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Hubble Contact Lenses: Data Driven Direct-to-Consumer Marketing

By now it's a familiar narrative in startup circles: you can make millions by disrupting industries where exorbitant markups are the standard. Usually, though, a company doesn't . . . attempt to change an industry responsible for manufacturing something that you put on top of your eyeball.

— Louise Matsakis, *Mashable*[1]

It was difficult for Hubble's co-CEOs and founders, Jesse Horwitz and Ben Cogan, to sit still for a minute as they dashed in and out of the conference room fielding urgent calls and visits from their venture capital investors and lawyers. It was a big day for Hubble, a subscription-based, direct-to-consumer (DTC) purveyor of contact lenses, as Horwitz and Cogan were negotiating an extension of the company's Series A fundraising round. Term sheets were flying back and forth, and the two realized that their choice of terms and investor groups would dictate different growth expectations for their company and available exit options for them as founders.

Hubble, incorporated as Vision Path Inc., had been launched 18 months earlier. By April 2018, it had received more than $30 million in funding and had 125 employees in New York and the Philippines. In its first year, Hubble had sold millions of contacts, generating an estimated $20 million in annual sales and a valuation of over $200 million.[2] (See **Exhibit 1** for recent key performance indicators.)

Hubble was a social-media-first brand that bypassed traditional channels and sold contact lenses directly to consumers via an aggressive digital-marketing-fueled customer acquisition strategy that allowed effortless purchase directly from Facebook ads with one click through to Hubble's streamlined, mobile-optimized e-commerce site. It offered consumers who had obtained a prescription disposable contact lenses conveniently delivered to their door each month at an affordable price: $1/day (or 50¢ per lens).

As the two founders considered the term sheets, they reflected on the company's success to date, realizing that the battle had just begun. Cogan said, "This is three standard deviations above my expectations. Entrepreneurs have a history of being optimists. We are not like that at all. It's better to be clear-eyed about what your warts are. The vast majority of startups fail."[3] Horwitz agreed, stating, "So far, everything has gone smoothly, but I'm sure there are pitfalls waiting for us."[4]

Senior Lecturer Jill Avery and Professor Ayelet Israeli prepared this case. It was reviewed and approved before publication by a company designate. Funding for the development of this case was provided by Harvard Business School and not by the company. Certain details have been disguised. 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.

The critical task of ensuring that their marketing dollars were being spent efficiently was proving to be complicated as the company considered moving spending, which had been almost exclusively focused on Facebook ads, to other online and offline media vehicles. Cogan said, "The next stage is going to be really important for us. We've acquired a lot of customers so far, but keeping up our momentum is critical. We'll do that by expanding our marketing channels and refining our message."

Horwitz continued, "How do we grow our business? What are the additional levers we should pull regarding the right product mix, distribution strategy, and marketing communications plan?" The two were particularly interested in ensuring that the business could scale and turn the corner on profitability as it started to move from its Series A funding period, where it focused on proving proof-of-concept and establishing traction in the marketplace, to a Series B phase, where it would have to begin to profitably scale the business, thereby testing its full business model." As he raced past on his way back to the conference room for another meeting, his husband and Hubble's Head of Finance, Mark Severs shook his head and smiled. It looked like it was going to be another late night at the office.

Testing the Concept

In 2015, Cogan (then 25) and Horwitz (then 27) were friends and neighbors. Cogan was ensconced in customer insights at Harry's, a DTC subscription razor company, and had just been accepted to Wharton's MBA program. Horwitz was a Research Analyst at Columbia University's endowment. Frustrated by the high prices he paid for his contact lenses, Cogan considered whether Harry's social-media-first subscription model could work to sell lenses at low prices directly to consumers. He enlisted Horwitz's help to develop this side business. Cogan recalled, "When we looked at the market and discovered that there were no DTC prescription services for contact lenses . . . a light bulb went off. Much of the profit in this industry comes from intermediary markups, and not only is that hurting consumers' pockets, ultimately, it's really unhealthy for their eyes too. When people are forced to pay exorbitant markups on a product intended to benefit their vision, many of them . . . end up sacrificing their eye health by over-wearing expensive lenses so that they don't have to regularly purchase more."[5] So Horwitz and Cogan decided to run an inexpensive demand experiment. Horwitz explained:

> It's hard to intellectualize whether an idea is good or not. You just have to start doing it and see. Not knowing quite what to expect, we tried gauging customer interest through a simple prelaunch site. We described our new business offering and asked interested visitors to leave their email address. We provided visitors with a link to share with their friends on Facebook and dangled freebies for each successful referral. We asked 30 friends to share the campaign. Then we sat back and waited to see what would happen.

Cogan recalled, "It went mini-viral. Within a few days, not only had their friends signed up, but friends of friends had too." Horwitz continued, "We were flabbergasted to log over 2,000 signups over a couple of days, including everyone from a Fortune 100 CEO to a New York City cab driver."

However, the two realized that they would face more hurdles than finding consumers who wanted to pay lower prices. By law, purchasing contact lenses in the U.S. required a valid prescription from a licensed optometrist, so the two set up a second demand test to see if they could drive prospective customers to optometrists who would prescribe Hubble lenses. "We collected consumer email addresses through Facebook's Lead Ads[a] and connected these potential customers to a network of

[a] Lead ads allowed consumers to fill out an online form with their personal information, such as their email address, and send it to the advertising company so that the company could reach them directly with marketing offers.

optometrists we recruited to fit our lenses. We wanted to see whether people would show up and pay for an eye exam in exchange for two months of free lenses. It turned out they would," recalled Horwitz.

The two then searched for a suitable supplier that satisfied all of the legal regulations surrounding the manufacture of lenses. Unlike DTC consumer brands that offered unregulated personal care products, such as Harry's and Dollar Shave Club (razors) and Glossier (cosmetics), Hubble wanted to sell contact lenses, which were classified as medical devices by the U.S. Food and Drug Administration (FDA) and governed by strict rules on manufacturing protocols and sales practices. According to Sunny Gosain, hired later as Hubble's Director of Operations, "There are only 40–50 viable soft lens manufacturers in the world that are FDA approved. If you cross out the ones that don't have enough capacity to support a meaningfully sized business, you quickly wind up with a fairly short list, realizing how limited the supplier landscape is." Cogan and Horwitz, as industry outsiders, didn't have the medical or legal expertise to conduct a thorough process to find a good partner. Thus, two contact lens industry experts accompanied them when they visited different manufacturers to help them make the decision.

They found a partner in St. Shine Optical, a large Taiwanese manufacturer that produced 20% of the lenses sold in Japan. St. Shine's daily disposable product had been approved in 2002 by the FDA and sold since then in the U.S., although most brands had moved on to newer lens technology that allowed more oxygen to flow through to the eye's sensitive cornea. To reduce their inventory exposure and simplify the supply chain, Hubble decided to offer spherical lenses that could fill prescriptions from –0.50 through –12.0 and chose not to offer toric lenses, which corrected for astigmatism, or multifocal lenses, which offered multiple prescriptions in one lens, allowing the wearer to differentially see objects close up and at a distance. This allowed Hubble to address 59% of the dailies market with a product line that contained 109 stock keeping units (SKUs).

Hubble was able to negotiate an exclusive contract for the online sale of daily disposables for the North American market with St. Shine Optical. As Horwitz and Cogan placed their first order for 50,000 lenses, Cogan declined his admissions offer to Wharton and the two began to hire friends to build out an e-commerce platform, develop a brand, and design advertising campaigns to promote the product. Paul Rodgers, one of Horwitz's best friends from college, and Dan Rosen, one of Cogan's best friends from middle school, were brought in to help, Rodgers as Chief Technology Officer and Rosen as Creative Director.

Horwitz and Cogan applied to tech incubators and began meeting with prospective investors. Venture investors had poured $3 billion into DTC startups since 2012 and were eager to talk to companies operating in the consumer space. After Euromonitor reported that companies that sold exclusively online were growing faster than any other type of retailer, at a rate of 17% per year, *The Economist* questioned whether this pace of growth could continue: "The success of some DTC firms has attracted a lot of wannabes, making this a crowded market and leaving some wondering whether the boom has reached its limits."[6] However, Unilever's acquisition of Dollar Shave Club for $1 billion fueled continued investor interest. In funding rounds led by Wildcat Capital Management and Josh Kazam, an angel investor from Two River, Hubble netted $7.2 million by November 2016. Other investors included Firstmark, Founders Fund, Greycroft Partners, and some angel investors, one of whom, Brian Levy, the former Chief Medical Officer of Bausch & Lomb, provided credibility and an industry insider perspective.

Industry Dynamics

In the U.S., 75% of people required some type of vision correction, 64% wore eyeglasses, and 12% (or 40 million people) wore contact lenses. Four companies collectively controlled 70% of the $4 billion U.S. contact lens market (see **Exhibit 2**): Johnson & Johnson (Acuvue), Valeant (Bausch & Lomb), CooperVision (multiple brands), and Novartis (Alcon). Sales were split among optometrists' offices and associated optical chains (37%); grocery stores, including Walmart and Target (36%); warehouse clubs (13%); and e-commerce through 1800Contacts and others (14%). Customers purchased lenses to correct vision and avoid wearing glasses. Most were ages 15–45, and women outnumbered men. Some wore contacts every day, while others wore them only for sports or special occasions.

There were three categories of contact lenses: conventional, which were daily-wear lenses removed each night and stored in a case filled with a disinfecting solution and replaced once to four times per year; *extended wear*, which were worn continuously without removal for up to a month (depending on the type of FDA approval); and *daily disposables*, a more hygienic choice, which were inserted each morning and removed and thrown away each night, so that a fresh pair was worn each day. Daily disposables accounted for 41% of the lenses sold in the U.S., and 70% in the rest of the world; the U.S. total had increased from 18% in 2012, as prices had decreased. By 2017, average unit prices were $1.00 for one daily disposable lens, $7.00 for one extended-wear lens, and $77.60 for one conventional lens.

Contact lenses were regulated as medical devices in the U.S. because there had been serious health risks associated with their use and the level of risk had been demonstrated to be associated with the wearing schedule. The Federal Trade Commission (FTC) mandated that lenses be fitted and prescribed by a licensed optometrist or ophthalmologist. Prescriptions specified the brand and the product, with the proper curvature for fit on the patient's eye; prescriptions were generally good for one year to encourage patients to return for annual checkups. Many optometrists sold contact lenses to consumers directly, filling prescriptions on-site. In the U.S., prescriptions could be filled by outside retailers either through patients physically sharing their prescriptions with the retailer or after a verification process with the prescribing doctor. A retailer was required to submit a verification request to the prescribing doctor whenever a physical prescription was not available, through either an active verification process, by which the retailer would speak with the doctor, or a passive verification process, by which the retailer would wait eight business hours for the doctor's office to deny the prescription if it was not deemed to be valid. In the latter case, if no word was received back, the prescription could be legally filled. (A typical purchase process is illustrated in **Exhibit 3**.)

An optometrist would pick the brand and product that best fit a particular patient, and consumers largely relied on their doctors' brand and product recommendations. Despite the warnings of their doctors, many consumers were careless with their lenses. One relayed, "I am, admittedly, one of the over-wearing, often procrastinating contact lens wearers of the world. I have been known to wear my lenses until they rip, run out before I have even thought of making another appointment with my doctor, and buy the cheapest lens I can instead of continuing with one brand. The one . . . time I bought lenses in bulk, I ended up with a lens I hated, one that tore easily and was very uncomfortable in my dry eyes. . . . My experience with contacts has just never been that great."[7]

The big four contact lens companies invested heavily in R&D to continuously deliver innovations that improved eye health. Products included those with increased oxygen permeability (measured by a metric known as Dk/t), with higher water content and moisture-retention capabilities to eliminate eye dryness, with UV-blocking technology to protect the eyes from sunlight, and with aspheric technology designed to reduce eyestrain from prolonged digital screentime.

Sight-threatening risks associated with wearing contact lenses had been identified through rigorous clinical and epidemiological studies over the years and were stratified by wearing schedule. The highest risk, bacterial infection, was associated with extended or overnight wear of contact lenses. The newer materials developed by the industry to increase oxygen permeability to the cornea, which was thought to be the major contributor to this problem, failed to reduce the risk in subsequent studies. Compared with wearing lenses overnight, taking lenses out at night and properly disinfecting them with an FDA-approved solution reduced the risk by approximately fourfold. Further clinical studies indicated that daily disposal of lenses appeared to be the healthiest form of contact lens wear.

Globally, the $9 billion contact lens market served 125 million people and was projected to grow to $13.5 billion by 2020. The U.S. market grew by 3% in 2017, with dailies, at 15% growth, outpacing other categories. The compound annual growth rate (CAGR) of the market was projected to be 2%, and the CAGR of dailies to be 9%, through 2022.

Creating a Brand

Once Hubble had secured its product, attention shifted to creating a brand focused on price and convenience. Horwitz explained, "Contacts is a broken category today, with high costs, inconvenient access, and poorly designed packaging, and we founded Hubble to fix that." In a 2017 interview, he further said, "Lens technology has been good enough for a long time now—it doesn't need more innovation. . . . By focusing instead on user experience, we can encourage healthier practices among wearers."[8] The company's hypothesis was that if consumers could access dailies easily and inexpensively, those currently wearing monthly lenses would be more likely to switch to dailies, and those already wearing dailies would be less likely to overwear their lenses. Cogan summarized the customer value proposition as follows:

> Hubble is America's first DTC contact lens brand that is dedicated to making it affordable and convenient to purchase high-quality daily contact lenses for a fraction of the price of other brands. Because of Hubble's subscription service, wearers will never run out of contacts again—a more convenient, healthier approach to avoid overwearing.

He continued, "Working at Harry's taught me to look for what is most important to the customer. It's very easy to get distracted by the secondary or tertiary issues, like what your packaging looks like or the font you use on your website—though these are not unimportant. What matters to our customers is value. You need to deliver a high-quality product at a good price. And it needs to be convenient, and you need to have good customer service."

Hubble offered contact lenses via a monthly subscription, priced at $30 for a one-month supply ($1 for a pair of lenses per day, or 50¢ per lens), with a shipping charge of $3 per month. As a result, Hubble's lenses were more expensive than some extended-wear and conventional lenses, but less expensive than almost all dailies that featured the latest technologies, some of which could cost consumers $700 or more per year. (See **Exhibit 4** for price comparisons.) Horwitz explained, "We cut out markups from intermediaries to sell directly to consumers. This means that our lenses generally cost a fraction of the price of competitors'. Secondly, we are willing to accept lower profit margins than the 80%-plus that are common in the industry." Cogan agreed: "Our profit margins are reasonable, not exorbitant. As a result, our business today is not cash-flow positive because we are investing in growth. But, when you're an established competitor and you have really high profit margins, it is not in your interest to lower prices."

Consumers who had already tried Hubble contacts during a fitting at their optometrists' offices were enticed to try the subscription service risk-free by an introductory offer that sent the first two weeks (30 lenses) for free (plus a $3 shipping and handling cost) and could cancel their subscription at any time or pause it if their supply of contacts became too large. The subscription format was designed to appeal to cash-strapped millennials. Horwitz said, "Millennials aren't interested in laying out $500 for a 12-month supply of contact lenses. . . . A subscription is more manageable."[9] (For the purposes of case discussion, assume that Hubble's gross margins were roughly 40%, and that the cost of the initial free boxes was $13, including shipping. Note that these numbers have been disguised.)

Hubble enlisted branding agency Athletics to help develop a brand, packaging, and a digital user experience that would add fun to a category that had long been serious and clinical. Athletics landed on the name Hubble, which it called "a nod to the first major optical telescope to be placed in space," adding, "Hubble evokes omniscience, technology, and of course, super vision."[10] (Shortly after its 1990 launch, the Hubble Space Telescope required the last-minute addition of a special lens to correct its optics, giving Hubble Contacts another connection with its namesake.) The agency developed recyclable boxes, which *Vogue* deemed "zippy and colorful" and *Forbes* declared added "a coolness factor to a staid product." (See **Exhibits 5** and **6**.) Cogan proclaimed, "People hide their contact lens packaging in their medicine cabinets because they're pretty unattractive. We have five different colored boxes. They look like chocolate boxes you can find in Europe."[11] Rosen expanded:

> The Hubble brand was created with the intention of being opposed to what was existing, which was a much colder clinical, medical, big-corporation style—a lot of blue with health-care graphics. Since we were attempting to reach an audience that wanted something more personal, our brand is more fun, much more accessible, and lighter. That flows through our website, which is very easy to use and to read. So, from the first ad you see, to our website, to our packaging, it's all meant to be extremely welcoming and the kind of thing you want to have in your bathroom.
>
> It's something that you want to fit into your lifestyle, something you can show off on Instagram to your friends, not just because it was a good deal, but also because it was aesthetically fun and fits in with other trends. You want it to be Instagrammable, not only because that excites customers, but also because they can share it and show it off.

Athletics also helped with the design of Hubble's digital platform, hosted by Shopify. The agency said, "While digitalization simplifies ordering contact lenses, we didn't want to lose the human touch . . . Crisp, friendly characters and icons guide customers through the experience . . . A hyper-streamlined questionnaire/sign-up form translates this dry, practical procedure into a more conversational, effortless process. Fully responsive, . . . the site feels airy, approachable, and modern. On mobile, it ties into native touch controls, supporting the best possible user experience."[12] (See **Exhibit 7** for examples of Hubble's brand storytelling.)

Recruiting Optometrists

Due to FTC regulations, Hubble needed to engage and recruit optometrists who would fit and prescribe its contacts. This was challenging on Hubble's limited budget. The optometrist market in the U.S. was highly fragmented, with over 34,000 practices. Over half had fewer than five employees. Each practice competed not only with other small, independent practices but also with one national chain—Visionworks, with 750 stores across 41 states—and one international chain—Luxottica Group, with a worldwide presence of 9,000 stores, including LensCrafters, Target, and Sears. In the last decade or so, a few group practices had formed, partially as a response to emerging competition from Walmart and

Costco, which had begun operating vision centers in their stores, and e-commerce sellers such as 1800Contacts. A typical private optometry practice derived 39% of its revenues from eye exams and medical care, 29% from prescription eyeglasses, and 32% from contact lenses. Nearly 50% of revenues came from patients' own out-of-pocket payments, and the rest from insurance company payments. Private insurance companies typically provided full coverage for annual eye exams but only partial coverage for prescription eyewear.[13]

Patients who wanted contact lenses were fitted for a specific branded product SKU and often were encouraged to purchase it on the spot at the optometrist's practice. Unlike eyeglasses, for which a prescription could work across any brand, prescription contact lenses could not be transferred to another brand or product SKU without the doctor's consent or, often, a new fitting process. Optometrists typically did not carry a complete inventory and would arrange for direct delivery from a brand's warehouse to a customer if they didn't have a particular SKU in stock.

Prices at optometrists were often higher than prices online. For example, a patient prescribed J& J's Acuvue Oasys 1-day could purchase a year's supply (eight 90-lens boxes) for as little as $566.32 online vs. $708 from an optometrist. Optometrists purchased the product for $430 from a distributor that bought it from J&J for $360. The cost of goods sold for eight boxes was approximately $70. Daily contact lens margins for the optometrist were typically $200–$300 for a year's supply, while margins for monthly contact lenses were substantially lower, around $75–$100 for an annual supply.

Gosain quickly learned the lay of the land. "Optometrists who have thriving practices are often unreceptive to our pitch because there's a limit to how many customers they can service. If their chairs are filled all day and they have the choice of serving a customer whom they can also sell contacts to, that's a better deal for them. So we started looking for practices that didn't yet have a lot of patients." He became aware of Zocdoc—an online platform that charged doctors $3,000 a year to receive patient referrals. Hubble targeted optometrists listed on Zocdoc, offering them a similar referral service for free. All they would have to do to receive referrals from Hubble was carry Hubble's fitting kit. Initially, efforts to engage optometrists were outbound, but inbound requests kicked in as optometrists saw Hubble's message online or their customers began asking for Hubble by name. Hubble provided optometrists with fitting kits but no inventory, which drove lens purchases to its DTC website (optometrists were not compensated for completed sales). In the long run, Hubble was aiming to have at least one prescribing optometrist within a half-hour drive for 90% of the U.S. population.

Not all optometrists were on board. Some raised concerns about the product's quality and the integrity of the company's prescription verification process. Optometrist Courtney Dryer wrote: "Would I prescribe Hubble contact lenses for my patients? No, the technology in contact lenses today is far superior. . . . Hubble is doing contact lens wearers a disservice by offering them old materials . . . for a perceived lower price. . . . The reality is, you can obtain lenses of superior quality and proven track record of safety and success for comparable costs. In a world driven by innovation and technology, our eyes deserve better."[14] Optometrist Sasha Radford elaborated: "To maintain corneal health, the Dk of a contact lens must be at least 24. Hubble contact lenses have a Dk of 18. Most contact lenses I fit today have a much higher Dk, typically over 50. . . . I want my patients to have the healthiest eyes possible so I do not fit low Dk lenses."[15]

In June 2017, to verify the quality of its product, Hubble had The Ocular Surface Institute of the University of Houston conduct a double-blind user pilot study of contact lens wearers that compared its contact lenses with Alcon's Focus Dailies, which had a Dk/t value of 26. The study found no significant differences between the two products with regard to comfort or vision performance.

On the prescription front, the American Optometrist Association (AOA) called for an FTC investigation of Hubble, after media reports emerged in December 2016 of customers ordering Hubble lenses without a valid prescription and from fabricated physicians. The AOA claimed that the lack of a robust prescription verification process could lead to serious eye-health complications and poorly fitted lenses. Dr. Claudia Lee cautioned, "Contact lenses are MEDICAL DEVICES. They are not one-size-fits-all, and what works best for you might not work for someone else. When choosing a contact lens for you, I have to consider other factors aside from just the prescription, including the conversion from glasses to contacts, the material, the size of the lens, and the curvature."[16]

In response to these allegations, Cogan and Horwitz worked to improve their already robust prescription verification processes and retrained optometrist-facing representatives in their dedicated call center. "Selling a prescription medical device to consumers is a big responsibility that we take very seriously. We hold ourselves to the highest standard on lens quality, compliance, and interactions with vision care professionals," said Horwitz.[17]

Hubble's Early Customers

Hubble sold millions of contacts in its first year. Post-purchase surveys indicated that, of Hubble's early customers, 90% were ages 24–40 (with the average age being 28); 70% were female; 60% came from households with an annual income over $50,000; 68% wore their lenses every day; and 52% had heard about Hubble via Facebook or Instagram. The surveys also indicated that 90% of site visits and 70% of sales came through mobile. Many customers had previously purchased contact lenses online. Customer satisfaction was high: When asked to rate their Hubble experience thus far, 60% of customers rated Hubble a 5 on a 1–5 scale (with 5 being highest), and 33% rated it a 4. Hubble earned a Net Promoter Score[b] of 60, and 77% of customers noted that they were highly likely to purchase Hubble contact lenses in the future.

Customer retention was tracked on a monthly basis. (For case discussion purposes, assume that after receipt of their first free boxes, 90% of consumers initiated another order. Note that this number has been disguised.) For these returning consumers, the average monthly churn rate was 4%. Some consumers ordered less than a full year's supply, since they wore contact lenses occasionally, not every day. (Therefore, assume that consumers would order, on average, an 8-month, rather than a 12-month, supply each year.)

Some customers expressed initial apprehension about purchasing from Hubble. One said, "When my lenses were delivered I was a little bit skeptical. Every time I have changed brands my eye doctor has given me trials and has examined my eye to make sure they fit correctly. So when it came time to trying contacts that I ordered online, every bone in my body told me it wasn't going to work. I was so wrong."[18] Another said, "There were a few concerns: Would they be comfortable? Would they dry out? Are they cheapo lenses that are stiff and itchy? But the first box was free. So of course I was willing to subject my eyes to potential torture. . . . So far, I love them. They're very soft and flexible. They have yet to dry out on me or make my eyes water, and best of all, they are cheap, cheap, cheap!"[19]

The company attracted two types of consumers. Rosen declared, "The audience that we wanted to reach were urban millennial women." Horwitz, however, claimed, "A brand like ours and many other DTC brands, we are price segmentation players. We're going into categories and finding the price-

[b] The Net Promotor Score measures the likelihood of consumers to recommend the brand, calculated as the difference between the fraction of consumers that are extremely likely to recommend the brand and the fraction of those that are not likely to.

sensitive consumers and picking them off from the big brands." However, Hubble's managers weren't picky. Rosen explained:

> Brand is important to us, but frankly, we really want to sell contact lenses. So, as far as choosing a target market, we are happy to get whichever customer demographic comes to us. Whoever is buying your product and likes your brand, then that's your target market. Why not lean into that if it's resonating with them? I think it would be non-ideal if we had some higher ideal of who we wanted Hubble to be for and then we forced that image through our marketing. I think that would lead to a highly inefficient marketing spend. In some ways, it's a feedback loop, we're constantly finding out who's buying our product. The results are telling us who we are and who we are for.

Acquiring Customers through Data-Driven DTC Marketing

Hubble's advertising had to efficiently and inexpensively reach potential consumers and break through the increasing clutter of ads from DTC brands taking over the Facebook feeds of American consumers. Both Cogan and Horwitz had an analytical background that was useful in designing ways to track the ads' effectiveness. Facebook was a logical place for the company to experiment with ways to reach prospective consumers, as it allowed advertisers to reach extremely targeted segments and inexpensively and quickly test ad creative executions. In its first six months, Hubble advertised almost exclusively on Facebook. (See **Exhibit 8** for information on Hubble's Facebook ad-buying process.)

Hubble's earned media plan inspired glowing coverage in publications such as the *New York Times*, *GQ*, *Forbes*, *TechCrunch*, and *Vogue*. Some excited consumers uploaded Hubble photographs to Facebook, Instagram, and Pinterest, and others blogged about the company. However, as Horwitz explained, "For the first six months, we had some sales coming in from earned media, but 95% of our sales were coming from Facebook advertising. We were doing a little bit on Google, but even there, the bulk of it was brand search driven by our Facebook impressions." Cogan elaborated:

> We did a big PR push and some influencer marketing. We also did paid advertising and, surprisingly, our initial customers were predominantly coming to us from the paid. Great press placement IS NOT a reliable sales strategy. It's a risky way to launch and at some point, you're going to realize that you need paid marketing. PR is not sustainable because when a business is at scale, 80%-plus of your customers are going to come from paid. Though in the long run, word of mouth will hopefully comprise an ever-increasing percentage of acquisitions.

Rosen continuously experimented with ad content and execution. Early on, for example, he learned that links to *GQ*'s article about Hubble, to posts such as "6 Reasons to Buy Hubble," or to quizzes were more effective for driving engagement than straight product ads. He also discovered that the funniest, most creative, or most aesthetic ads they could develop were popular and widely shared but didn't always move consumers to click or buy. While everyone in the DTC space dreamed of creating a hilarious viral video such as the one that propelled Dollar Shave Club to success, most quickly realized that this was difficult in the ever-changing digital culture. Horwitz remarked, "Making viral videos is impossible. You'd have to make a ton of them just to have one hit, and that gets expensive. Dollar Shave Club never had another video like the first one that went viral. There is no easy formula. Going viral is not a strategy. It's not sustainable." Instead, Hubble's managers kept testing different types of creative executions, influenced by popular internet memes and trends they observed other advertisers using. They also experimented with other media to understand which channels provided the best avenues for acquiring customers. They ran digital ads on other social media channels, including Instagram, Pinterest, and Snapchat, and added more traditional offline channels, such as podcasts, radio, and television. They also purchased Google AdWords and Google Display Ads and began dropping direct mail campaigns. (**Exhibit 9** presents Hubble's spending across channels in April 2018.)

Each channel offered a variety of ways to purchase and track spending to guide decision making. The most traditional measure used in most offline media was cost per mille (CPM), which denoted the cost the advertiser paid to serve the ad to 1,000 people and was used to measure an ad's reach, or number of impressions. The digital landscape also allowed for advertisers to purchase media and track its effectiveness based on customer response. Cost per view (CPV) was similar to CPM in that it calculated a cost based on how many consumers were served the ad as they browsed online. The click-through rate (CTR) measured how many people clicked on an ad to proceed to the company's website, providing a proxy for the ad's level of engagement. Advertisers who wanted to pay for performance rather than reach could choose to pay based on cost per click (CPC). Cost per acquisition (CPA) measured the media cost associated with acquiring a customer through a particular channel.

Hubble meticulously tracked all of these metrics. However, Horwitz claimed that only one acquisition metric truly mattered to Hubble: the ratio between its customer acquisition cost (CAC) and the lifetime value (LTV) of a customer. The LTV/CAC ratio helped guide the company's spending process. CAC varied across media, as did the LTV of the customers each type of media attracted. For example, Snapchat's younger audience tended to be more price-sensitive and churn faster than customers acquired through other channels. Some media were a challenge for Hubble's data-driven, analytical culture because they were more problematic to quantify, which made media allocation difficult. They had read research that suggested that television advertising could be a more effective brand-building vehicle, as it tended to create top-of-funnel awareness and cultivate trust among consumers, but, as a company, Hubble was much more comfortable with media that affected the bottom of the funnel because these were more directly measurable channels. Horwitz reflected:

> One of the trickiest things to get right is the spending allocation between offline and online. Digital spend gives you a ton of attribution data, but whether it's accurate or not is definitely in question. There's a lot of numbers and you get fast feedback loops, so it feels good to analyze it. Offline is a lot trickier, particularly television. You have good CPM numbers, but you don't have sales lift or sales conversion numbers. So how can you build confidence about the ROI [return on investment] of offline media? Complicating it further is [that] all of the offline channels tend to be long-tail channels. It takes a while to get results on any of it. You can get the benefits of a television spend for weeks or even months after your ads air.

Rosen agreed: "TV is the most difficult to attribute. It creates a halo effect on everything, and it's another touchpoint for every single channel because of its scale. We know it's effective, we just don't know exactly how much it's helping the other channels." He and Horwitz analyzed the results of the latest Facebook campaigns (see **Exhibit 10** for details), tinkering around with the numbers. Horwitz admitted that even data from some digital sources was problematic:

> When we first started advertising, 95% of our spending was on Facebook, so attribution was easy—all of our sales results were coming from Facebook. Now that we have been doing this for over a year, it's much harder. We're now spending across tons of media channels, and our results are coming from today's spend but also from spend that happened months ago. It's a real headache from a measurement perspective.
>
> There are two types of customer journeys. One is direct: See a Facebook ad, click, find a prescribing optometrist, get fitted, and buy. The other is more indirect: See a Facebook

ad, then an article, an Instagram ad, a few more Facebook ads over the next few weeks, and then get fitted and buy after a friend told you about it. How in the world can you attribute that? Would the consumer themselves be able to pinpoint which marketing exposure drove them to purchase? We're skeptical of overly precise attribution models because once you start playing with the data, it's just messy.

As an example, in April 2018 there were three different metrics that measured from which media source new customers were acquired. Facebook's report claimed that about 50% of them should be attributed to its ad delivery, either due to direct clicks from the ad or through tracking technology that allowed Facebook to observe users' behavior on other websites. At the same time, Google Analytics data showed that 90% of customers arrived directly to Hubble's website after searching for branded keywords such as *Hubble Contacts*, while internal survey data reported that 33% of new customers claimed they first heard of Hubble on Facebook.

WideOrbit, an advertising agency managing Hubble's TV spend, attempted to measure the effectiveness of the channel. It ran a $1 million test campaign with a goal of reaching 279 million customers using local ads with a targeted CPM of $3.60.[c] The agency designed the spend as an A/B test in which Hubble advertised in 127 treatment markets, and it used another 83 markets as a control group that didn't receive television advertising. As initial evidence, WideOrbit calculated a positive correlation between high spending periods and sales (see **Exhibit 11**). It then calculated the differential sales lift from the television media spend to be in the range of 12.5% by comparing across the treatment and control markets one month after the ad was shown (see **Exhibit 12**). In late October 2017, Hubble was offered the opportunity to spend $350,000 on two 15-second national television ads during Major League Baseball's World Series and a few repeat ads in the days that followed. While it couldn't use a similar A/B test structure to measure the differential lift in sales, since the ads were broadcast nationally, Rosen noted that while Hubble's total spending on Facebook was identical in October and November, prior to and immediately following the broadcast, the number of new customer acquisitions from Facebook grew by 25% in November. (As a baseline, assume that in October the number of new customers was 10,000. Note that this number has been disguised.)

CAC metrics were constantly tracked and compared across media. Gosain explained: "Our challenge is that there is a point past which it doesn't make sense for us to grow, where our churn gets so high or our CAC grows to a level where it gets too expensive to acquire and service a customer. The 50th customer we acquire is going to be cheaper than the 51st and so on. The intuition is that for the first customer it might have been enough for them to see just one ad before they bought, but the 51st had to see a thousand. Of course, there's a limit on what we can pay to acquire a customer, because you can't pay more for the customer than they're actually worth."

As the two grappled with analyzing the data coming out of their media spends, Horwitz asked, "Should we spend more on attracting new prospects or on retargeting campaigns that deliver incremental ads to those who are aware of us but not buying? Is an incremental Facebook customer cheaper to acquire than the first television customer? Should we slash the high-cost channels entirely and shoot for fewer new subscribers each month? Such questions fill our days." He continued:

We've been succeeding through being a sales-driven, immediate-results-oriented organization. All of our marketing to date has been about achieving immediate performance. Should we push to become more focused on brand building? That might

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[c] This cost was much lower than that of a typical 30-second ad on a national network, which could have a CPM of $15–$25. Facebook CPMs varied by the particular product, campaign, and target market, with a reported median CPM of $11.20 in 2018. Hubble's CPM in April 2018 was $20 for a 30-second podcast ad, $4.90 for Snapchat, and $2.20 for Pinterest.

> not be the best move. It might kill our metrics. Branding is wishy-washy and qualitative, and it has a long time horizon to payback. Our cost of capital is very high today, and we are mostly focused on the short-term time horizon. Even if spending on brand building works to raise sales 12 months from now, that's too long term for us to think about.

Rosen added, "Our ads have been all over the spectrum. Something that works to catch your attention may not be as aesthetically sleek or on-brand as you would like it to be, but if that's what's working, then you have to go with it. You can have the best brand in the world, but if you don't have any customers, what's the point?" He continued:

> It's a black box as to how exactly the Facebook algorithm works. I've talked to many people in this space who say "Yeah, I'm totally shocked that this ad worked and I have no idea why." It's like praying to a rain god sometimes. . . . You need to be very open to seeing what the data is pointing to and being meticulous about testing. Once you know you have the right image and copy, then you can start testing different audiences. Then, you have to test budgeting, bidding strategies, time of day, day of the week, and month of the year effects. There's so many variables at play so you kind of have to just chase it a little bit.

Scaling the Model

Hubble's new funding round was fostering interesting strategic questions for the company. Horwitz explained:

> I've always thought that you should raise as much money as you can, even at the cost of equity. How much of the pie you retain doesn't matter very much if the pie vanishes due to lack of access to capital. . . . Raise as much money as you can so that you have as much runway as possible to mess things up, and eventually get them right.
>
> As I explore our options, one would be to double down on selling contact lenses direct to consumers online, and then we are close to having the right team and right information that we need to get this over the finish line. Smaller return, but pretty low risk. But another would be to increase the pie substantially; that means we need to test some different strategies—product extensions, distribution channel extensions, geographic extensions. Bigger returns, but bigger risks.

Product Extensions

First, the company was considering whether to expand its product offerings. Horwitz believed there was potential: "The fact that we have a consumer-friendly brand puts a lot of product-line extension opportunities on the table that are not available to brands like Bausch & Lomb. They have more limits on where their brand can go than we do. They have done a great job of building a great brand for optometrists. But I'd be surprised if people were hankering for Bausch & Lomb eyeglasses. One of our major brand stakes is trust around eye health and the best vision experience possible, so eyeglasses seems viable for us." Cogan added, "We've done surveys on what products people want and I think we clearly have the most trust in the eye-related space. But, so many of our customers are women who wear contact lenses for cosmetic reasons. So we could expand into mascara or makeup."

Another possibility was for Hubble to expand its offerings of lenses for better market coverage. Cogan said, "We could potentially launch a multifocal . . . and open up more of the market. We currently have coverage for 55% to 60% of the market. About 30% percent is astigmatic and 10% is multifocal, and then there are extreme powers and specialty contacts."[20] Horwitz said, "Everyone is very keen to do cross-selling on digital. But a lot of what makes Facebook-driven brands work is that the purchases are happening on mobile devices. So a really simple, clean shopping experience is huge. If you're using that streamlined checkout process to try to cross-sell other items, you're going to hurt your conversion. Cross-selling in digital settings is proving harder than people anticipated."

Distribution Channel Expansion

Second, the company needed to decide whether to expand its channels of distribution. It was considering opening up its own retail stores, a capital-intensive commitment, or forging wholesale partnerships with retailers that would stock and resell its products. Horwitz and Cogan were also considering and testing a reseller option for optometrists that would allow optometrists to sell Hubble lenses and would provide them with a margin on each sale. This approach would require investment as well, as competitors invested significant funds in selling and marketing and had sales forces of 200-plus people who regularly called on optometrists twice per month and sponsored conference talks and fancy dinners.

Horwitz reasoned, "When you do a lot of paid marketing like we are doing, you build a lot of brand awareness. If you don't have any way to capture that in foot traffic, that's a big asset you're leaving on the table." He then fretted, "But there's a big difference between selling at retail vs. selling via Facebook ads. At retail, the shelf is crowded with competitive brands, and that encourages a very price-focused, head-to-head evaluation by customers, which is not favorable to brands. Even though all of our competitors are bidding on Facebook ads, it's not the same. That means we can have a conversation with our consumer in a way that is oriented toward building a relationship and less about just getting price arbitraged at retail." Cogan retorted, "But CPMs on Facebook have risen in the last two years and particularly in the past few months, and it's sort of an arms race where you're constantly trying to beat out the other DTCs for ad space."

Geographic Expansion

Third, the company needed to decide whether to expand internationally. Expansion into Canada in August 2017 had gone well, and Horwitz and Cogan were now considering whether to move into Europe. Horwitz saw potential: "The easiest thing for us to do is to keep focused on selling one product. We could pretty easily expand internationally. Our marketing has been so heavily digital, and that makes international expansion easier. Europe would be relatively straightforward, because it's so Facebook-driven. We really don't have to be any smarter to get Europe done. But if we want to go to Asia or Latin America, now we're talking about very different market dynamics, as these markets are less similar to the U.S."

Rosen was more pessimistic: "European countries are less familiar with subscription models, so we would have to educate about that. We're less competitive pricewise there; prices are unusually high in the U.S., but lower in other countries." Christina Pan, Hubble's Director of Strategy, agreed: "Figuring out how to enter each market is difficult; each has a unique set of challenges. Different countries' customers behave differently. We want to be agile and move fast, but we can't do as much customer research as a big corporation would before entering a market. So we're going to make mistakes."

Pan also recognized an important trade-off associated with moving overseas: "There's still many new countries we could penetrate. But we could also stay focused on the U.S. and improve here. Given that we haven't been around for that long, our emphasis has been focused on acquiring more customers. We haven't spent much time on improving customer retention and winning back customers we've lost." Retention was tough to predict. Kate DeBolt, Hubble's Co-director of Customer Experience, reported, "People cancel for all different kinds of reasons—because they're moving or because they have enough supply right now, or they don't want to be on a subscription."

As Cogan and Horwitz considered the funding offers on the table, they realized that they had a lot of marketing decisions to make. Cogan advised, "We should try to keep various irons in the fire. We should diversify if we don't know which of them will light up." To which Horwitz responded, "I hope Hubble sticks the landing. DTC is an exciting space, but it has had a shortage of successful exits."

Exhibit 1 Hubble's Key Performance Indicators, March 2018

Metrics	Year-over-Year Growth
Cumulative Number of Customers	14x
Number of Orders	7x
Monthly Revenue	10x
Revenue Run-Rate	10x
Gross Margin	+2 percentage points

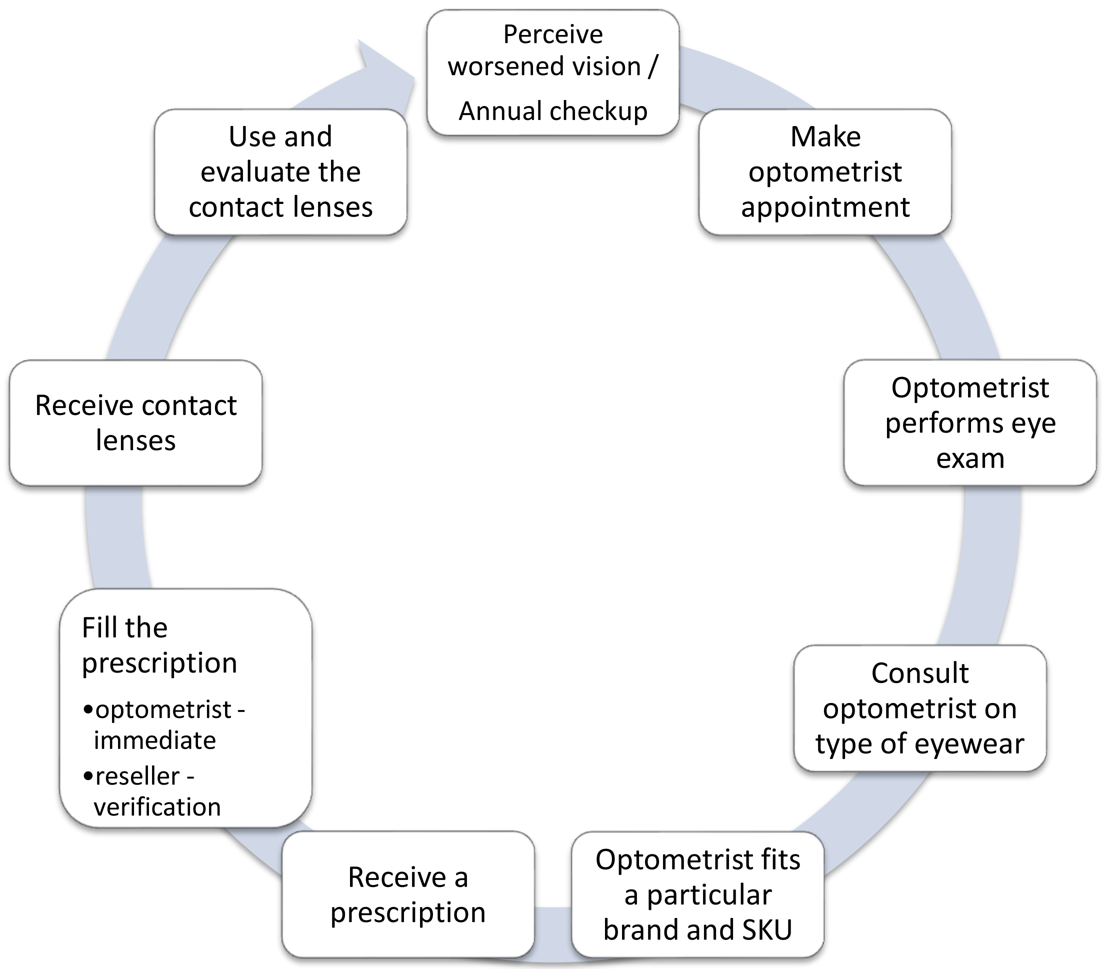
Source: Casewriters, adapted from company documents.

Exhibit 2 The U.S. Contact Lens Market, 2016

Company and Product Shares of Contact Lenses and Solutions (Share of Total Retail $ Value)		
Johnson & Johnson Vision		27.2%
Acuvue Oasys	14.4%	
1-Day Acuvue Moist	8.1%	
Acuvue Oasys 1-Day	2.4%	
1-Day Acuvue TruEye		
Alcon Laboratories Inc.		21.5%
Air Optix	11.9%	
Dailies Aqua Comfort Plus	6.5%	
Dailies Total 1 Water Gradient	2.4%	
Freshlook	0.7%	
CooperVision Inc.		15.7%
Biofinity	9.0%	
Proclear 1 Day	1.8%	
Proclear	1.2%	
Clariti 1-day	0.9%	
MyDay	0.5%	
Bausch & Lomb Inc.		6.2%
Bausch & Lomb Ultra with Moisture Seal	2.3%	
PureVision	1.5%	
SofLens	0.6%	
SofLens Daily Disposable	0.5%	
Optima	0.1%	
Menicon Co Ltd		0.1%
Others		29.3%

Source: Casewriters, adapted from "Contact Lenses and Solutions in the U.S., Country Report," Euromonitor, August 2017, accessed June 29, 2018.

Exhibit 3 Typical Customer Journey for Contact Lenses



Source: Casewriters.

Exhibit 4 Price Comparisons in Online Stores for Low-Priced Products of Leading Companies*

Brand/Product	Online Retailer	Price/Quantity	Characteristics
	Daily Contact Lenses		
Hubble 1-Day	Hubble[a]	\$33.00 for 60	Dk/t[b] = 18; 55% water content[c]
Alcon AquaComfort Plus Dailies	1800Contacts[d] Costco[e] Walmart[f]	\$30.99 for 30 \$44.93 for 90 \$25.00 for 30	Dk/t = 26; 69% water content
Bausch & Lomb BioTrue ONEDay	1800Contacts Costco Walmart	\$34.99 for 30 \$53.99 for 90 \$30.00 for 30	Dk/t = 42; 78% water content
CooperVision AquaTech 1-Day[g]	1800Contacts Costco	\$44.99 for 30 \$56.99 for 90	Dk/t = 24; 52% water content
J&J Acuvue Moist 1-Day	1800Contacts Costco Walmart	\$34.99 for 30 \$21.97 for 30 \$33.00 for 30	Dk/t = 25; 58% water content
	Monthly Contact Lenses (Extended Wear)		
Alcon Air Optix Aqua	1800Contacts Costco Walmart	\$54.99 for 6 \$35.96 for 6 \$48.48 for 6	Dk/t = 138; 33% water content
Bausch & Lomb ULTRA	1800Contacts Costco Walmart	\$57.99 for 6 \$47.97 for 6 \$56.00 for 6	Dk/t = 163; 46% water content
CooperVision Biofinity[f]	1800Contacts Costco	\$49.99 for 6 \$33.13 for 6	Dk/t = 160; 48% water content
J&J Acuvue VITA	1800Contacts Costco Walmart	\$57.99 for 6 \$40.98 for 6 \$56.00 for 6	Dk/t = 147; 41% water content

Source: Casewriters, based on data found on 1800Contacts, 1800contacts.com; Costco, contacts.costco.com/; Walmart, walmartcontacts.com; and ODspecs, odspecs.com, all accessed July 5, 2018.

Note: *This table contains lower-priced options from the four leading companies for 30-lens boxes of daily contacts and 6-lens boxes of monthly contacts. The dailies were often offered in a 90-lens packs for deeper discounts (for example, the Alcon AquaComfort Plus 90-lens pack cost \$64.99 at 1800Contacts). Costco didn't offer a 30-lens pack for all of its contacts. The cost of two boxes of 30 daily lenses was twice the cost of one, unless specified below.

[a] Hubble's price included \$3 monthly shipping charges. Hubble consumers would receive their first 30 contacts for free. 1800Contacts and Walmart offered free shipping on all orders.

[b] Dk/t measured oxygen transmissibility of the lens (i.e., the amount of oxygen that can pass through it).

[c] The more water contact lenses contained, the more difficult it was for oxygen to get to the cornea.

[d] 1800Contacts was also offering a special price promotion: a subscription option with 5% off for every future shipment, or up to \$30 rebate for a one-time order for monthlies and up to \$90 for 90-pack dailies.

[e] Costco was offering a special price promotion for some of the products: For Bausch & Lomb BioTrue ONEDAY: buy 4 boxes of 90 and get \$70 off, buy 8 boxes and get \$140 off. For Bausch & Lomb ULTRA: buy 2 boxes of 6 and get \$25 off, buy 4 boxes and get \$75 off.

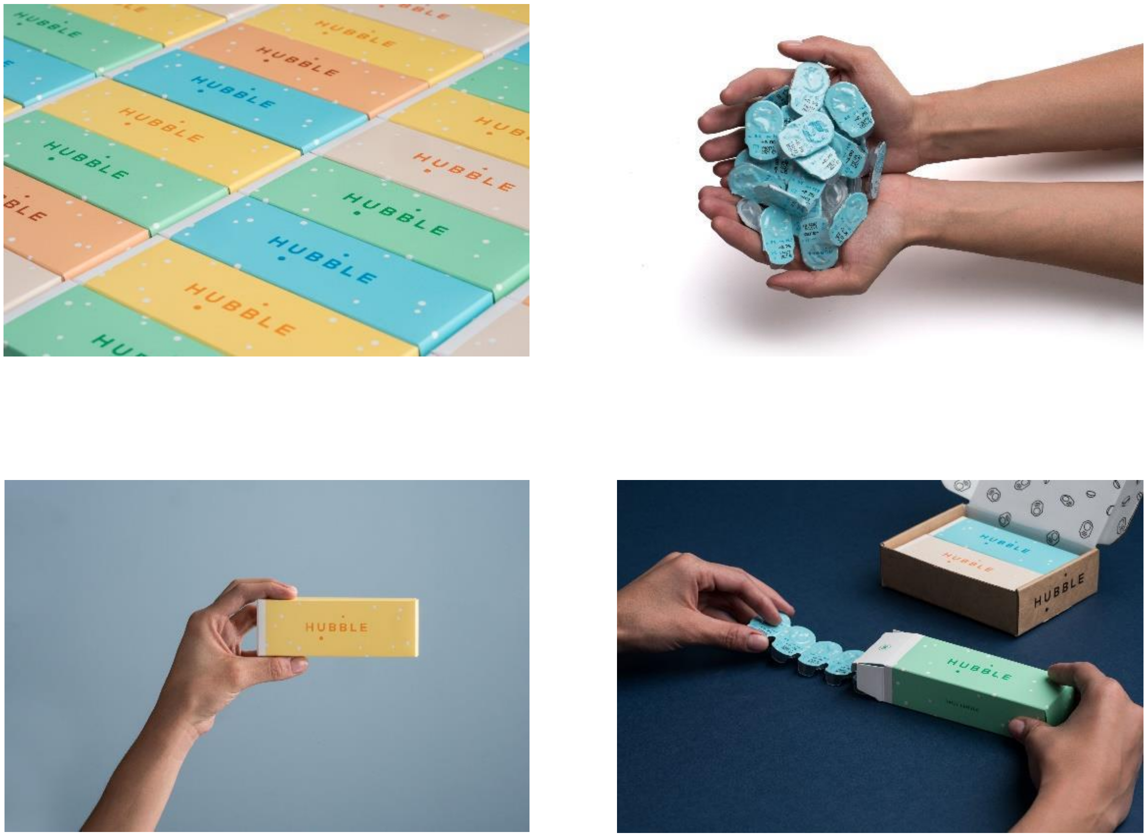
[f] Walmart was offering a quantity discounts for some of the products: Buy 4 or more monthly boxes of Bausch & Lomb ULTRA (full-year supply) and get each box for \$12.50 off. Get \$4 off for J&J Acuvue VITA. For dailies, two or more boxes of Alcon AquaComfort Plus were sold for \$5 off each.

[g] Walmart didn't carry an equivalent version of CooperVision's products.

Exhibit 5 Traditional Contact Lens Packaging

Source: Company documents.

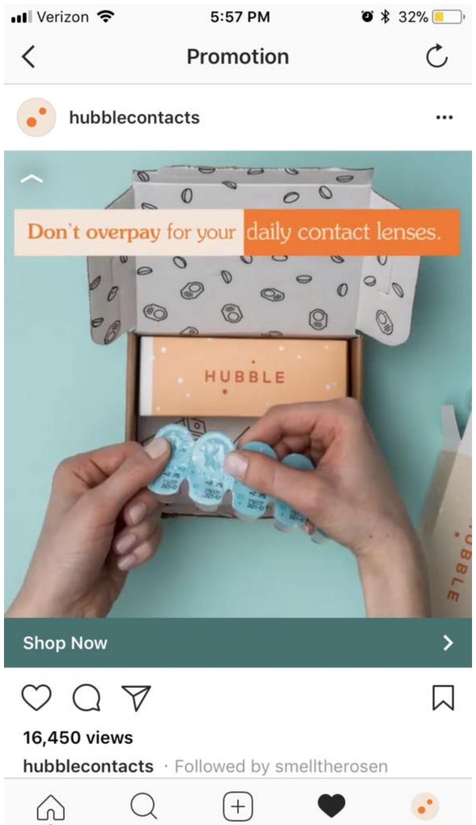
Exhibit 6 Hubble's Colorful Packaging

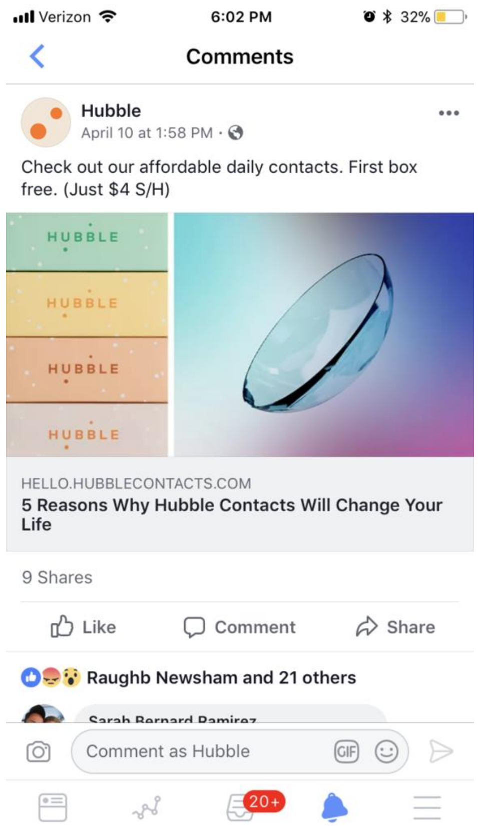


Source: Company documents.

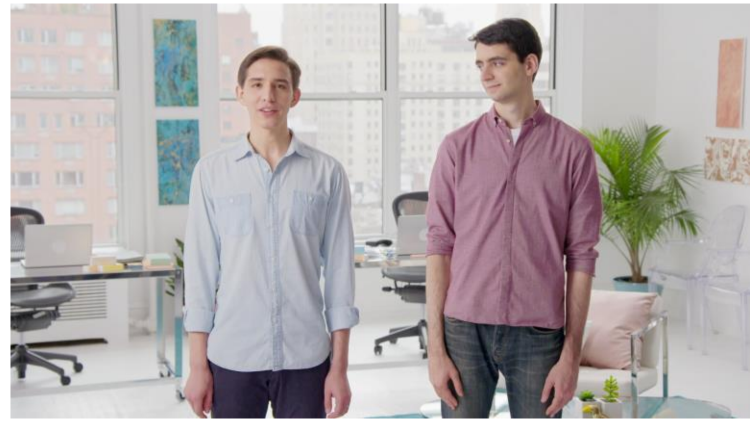
Exhibit 7 Hubble Brand Storytelling

Facebook/ Instagram

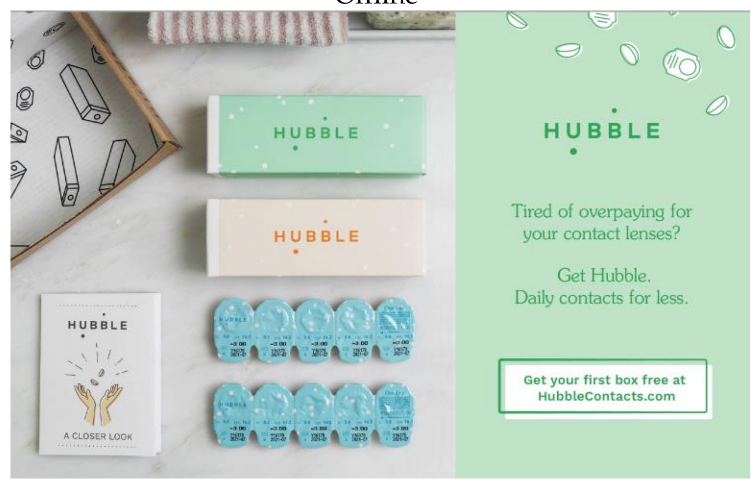




TV



Offline



Source: Company documents.

Exhibit 8 *New York Times Magazine* article on Hubble's Facebook Ad-Buying Process

How Facebook's Oracular Algorithm Determines the Fates of Start-Ups

By Burt Helm

…To ad sellers, Facebook is now a gluttonous monster, which, along with Google, is gobbling up the digital advertising business in the United States; according to Pivotal Research Group, the two companies controlled 70 percent of the market and most of the growth in 2016… In considering Facebook's far-reaching influence, it's worth keeping in mind the perspective of the more than five million advertisers whose money is financing the social network's rampant growth. For them, Facebook and Instagram… are the stuff of fantasy — grand bazaars on a scale never seen before. By advertising directly in users' news feeds, companies can, at any time of day, target potential customers at moments when they are often bored and open to novelty. What better time to hear a product pitch?

The process is easy, cheap and effective. With a few hundred dollars and a morning's effort, an entrepreneur can place his or her ads before social-media users that same afternoon. Companies unsure which ads are best can upload a handful of them and let Facebook's artificial-intelligence software test their efficacy. If they don't know who should see their ads, they can embed code on their websites that enables Facebook to monitor the traffic and then show ads to recent visitors. Or companies can send the email addresses of their existing customers to Facebook, and it will locate their Facebook accounts and put ads in front of so-called Lookalikes, users who like and click on the same things that your proven fan base does.

…I watched as Rosen selected three new ads from an extensive photo shoot... Rosen resembled a sleep-deprived new parent... He attributed his fatigue… to Facebook's artificial-intelligence software that placed Hubble's ads…"the algorithm"… The basic building block of Facebook advertising is an ad set. It consists of the ads themselves and choices in three other categories: audience, goal and budget. That day, Rosen was designing a set to reach an audience of people on Instagram who had visited hubblecontacts.com in the past 30 days. His goal was "conversions," or persuading users who had seen the company's ad to make a purchase. Finally, he set a budget of $1,000 per day. He uploaded the three images. Now they were ready to be tested, to see if any of them were winners in the eyes of users and the algorithm.

What happened at 8 a.m. the next morning, when the ad set became active, was complex — and far removed from human sight. Just before Facebook places an advertisement in a user's feed, it holds a sort of instantaneous auction to determine which advertiser gets the space. The amount of each advertiser's bid is influenced by its budget size, of course, but the algorithm also weighs what it knows about the company, the ad and the individual Facebook user. Seeking to act like an intuitive matchmaker, the algorithm draws inferences from personal interests, current online behavior, the user's potential value to each advertiser and the ad's general appeal. Sometimes the winner is the advertiser that offered Facebook the most money. Sometimes the algorithm decides you are more likely to click a different ad and awards the space to *that* advertiser for less money.

This detailed handicapping process involves thousands of advertisers per auction. Millions of auctions take place every minute as users across Facebook load their feeds. The process is never the same twice. The algorithm is constantly learning, using past results to inform how it weighs bids in the next auction. The intent, Facebook says, is to maximize value for everybody: to pair the advertiser with its likeliest customers, and to show ads that users want to see. And, of course, to make money for Facebook.

… Facebook had spent a grand total of $1.86 on his ads. It had shown the first ad to 51 people, the second to 45 and the third to only two. The first ad had been clicked once… Twenty minutes later, Rosen refreshed his browser… [he] could see only the results, not the process that produced them, but it seemed as if the click had inspired the algorithm to favor the first ad. During those 20 minutes, the first ad appeared before 76 more people — that is, it won 76 more auctions than the other two ads… Over the next hour, the algorithm showed the first ad… to more and more users; the algorithm had begun to favor it, apparently… the sensation was like watching a seed sprout. The ad got more views. Some led to clicks. And eventually… one of those clicks led to the test's first sale. Commerce was in bloom.

The moment felt odd. Obviously there was science behind the scenes; the algorithm was a set of rules written by Facebook engineers. But from where Rosen sat, the operation might as well have been run by the Holy Spirit. Facebook's artificial-intelligence algorithm had wound its way through the server farms, reached out among two billion users, found an individual and showed her a Hubble ad on Instagram — and she used her credit card to buy a subscription for contact lenses.

…Rosen could see all sorts of data arranged in neat rows on Facebook's Ads Manager program: the number of views, clicks, sales and the average cost, in advertising, of acquiring each new customer. But none of the metrics at Rosen's fingertips could resolve a fundamental mystery: why the algorithm behaved as it did, why it preferred some ads over others… To what extent was the day's outcome, apparently set in motion when the first ad happened to get that first click in the morning, actually random? Rosen could only guess.

…Facebook and Google… give access to everyday advertisers. Anyone with a credit card can go online and test ads on Facebook's platform, one of the most sophisticated direct-marketing operations ever. But while average people can use the machine, there's still a lot of mystery about how it works. The methods and calculations of the algorithm… are all hidden.

Almost as soon as they began… Hubble became determined to fathom the algorithm's secrets... Soon they were trading hypotheses with other entrepreneurs, cribbing ideas from other companies' ads and taking a formal approach to testing, rooted in the scientific method… But even as the Hubble team gleaned more about what yielded successful Facebook ads, the algorithm could be unpredictable, almost moody… The algorithm could also be impulsive and streaky…

To formulate audiences, the algorithm scours profiles and analyzes them for shared traits and correlations and self-identified interests and, it assumes, our preferences, grouping us into tribes that can be targeted…

…A new problem arose: No matter what new ads they put in an ad set, the growth rate of sales declined and the cost per acquisition went up. They began to think it was an audience problem: Had they found all the customers in those groups?... [They] scrambled to find fresh and fertile ground. Their ideas for new audiences got quirkier, more outlandish. One week they zeroed in on people who like Sweetgreen, the salad chain. Next they went after people who had indicated that they were fans of bottled water... Each group fizzled after a few days — the cost per each new customer climbed higher and higher; sales dwindled…

…Cogan and Horwitz have decided that they need to reduce their dependence on Facebook advertising, for the sake of their business and their own sanity.

Source: Helm, Burt (2017) "How Facebook's Oracular Algorithm Determines the Fate of Start-Ups," *New York Times Magazine*, November 2, 2017, accessed May 25, 2018.

Exhibit 9 Media Budget Allocation across Channels, April 2018

Media	Allocation
Facebook / Instagram	61%
TV	12%
Google/ Bing Search	10%
Podcasts	6%
Pinterest	5%
Radio	2%
Mailers	2%
Snapchat	1%
Google Display	1%

Source: Casewriters.

Note: The figures in this exhibit were disguised by the casewriters to protect the confidentiality of the company. For case discussion purposes, assume that total monthly media budget averaged $1.5 million in 2018 and that average CAC across channels was $100.

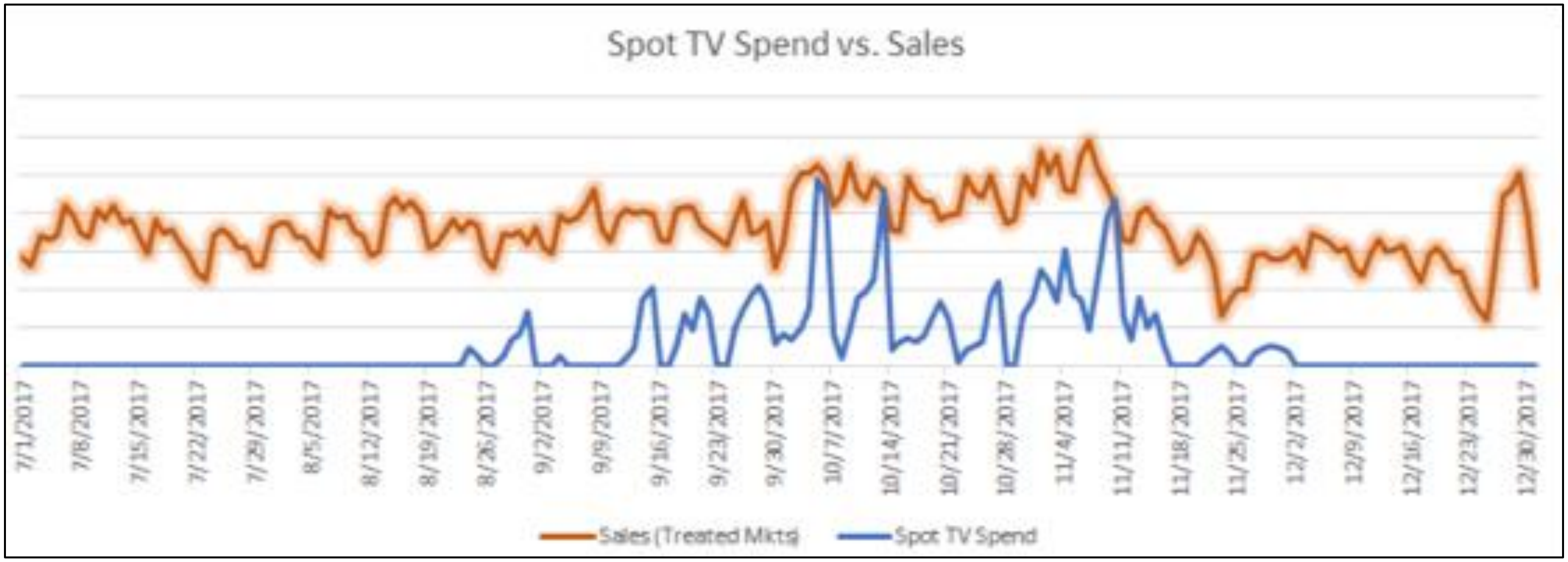
Exhibit 10 Results from Recent Facebook Campaigns

	Prospecting Campaign	Retargeting Campaign
Spend	$100,000	$100,000
Impressions	6,425,703	417,084
Clicks	98,313	21,986
Customers Who Initiate Checkout	5,141	3,153
Customers Who Complete Purchase	1,285	2,628
CPM—Cost per Thousand	$15.56	$239.76
CPC—Cost per Click	$1.02	$4.55
CPA—Cost per Completed Purchase	$77.81	$38.06
CTR—Click Through Rate	1.53%	5.27%
Conversion to Purchase Rate	0.02%	0.63%

Source: Casewriters.

Note: The figures in this Exhibit were disguised by the casewriters to protect the confidentiality of the company. Assume that the campaigns lasted one full month, April 1–April 30, 2018. The prospecting campaign targeted new users; the retargeting campaign targeted those who had seen Hubble's ad impressions before, some of whom engaged with the ads previously but did not complete a purchase.

Exhibit 11 The Correlation between Television Ad Spending and Hubble's Sales, July 1–December 30, 2017



Source: Company documents.

Exhibit 12 A Comparison between Television Advertising Media Treatment and Control Markets

	Sales in the Period before Advertising (Acquisitions per 1,000 Customers)	Sales in the Period after Advertising (Acquisitions per 1,000 Customers)
Treated Markets	0.036	0.054
Control Markets	0.032	0.044
Difference (Treatment minus Control)	0.004	0.010

Source: Casewriters, with disguised figures based on company documents.

Note: The interpretation is that the ads added 0.006 more acquisition per 1,000 customers in the treated market than what we would expect without ads. This means we would have expected to see 0.044 + 0.004 = 0.048 sales, but we see 0.054. Comparing these figures, the lift in sales in the treated market due to advertising is 12.5%.

Endnotes

[1] Matsakis, Louise (2016) "This startup wants to deliver affordable contact lenses straight to your door," *Mashable*, November 1, 2016, https://mashable.com/2016/11/01/hubble-contact-lenses-deliver-startup-warby-parker/, accessed May 25, 2018.

[2] Helm, Burt (2017) "How Facebook's Oracular Algorithm Determines the Fate of Start-Ups," *The New York Times* Magazine, November 2, 2017, accessed May 25, 2018.

[3] Feldman, Amy (2017) "Hubble contacts wants to do for contact lenses what Harry's did for razors," *Forbes*, March 20, 2017, https://www.forbes.com/sites/forbestreptalks/2017/03/20/hubble-contacts-wants-to-do-for-contact-lenses-what-harrys-did-for-razors/2/#1cc127534679, accessed May 25, 2018.

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