leaders to propose a standardized system for traceability. Recommendations from the Produce Traceability Initiative (PTI) included identifying products at the case level and electronically recording transactions at every point in the supply chain. "For us, PTI was not that difficult to do," Bjorn recalled. "We were already using barcodes and had a good paper tracking system in place. However, we were not finding it overly helpful. We were identifying trays, and trays do not go on the retail shelf – clamshells do! If we had a food safety issue, we had to recall everything."

In 2008, Driscoll's introduced technology from HarvestMark,²¹ a California startup that had developed a system to electronically track individual consumer packs. Consumers could scan the QR code on the bottom of their berry package with their phone or enter the 16-digit code on HarvestMark's website and find out the farm where their berries had been grown. "When we first started using HarvestMark, we thought the technology was interesting but very expensive when we were thinking only of food safety, where it would be used as an item-recovery tool," Bjorn noted. "But over time HarvestMark added new tools to get consumer feedback and we began exploring other ideas of how we could apply it."

In particular, the Driscoll's team thought the HarvestMark system could be linked to the company's mission of continually delighting berry customers. "When we started on this journey in 2009, we had no way to measure how we were doing against our mission," Bjorn explained. "We had very limited ways to get feedback from consumers. We often relied on anecdotes, 'I saw this one clamshell...'. We tracked calls to our consumer hotline and talked about the 'Complaint-to-Rave Ratio' in our team meetings every week. This was not very meaningful." Bjorn noted that Driscoll's had implemented a small program to obtain consumer feedback:

We put \$10 coupons in clamshells and asked them to call us. The advantage was that we could be thorough and target the information we wanted. However, it was an administrative nightmare and very expensive. We were spending \$12.75 for each response and collecting a few thousand a year. We couldn't scale it up given the administrative burden.

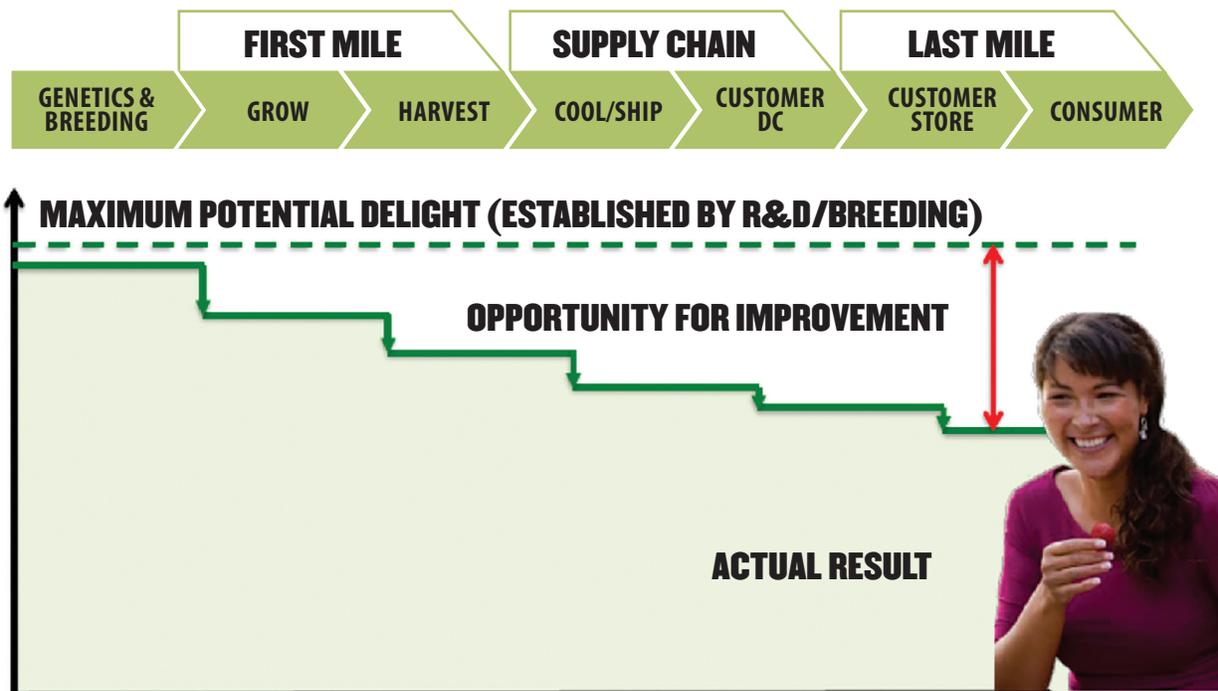
In 2012, Driscoll's launched an expanded HarvestMark insights system that allowed consumers to connect with the company by scanning the code on their pack and "telling us exactly what they thought about the berries they had just eaten," Komar explained. "At that time, QR codes were becoming more pervasive, so asking consumers to respond directly to us and fill out a quality survey seemed like a small next step." He continued:

We also stepped back and realized this program could be of tremendous strategic value if we could use the feedback to systematically drive quality improvements. To do this, we had to expand our orientation beyond our own facilities. We envisioned creating a 'Delight Platform' that would span the entire supply chain and allow us to tie together three key enablers of delight:

- R&D/Breeding, which establishes the delight potential of a particular crop
- Agronomy & Picking, where delight potential is realized
- Supply Chain, which delivers the delight potential to consumers

Komar noted that the plant's genetics set the potential for how great the fruit could be: "From there, it can only go in only one direction – down! The gap between the genetic potential and what we actually deliver to consumers is our opportunity for improvement." (See Figure 1)

Figure 1: Maximizing Delight to the Consumer



The Delight Platform

Consistently delighting consumers required coordinating the efforts of a large and complex supply chain that included independent growers, company-owned and third-party coolers and packing houses, third-party logistics providers, and customers' distribution facilities and stores. (See Exhibit 5 for map of Driscoll's of the Americas supply chain.) The Delight Platform provided an integrated system for Driscoll's to monitor and track berries as they moved from farm to table. Importantly, it allowed managers to proactively manage the "twin towers" of time (how fast the berries got to the consumer) and temperature (maintaining the cold chain at a consistent temperature of 33°F from cooler to store).

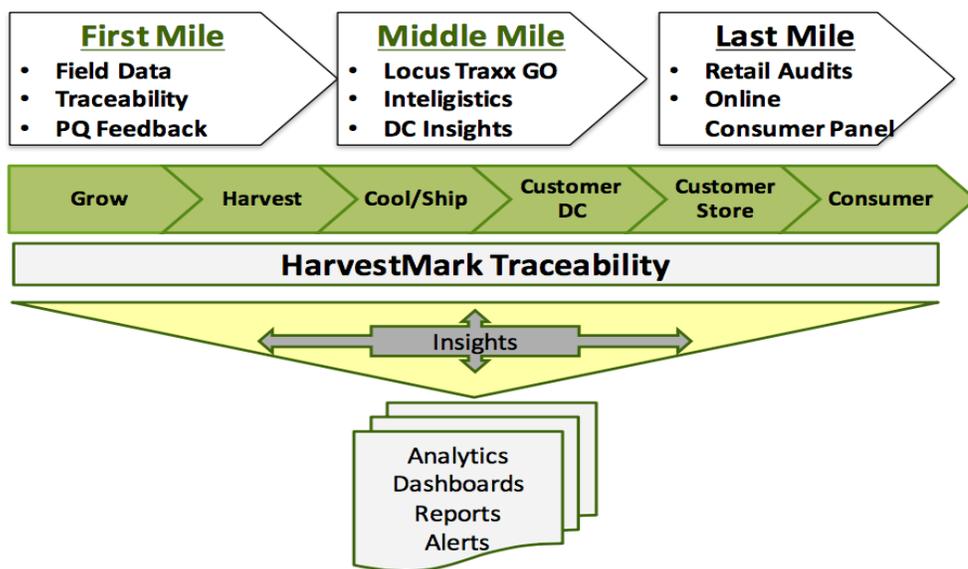
For example, Driscoll's had installed a smart system developed by Inteligistics in their cooling operations. A Bluetooth-connected sensor that provided precise temperature monitoring was hung on each pallet before it entered the cooling tunnel. The monitor alerted the operator when the berries were ready to move. "The typical cooling cycle is 1.5 to 2 hours. Before, operators set the cooling time based on gut feel. Now, if there are 20 tunnels, this system will tell the operator precisely when each one is ready," Komar explained. This eliminated undercooling, which created quality problems, and overcooling, which was a waste of energy

and capacity. “Now, our cooling managers have KPIs [Key Performance Indicators] for this,” he continued. “They are measured on their temperature and turn-time results against the optimum. That’s their contribution to Delight. Having this direct link to our mission increases their ownership.”

Another major project was to improve the visibility of berries in transit from the coolers to customers’ distribution centers. Battery-powered sensors made by Locus Traxx were placed in every pallet. The GPS-based system allowed Driscoll’s to monitor trailer location, temperature, and security (e.g., if the trailer door was open) electronically and visually, using a giant wall map covered with dots that showed the location of each truck. Komar explained the value: “We ship 35,000 loads a year, which means we must execute over and over. We knew we needed visibility to make it actionable. Now, if we get an indication of a problem, such as an increase in temperature that could mean a broken cooling unit, we can reroute the truck and get it fixed before the product is delivered. This avoids a customer claim.”

By 2016 the Delight Platform included a number of technologies and applications that covered the “first mile” (growing and harvesting), “middle mile” (cooler to customer DC), and “last mile” (store to home) (see Figure 2).

Figure 2: Driscoll’s Delight Platform



Online Consumer Panel

A cornerstone of the Delight Platform was the ability to obtain quick consumer feedback on berry quality that could be used to identify trouble spots and improve decision making. A label on the inside lid of each clamshell invited buyers to “join for berry rewards” by scanning the code on the bottom of the pack.²² Responders signed up for Driscoll’s Consumer Advisory Panel by providing their name, email, and zip code and were rewarded with coupons: \$0.50 off for each of the first five surveys they submitted, \$0.75 off for surveys six to 15, and \$1.00 off for each survey beyond 15 completed in a calendar year.²³ “Our objective is to get continuity, to have individuals participating at least one time per month so we can understand their delight experience over time,” explained Vice President of Marketing Doug Ronan. “This allows us to track how berry quality changes through the year and how our improvement initiatives are working.” Participation had been strong, with over 550,000 surveys submitted in 2015 and an expected 575,000 to 600,000 in 2016 coming from more than 30,000 individuals in the U.S. and Canada. “The sample size is good and the individuals are well distributed,” Ronan said. “We can see how Denver is different from Washington, D.C. We feel our panel is large enough now, so we are not actively recruiting new members at this time.”

The survey, which took between five and ten minutes to complete, began by asking for the respondent’s email and zip code (for verification), type of berry purchased, and HarvestMark code, followed by the size of package, if the product was organic, the store where purchased (chosen from a list), the price (if remembered), and how many days ago the pack was purchased. “The HarvestMark code on the pack is attached to the grower, not to the retailer,” Ronan explained. “We can’t fully track where each pack is sold based on supply chain information. It may have gone through a distributor, for example.” Next, respondents were asked to rate the package of berries on each of four dimensions – taste/ flavor, appearance, condition, and texture – using a 10-point satisfaction scale. This was followed by a series of questions drilling into quality: berry size (too small to too large), outside color (too bright to too dark), shiny/glossy (too dull to too shiny), juiciness, firmness, ripeness, mold, and bruising.

Questions at the end of the survey helped Driscoll’s to better understand the respondent and their purchase motivation: “check all that describes you” (regular Driscoll’s organic buyer, loyal Driscoll’s buyer, Driscoll’s was on sale, I had a coupon, etc.) and “describe how the berries were eaten/used” (convenient snack, special occasion, luscious treat, to get extra energy, etc.). Consumers were also asked to provide an overall satisfaction rating for the package and

how likely they were to recommend Driscoll's to others. The final questions asked if there was anything else the respondent would like to say and if they would like to be contacted directly about an issue.

Results were monitored continually. A score of eight was defined as meeting Driscoll's expectations, scores of nine and ten exceeded expectations, and seven was neutral. Scores of six and below were broken out in separate monthly reporting, "but we wouldn't wait to dig into them if we observe a troubling pattern," Ronan remarked. The immediacy of the data created new opportunities to manage the crop: "We can monitor in real time the condition of specific berries. With this system, we have feedback in five days versus the 14 days it might take for a market claim [for poor quality] to come in. We can look at what's trending week to week in terms of production areas and varieties, then investigate and understand what's driving the variation. This is much more actionable than call center information."

Driscoll's also used the consumer panel to answer questions such as "can a berry be too sweet?" or "can a blackberry be too big?" that were important to the breeding team. Packaging could be evaluated as well, as Ronan explained: "We sell raspberries in several different pack sizes ranging from 6 ounces to 18 ounces. Larger packs provide better value but often lead to some fruit being thrown out, so consumers are not delighted with the whole experience." Questions on the survey were reviewed every 18 months. "We go to the breeders and other departments and ask if there is something they want to dig deeper into. We also ask the core panel the right way to do it, or if it would be better in a sensory panel where there is a greater depth of insight," Ronan said.

Implementation and Applications

The Delight Platform was continually evolving as the company, through internal efforts and outside technology partners, developed new real-time, on-demand tools and analytics that were easy to access throughout the organization. Bjorn explained that the "Delight Initiative" was not a top-down approach: "We established an internal team, gave them access to the data, and turned them loose to come up with applications. If we want people to innovate, we must give them freedom. Sometimes I don't know what they are working on until it is presented at a management meeting." Komar agreed: "This is a massive exercise. It's not the

domain of any one group. We extend it to all the organization and allow each person to take their piece.”

In 2015, Driscoll’s started moving the conversations upstream. For growers, the consumer feedback provided valuable information, such as how an individual ranch had performed over time and how that ranch was doing compared to its peer group. “We’ve used a pay for quality system for a long time; however, growers were always suspicious about the ratings,” Komar remarked. “Now we can show them exactly what delight means to consumers. It really comes down to three things, in this order of importance: Appearance – which gets the customer to accept the fruit and the consumer to buy it; Condition – which allows the product to go through the supply chain; and Flavor – which brings the consumer back.” Komar noted that berry growers were constantly making trade-offs, “Picking fruit later, when the sugar content is higher, can mean better flavor; but pushing the flavor envelope too far creates challenges for the grower and the supply chain. This is a giant optimization problem. Now we can show the data from consumer homes to the growers. This allows us to have productive conversations.” QA Program Manager Michael Moore agreed: “This year, for the first time, we are partnering with growers to fix possible quality issues. We are on the same side of the table. The growers see us as an ally, trying to help them.”

The consumer data also could be used with food retailers. “We can discuss differences in performance across regions or between individual stores in a chain and also compare their performance to other retailers,” Bjorn said. For example, Driscoll’s marketing team had used survey data to show a well-known premium retailer that the display method it used – putting berries on tables close to the front doors – resulted in poorer quality and consumer dissatisfaction. “Their satisfaction results were consistently lower than the mainline retailer across the street,” Bjorn recalled. “This data convinced them to install refrigerated cases in all their stores in the region. Without this evidence, we would have had to buy a couple of cases and run a test.”

Looking ahead, Driscoll’s hoped to engage its retail customers at the enterprise level. Two pilots with customer collaborators were underway in 2016. “Their organizations are more complex than we realized,” Bjorn said. “We’ve found a lot that they don’t track. For example, they don’t know how old the fruit is when it is purchased by the consumer. We are working together to develop systems to track how long the fruit stays in the DC and how long it sits in the store.”

From reactive to proactive. Driscoll's QA team had begun to develop analytical models and other tools that would help the company proactively drive change and manage risk. "Our approach to quality is shifting," Moore remarked. "We want to identify potential problems in advance – for example, to gauge the risk of particular berries being rejected before we send those berries to the market." This would reduce customer claims and increase consumer delight. "In a market like California, where grower margins are tight, reducing market claims will increase grower returns," Moore continued. "One market claim impacts the whole pool."

Model development began with identifying a problem that Driscoll's wanted to solve. The QA team generated theories and tested them using the company's historic data on thousands of pallet shipments combined with public information on weather and supply.²⁴ "Once we are confident in the results, we will engage the growers," Moore explained. "We don't want to take the chance of giving the wrong advice and having rejects."

The first project was to look at summer raspberries, a product that had resulted in a multi-million dollar loss in revenue in 2015 due to weather-related market claims. Working backwards from the previous year's data, the QA team developed a model that tied the current quality metrics to projected levels of market risk. They also developed a visualization tool that made it easy to spot ranches outside of the threshold while giving priority to the highest-impact ranches (those with high volumes or a common variety). "This tool allows us to quickly identify the ranches that present the most risk based on the weather. We direct our in-field quality managers to go visit the ones where quality might be compromised so they can evaluate the berries' condition and decide what should be done," Moore said.

Bjorn saw this approach as a game-changer:

Our history until now was looking back in the rearview mirror. Before, a claim would come back from the market on an individual truck 10 days after it had been shipped. One of our employees would then spend six or seven hours analyzing what went wrong and handing that over to production. But that was 10 days ago! The conditions are different, so the analysis can't trigger any change in actions. This new system predicts the likelihood that this particular fruit will end up in claim. Before, if there was rain in an area towards the end of the season, like strawberries around Watsonville right now, we used a 'meat cleaver' approach – shutting down the whole area. Now we can be more surgical in our actions, identifying specific farms to shut down while allowing others to continue.

Moore noted that the speed of developments had increased over the last year and that QA had become more integral to the company:

Our data is now more accessible to a broader scope of QA staff and other departments. We have moved from independent experts to empowered teams. As we have demonstrated success, conversations between QA, marketing, supply chain, and R&D are happening with greater frequency. Instead of someone saying, ‘We’d better email those QA guys,’ the genetics guys now come and sit at the table with us; we are now involved in decisions on what varieties to grow.

Growing the Future

By late 2016, Bjorn and his team were pleased with their progress. “The Delight Platform is really one giant visibility tool,” Komar remarked. “We use it to mobilize internally and also enlist our growers and our customer base. It allows everyone to have a hand in achieving our mission of delight. This was a fundamental shift in mindset. As a result, ownership of product quality has gone through the roof! It generates lots of engagement along the chain and across customers.”

Improved quality paid out in higher loyalty and prices for Driscoll’s berries compared to the rest of the market. “We know that higher levels of consumer satisfaction drive higher purchase intent,” Ronan said. “We have achieved a notable brand premium and that’s been accelerating over the last six years.” To reinforce the premium image of its berries, Driscoll’s had recently introduced a new global positioning, visual identity, and packaging designed to make a stronger emotional connection with consumers. The company’s website, which previously emphasized recipes and functionality, was changed to explain more about Driscoll’s berries and what made them different. (See Exhibit 6 for infographic and Exhibit 7 for new labels.)

Looking ahead, Bjorn saw many opportunities for continued growth: “The single largest gap we have today is in the field. We must do more, especially in the area of sharing best practices. This will be critical given the coming changes in minimum wage and overtime laws in California.²⁵ We also must do more with our customers. So far, food retailers have not been eager to share their data. What can we do to get their attention and bring them aboard?”

Discussion Questions

1. What are the primary benefits of Driscoll's Delight Platform?
2. Was the company's investment in this initiative worth it? How do you know?
3. What can Driscoll's do to get producers and retailers on board?
4. How far can Driscoll's go towards aligning the supply chain? Are there limits and/or diminishing returns?
5. What are the implications of digital technologies, big data, and analytics for other agricultural companies?

Exhibit 1: California Strawberry Acreage

Acreage

Total California strawberry acreage was reported at 32,515 acres for 2016.

Watsonville/Salinas:

13,448 acres

Season: April – November

Varieties: Proprietary varieties represent 49.9% of the district.

Monterey was reported at 36.3% of the district and Albion at 6.8%.

Santa Maria: 9,558 acres

Season: March – December

Varieties: San Andreas represents 29.3% of the district. Monterey was reported at 24.8% of the district and Proprietary varieties at 22.8%

Oxnard: 9,004 acres

Season: January – June (75.7% of the acreage), and September – December (24.3% of the acreage) Varieties:

Proprietary varieties represent 57.1%, San Andreas was reported at 12.5% and Radiance at 8.1%.

Orange County/San Diego: 438 acres

Season: January – May

Varieties: Radiance represents 37.5% of the district. Fronteras was reported at 30.5% of the district, and San Andreas was reported at 8.1%.

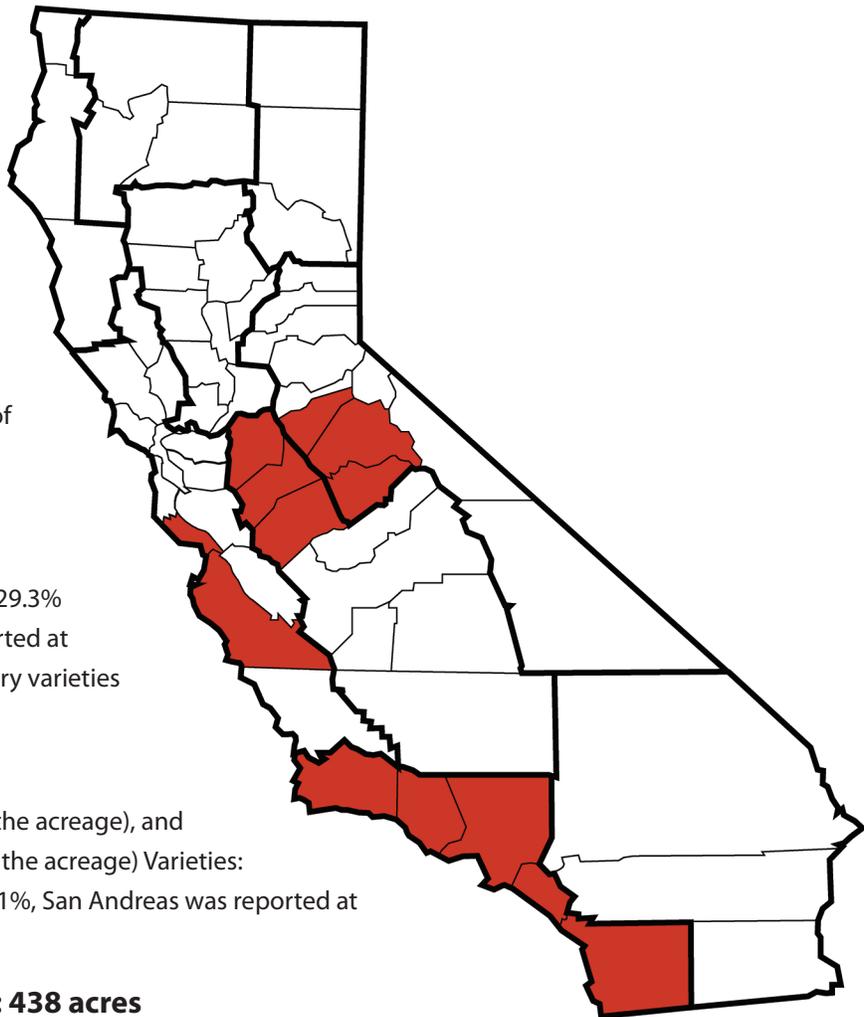
San Joaquin: 67 acres

Season: January – May

Varieties: Chandler is the dominant variety in this district. This district is committed primarily to the processed strawberry market.

Organic: 3,358 acres

Organic acreage in the Watsonville/Salinas area was reported at 2,161 acres. Santa Maria reported 708 acres, Oxnard reported 364 acres, and Orange County/San Diego reported 125 acres. All major varieties contribute to the state's organic acreage.



Source: California Strawberry Commission, <https://calstrawberry1-web.sharepoint.com/Reports/Industry%20Fact%20Sheets/Acreage%20Fact%20Sheet%202016.pdf>, accessed January 2017.

Exhibit 2: Driscoll's Mission and Values

Delight = consumer's eating experience meets or, more importantly, regularly exceeds their expectations

Mission

Continually delight Berry Consumers through alignment with our Customers and our Berry Growers

Vision

To become the world's berry company, enriching the lives of everyone we touch

Values

Passion, Humility, Trustworthiness

Delight



Source: Company documents

Exhibit 3: Berry Production Schedules

CONVENTIONAL STRAWBERRIES



ORGANIC STRAWBERRIES

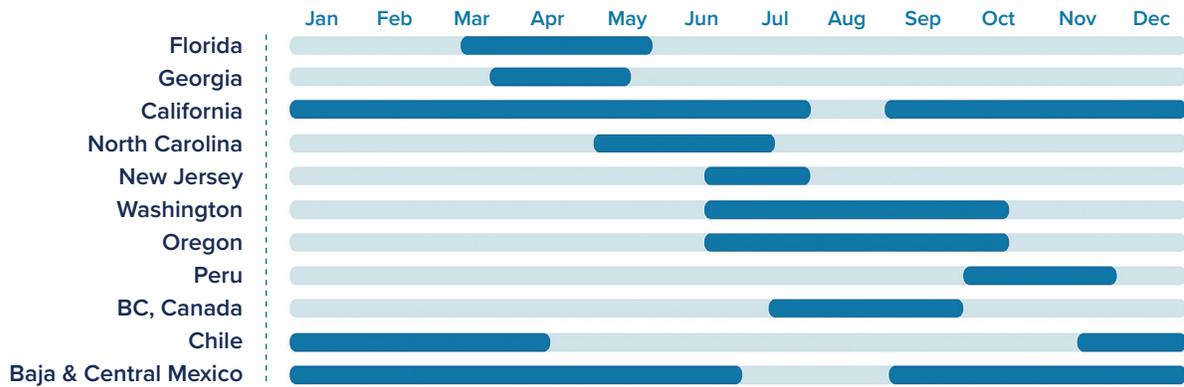


SPECIALTY STRAWBERRIES

LONG-STEM STRAWBERRIES

Growing Regions and availability are contingent upon production. Please contact your local retailer for availability and seasonality.

CONVENTIONAL BLUEBERRIES



ORGANIC BLUEBERRIES

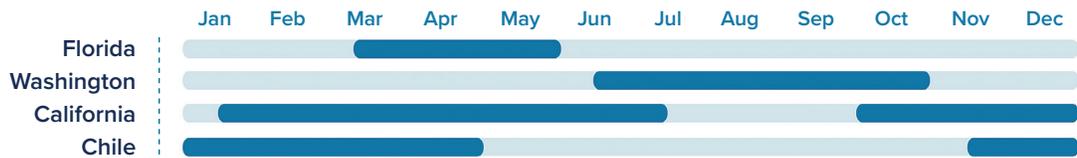


Exhibit 3 (continued): Berry Production Schedules

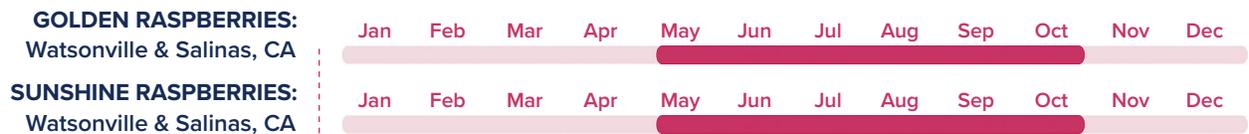
CONVENTIONAL RASPBERRIES



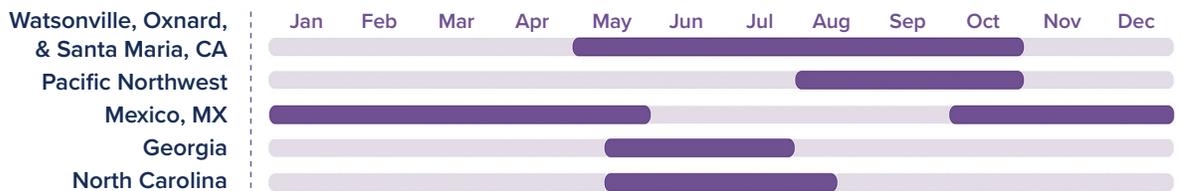
ORGANIC RASPBERRIES



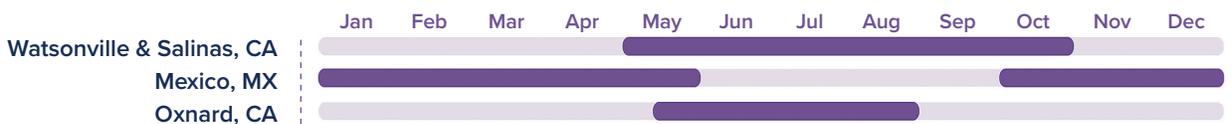
SPECIALTY RASPBERRIES



CONVENTIONAL BLACKBERRIES



ORGANIC BLACKBERRIES



Source: Company documents

Exhibit 4: Typical Berry Production Characteristics

- Strawberries were planted annually and were picked twice per week during the season, which was three to eight months long.
- Raspberries produced between two and five production cycles in an 18 to 36 month timeframe; during the season, which was less than two months for each cycle, raspberries were harvested every other day. Raspberries were the most perishable of the berries and also required the most labor to harvest.
- Blackberries were a permanent crop with one planting typically staying productive for at least eight years. One crop was produced each year in a relatively short season of about six weeks. Harvesting during the season was every other day.
- Blueberry plants were perennials. They stayed in the ground for at least eight years, but there were highly productive blueberry plantings that were older than 30 years. They produced one crop per year over a period of six to eight weeks, but in newer “low-chill” environments the season tended to be longer. (Traditional blueberry varieties required 1,000 accumulated hours of temperatures between 32°F and 45°F for a dormant plant to break dormancy and produce buds. Breeders had developed new low-chill varieties that required only 150 hours to 600 chill hours for bud-break.) Harvest typically took place every three to four days. It was the only berry where a sizeable portion of the crop was mechanically harvested, and it was the only berry that currently was packed in a packhouse (all the other berries were packed into the clamshell in the field).

Source: Company information

Exhibit 5: Driscoll's of the Americas Supply Chain

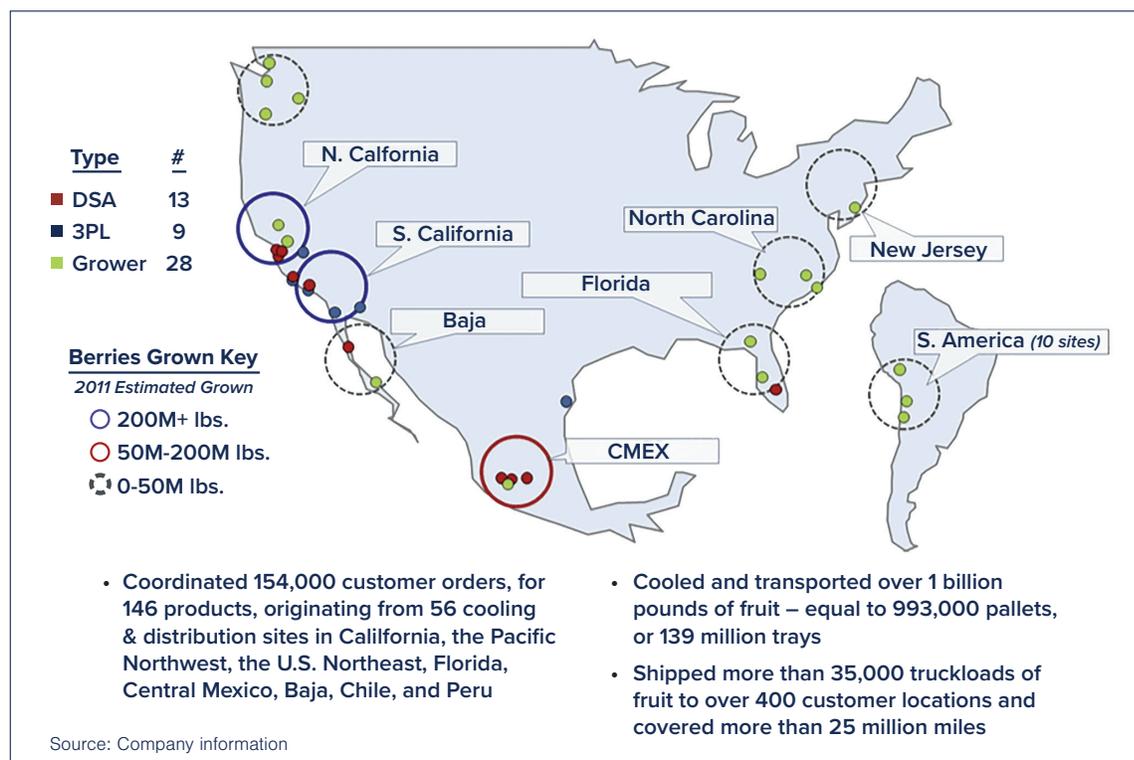
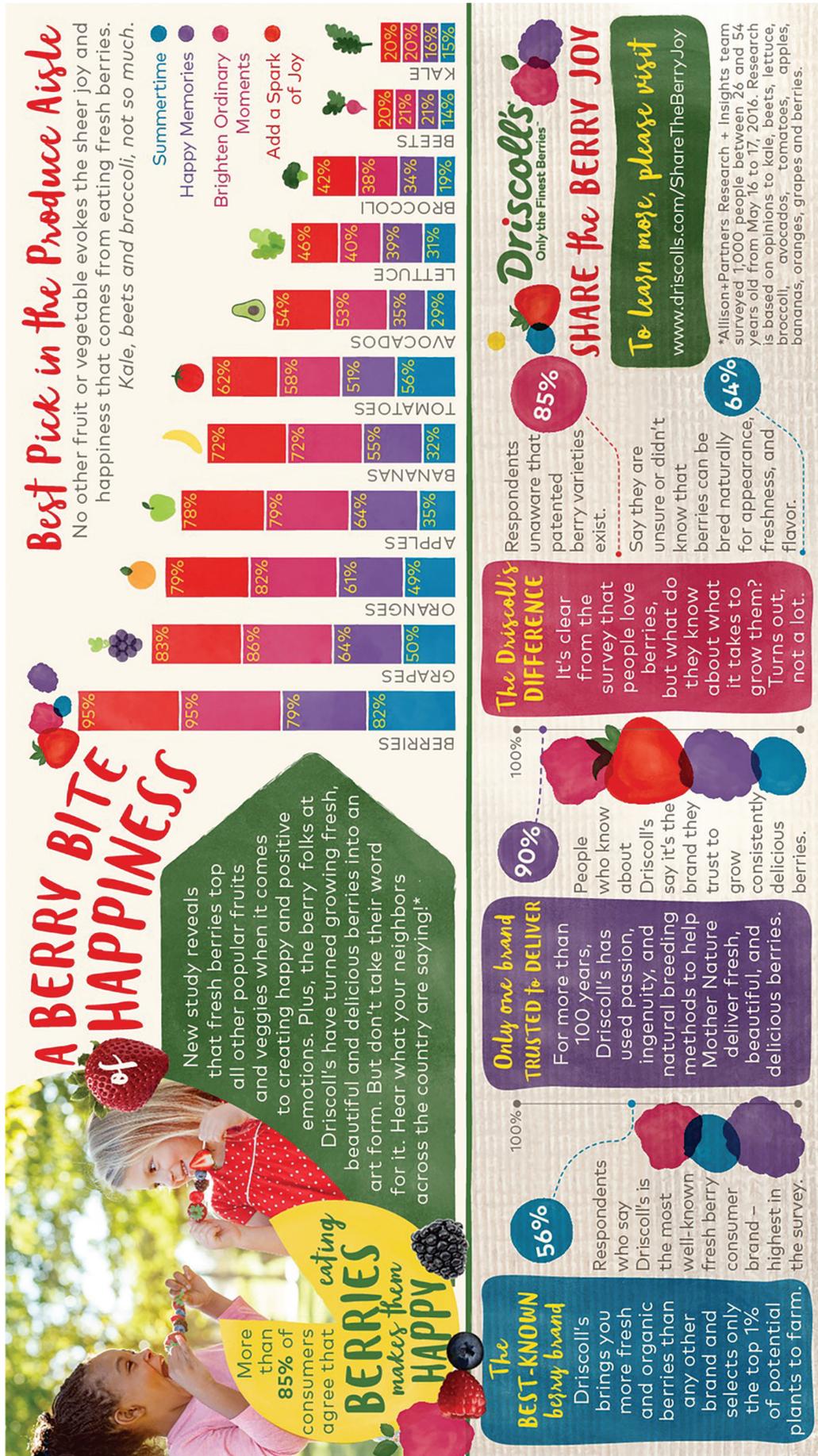


Exhibit 6: New Brand Positioning



Source: Company documents

Exhibit 7: New Berry Packaging



Source: Company documents

Endnotes

1. Driscoll's of the Americas customers included food retailers such as Kroger's and Whole Foods and foodservice distributors such as Sysco and Fresh Point. Large customers might have several delivery locations, such as warehouses located in different regions.
2. USDA ERS Fruit and Tree Nuts Yearbook, various years, accessed January 2017.
3. "Retail Category Trends-Total U.S.," California Strawberry Commission, <http://reports.calstrawberry.org/Reports/Retail%20Category%20Trends/Retail%20Category%20Trends%20-%20Total%20US.pdf>, accessed December 2016.
4. Shrink, which was shorthand for shrinkage, was defined as the produce that was delivered for sale to a supermarket but not sold for any reason. Causes of shrink included damage from improper handling in the store or in the supply chain, produce packaging (e.g., some fruit in a package damaged, so all is thrown away), seasonal factors such as excessive heat at harvest or displays near to store doors, etc.
5. "Noncitrus Fruits and Nuts 2015 Summary," USDA National Agricultural Statistics Service, July 2016, <http://usda.mannlib.cornell.edu/usda/current/NoncFruNu/NoncFruNu-07-06-2016.pdf>, accessed January 2017.
6. Karen Barber, "U.S. Fresh Berry Boom – Who Will Profit from the Growth," Rabo AgFocus, Rabobank International Food and Agribusiness Research and Advisory, October 2012.
7. Berry imports were limited by perishability. Most production needed to be within a few days driving distance of where it was consumed. Blueberries were less perishable than raspberries and strawberries, so they could be shipped longer distances. Air freight, although expensive, was used for high-value berries.
8. Mexico had grown from limited berry production in 1995 to become the world's third-largest exporter of blueberries, raspberries, blackberries, and strawberries in 2016.
9. "Fruit and Tree Nut Data," USDA Economic Research Service, <https://www.ers.usda.gov/data-products/fruit-and-tree-nut-data/data-by-commodity/>, accessed January 2017.
10. "About Us," Naturipe Farms website, <http://www.naturipefarms.com/about-us/>, accessed January 2017.
11. "Making History One Berry At a Time," Well-Pict Berries website, <http://www.wellpict.com/about-us/>, accessed January 2017.
12. Dole Food Company, Inc., Company Information, Hoover's, http://www.hoovers.com/company-information/cs/company-profile.dole_food_company_inc.46d53f7cb4d75bf6.html, accessed January 2017.
13. Karen Barber, "U.S. Fresh Berry Boom – Who Will Profit from the Growth."
14. Cindy van Rijswick, "Burgeoning and Blossoming: The Bar Is Raised in the Promising EU Berry Market," Rabobank Industry Note #544, April 2016.
15. <http://www.andnowuknow.com/headlines/driscolls-and-costa-group-band-together-china-joint-venture/melissa-de-leon/48250#.WH5FNvkrKK8>.
16. The name came from the distinctive packaging that Driscoll and Reiter used to market the special variety. Each strawberry crate was wrapped with a wide blue paper ribbon emblazoned with a red strawberry, leading buyers to refer to them as the "banner" strawberries.
17. The Strawberry Institute developed proprietary varieties with extended growing seasons, better taste, and that held up to shipping over long distances.

18. Jim Harris, "Driscoll's," Supply Chain World, February 21, 2016, <http://www.scw-mag.com/sections/retail/573-driscoll-s>, accessed January 2017.
19. Blueberries were the exception: a sizeable portion of the crop was mechanically harvested and berries were packed into containers in a packhouse.
20. In September 2006, E. coli in bagged fresh spinach killed three and sickened about 200. This led to a voluntary recall of all bagged spinach, which was subsequently downgraded to brands grown on two farms as the contamination was traced to cattle near a spinach field in California. Fresh spinach sales plummeted due to consumer concerns about safety. In December 2006, Taco Bell closed all 5,800 of its restaurants in the U.S. after tests indicated they were to blame for an outbreak of E. coli that had sickened at least five dozen people in New Jersey, New York, and Pennsylvania. The outbreak was initially attributed to green onions from Mexico but later changed to lettuce from California. Other 2006 outbreaks included an Olive Garden restaurant in Indiana and at Taco John's restaurants in Idaho and Minnesota.
21. HarvestMark was an early mover in the field of food traceability and quality inspection solutions. In 2007, it launched a system to allow anyone, anywhere, to instantly track fresh produce via the web or a cell phone to the ranch, field, and date on which it was picked. Trimble acquired the assets of HarvestMark from YottaMark in 2015.
22. Customers could also go to the Driscoll's website and input the 16-digit HarvestMark code.
23. The number of completed surveys for each panelist was reset to zero on January 1.
24. Berry quality was affected by the weather and customers changed the quality they accepted based on how many berries were available in the market.
25. California's minimum wage of \$10 per hour in 2016 would rise in increments to \$15 per hour in 2022. While most agricultural workers were paid based on what they picked, piece-rate employees had to be paid at least minimum wage for each hour worked and at the average hourly wage for rest and recovery periods. Adding to the cost pressure, in September 2016 California Governor Jerry Brown signed a law (AB 1066) that phased in new overtime requirements for agricultural workers (California was one of only four states that required agricultural workers to be paid overtime). Rather than being paid overtime (one and one-half times the regular rate) after working 10 hours in a single day and 60 hours in a week, regular hours would be reduced each year beginning in 2019 until 2022, when agricultural workers would receive overtime pay after working 8 hours a day and 40 hours a week.