



JILL AVERY

THOMAS STEENBURGH

## HubSpot and Motion AI: Chatbot-Enabled CRM

On September 20, 2017, HubSpot, an inbound marketing, sales, and customer relationship management (CRM) software provider, announced that it had acquired Motion AI, a software platform that enabled companies to easily build and deploy chatbots to interact with their customers. Chatbots were pieces of conversational software powered by artificial intelligence that had the capability to engage in one-to-one chats with customers on their preferred chat platform, such as Facebook Messenger or WeChat. Fueled by pre-programmed algorithms, natural language processing, and/or machine learning, chatbots conversed in ways that mimicked actual human communication.

Since its founding in November 2015, Motion AI had facilitated the building of 80,000 bots for brands including T-Mobile, Kia, Sony, and Wix, which were busy conversing with customers via 40 million total chat messages sent to date. The software was simple to use and enabled anyone, regardless of their level of technical knowledge, to build and manage a chatbot. The entire Motion AI team, including founder and CEO David Nelson, joined HubSpot following the acquisition.

HubSpot saw great potential for chatbots for its business-to-business (B2B) customers, who could use them to automate many of their customer interactions that were staffed by humans at the time of the acquisition. Unlike other automated customer service solutions, such as interactive voice telephone response (IVR) systems that were almost universally disliked for their robotic nature, chatbots were getting closer to passing the Turing Test, simulating a human conversational partner so well that it was difficult to sense when one was chatting with a machine. Thus, chatbots had the potential to enable a company to nurture and manage one-to-one customized relationships with prospects and customers efficiently at scale by making artificial intelligence the new frontline face of their brands.

Chief Strategy Officer Brad Coffey and Chief Marketing Officer Kipp Bodnar were responsible for working with Nelson to bring Motion AI's technology into the HubSpot family of products. Before unleashing bot-building technology to its customers, HubSpot first needed to develop some best practices for the use of chatbots for CRM. Without proper instruction, Coffey worried that companies, in their rush to incorporate the newest marketing technology, would build bots that would do more harm to their brands than good. He prognosticated:

In the not-so-distant future, there's a bleak, forsaken landscape. Civilization, absent. Communication channels, silent. All of the people have fled, terrorized by never-ending notifications and antagonizing messages. What could cause such a desolate scene? Bad

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bots. Okay, maybe that sounds a bit too much like the next superhero blockbuster. But it wouldn't be the first time that brands abused a new technology until people were buried in spam up to their eyeballs.

He continued, "Five percent of companies worldwide say they are using chatbots regularly in 2016, 20% are piloting them, and 32% are planning to use or test them in 2017. As more and more brands join the race, we're in desperate need of a framework around doing bots the right way—one that reflects the way consumers have changed."

The Motion AI technology would be incorporated into HubSpot's product over the next few months, so the team had little time to make some important decisions. First, they had to clearly assess the implications associated with the use of bots versus humans to create, nurture, and manage customer relationships, and determine whether and where bots were appropriate for use during marketing and selling processes. Second, they had to decide to what extent to anthropomorphize chatbots. How human-like should they be? Was a conversational user interface (UI) the desired solution, or would a more functional UI produce more efficiency for customers? How much should the bot embody the brand's personality or mimic the conversational style of an individual user? Should users know when they were interacting with a bot, or could human-like bots create stronger relationships?

Historically, HubSpot had "practiced what it preached," using its own products to build its business. Coffey and his team had to consider whether to use chatbots to nurture and service its own customer relationships. Currently, a team of chat representatives worked to engage, nurture, and prime prospects for HubSpot's sales team. Could they and should they be replaced with chatbots? Was HubSpot ready for bots to become the face of its brand to prospective customers?

## HubSpot's Acquisition of Motion AI

HubSpot was founded in 2006 as an inbound marketing software-as-a-service (SaaS)<sup>a</sup> solutions provider that helped primarily business-to-business (B2B) companies develop online content, attract visitors to the content, convert the visitors into sales leads, and finally acquire the visitors as customers. HubSpot's software helped companies develop, host, disseminate, and analyze digital content to execute inbound marketing programs, a collection of marketing strategies and techniques focused on pulling relevant prospects toward a business and its products during a time when these prospects were actively searching for solutions.

In 2016, HubSpot's revenues were up 49% to \$271 million and were derived from 23,226 small and medium-sized business (SMB) customers (see **Exhibit 1** for the company's financials). The company was excited to expand its value proposition and reposition itself as a robust, multi-product growth stack platform that helped SMBs combine all of their marketing, sales, and customer success software solutions into one convenient and easy-to-use platform. The growth stack platform was premised on delivering a promise "to fuel your growth and build deeper relationships, from first hello to happy customer and beyond," and included three product solutions:

- **Marketing Hub:** Grow your traffic and convert more visitors into customers. Prices ranged from \$50/month for a starter package to \$2,400/month for an enterprise solution.

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<sup>a</sup> HubSpot's software was sold via a software-as-a-service (SaaS) model, where users paid a recurring monthly fee to access the software.

- Sales Hub: Drive productivity and close more deals with less work. Prices ranged from \$50/month for a starter package to \$400/month for a higher-end, professional solution.
- Customer Hub: Connect with your customers on their terms and help them succeed. As of September 2017, HubSpot was offering this product free with its other products.

At the heart of the new platform was the free CRM system that allowed companies to collect and analyze deeper insights on every contact, lead, and customer. A feature called “Conversations” empowered the CRM tool to collect customer conversations from Facebook Messenger, web chat, social media, email, and other messaging outlets into one cross-team inbox to help marketing and sales teams manage, scale, and leverage one-to-one communications with their customers across all conversation channels. With its acquisition of Motion AI, HubSpot was hoping to further power efficient and effective customer conversations for its clients by introducing chatbots that would better engage, convert, close, and delight their customers at scale. Said Bodnar:

Today’s buyers expect that conversations with a business happen where they are. That might be the website, but it could also be social media, Skype, Slack, or any messaging app. They expect that conversations are portable. Regardless of where a conversation gets started, it should be able to be transferred to any other channel seamlessly. A thread kicked off on live chat should be able to be passed to Facebook Messenger or email without data loss or crossed wires. And, they expect that conversations have context. Context shouldn’t leave with the person who fielded the initial inquiry. All of a customer’s historical interactions and information should be attached to a common record which populates instantaneously. We need new technology paired with automation to live up to our buyers’ expectations and make these types of conversations a reality.

## The Market for Chatbots

Chatbots were part of a wave of new artificial intelligence tools that were changing the way people interacted with technology. Digital virtual assistants housed in a smartphone, desktop, or laptop computer, such as Apple’s Siri and Microsoft’s Cortana, had paved the way for person-bot communication. More recently, Amazon’s Alexa, which could be awakened at any time by a voice prompt that spoke her name, provided ambient virtual assistance to consumers in their home.

Unlike these virtual assistants, chatbots were less sophisticated and tended to specialize in executing simple tasks rather than providing omnipresent and wide-ranging functionality (see **Exhibit 2**). While the most advanced virtual assistants were powered by artificial intelligence, which enabled them to understand complex requests, personalize responses, and improve interactions over time, most bots in 2017 followed a simple set of rules programmed by a human coder who simulated a typical conversation. The coder programmed the bot to prompt a conversation by delivering a series of queries to a customer and then to answer the customer with canned responses triggered by simple if-then statements. Explained Derek Fridman, Global Experience Director at Huge, a digital agency that helped its clients build chatbots, “The illusion that HAL [the computer from the movie *2001: A Space Odyssey*] is out there, and the machine is alive is just that: an illusion. There’s machine learning taking place and algorithms making decisions, but in most cases, we’re scripting sequences.”<sup>1</sup>

According to McKinsey & Company,<sup>2</sup> technology companies spent between \$20–\$30 billion on artificial intelligence in 2016. The market for chatbots was estimated to be \$1 billion and was expected to nearly double by 2020 and triple within a decade. A 2017 Forrester study<sup>3</sup> claimed that worldwide, 57% of firms were already using chatbots or planned to begin doing so shortly, and 80% of businesses

wanted chatbots in place by 2020. In the U.S., 31% of marketers already used chatbots to communicate with consumers, with 88% of them deployed on Facebook Messenger. After Facebook opened its Messenger platform to chatbots in 2016, 100,000 were created within the first year.<sup>4</sup>

Another 2017 study<sup>5</sup> found that among companies using AI, the most common use cases were customer service (39%), marketing and sales (35%), and managing noncustomer external relations (28%). (See **Exhibit 3** for examples.) It was estimated that in 2017, 60% of customer service support issues could be resolved by chatbots—and that number was expected to be 90% by 2020. Companies were finding that chatbots completed customer interactions at twice the speed and a fraction of the cost of human-provided telephone support. Oracle estimated that the cost of building a chatbot ran from \$30,000 to \$250,000 depending upon its sophistication. While chatbots were reportedly saving businesses \$20 million per year in 2017, they were expected to help cut costs by more than \$8 billion per year by 2022.

## Chatbots and CRM

HubSpot's CEO, Brian Halligan, was excited by the potential, saying, "It's impossible to ignore the impact of chat and messaging, not just on the way B2B companies operate, but on society as a whole. We're in the midst of a massive shift as businesses embrace this new platform and consumers come to expect more immediate, always-on communication from brands." Coffey echoed his enthusiasm:

There's no downplaying what bots could do. For brands and consumers alike, we have a chance to facilitate a new type of communication and commerce. Research would be convenient, purchases streamlined, and service personalized. A conversational interface, powered by bots, can facilitate a response that's as fast as talking to a human, with the depth of a full website, and a simple texting-like interface that everyone is already accustomed to using.

Bots provided instant responses to customers' needs without the stress of waiting in a call queue or having to call during business hours. Calling or emailing a company was quickly falling out of favor with consumers; TechCrunch reported that 9 out of 10 consumers wanted to use messaging to interact with companies. Because chatbots were deployed within messaging app platforms, such as Facebook Messenger, WhatsApp, and WeChat, customers could speak with a company and accomplish their task without having to leave their preferred chat interface and without the hassle of downloading yet another app to their smartphones or visiting a company's website. Five billion active users accessed messaging apps each month, and their usage had surpassed that of social networks. According to Facebook, "convenience creates closeness...messaging makes commerce personal."<sup>6</sup> Research showed that 63% of people said chatting with a business made them feel more positive about the relationship, 55% were more likely to trust the business as a result of their chat conversations, and 53% were more likely to shop with a business they could contact via a messaging app.

HubSpot's own research showed that consumers were showing greater interest in using messaging apps (see **Exhibit 4**). Explained Public Relations Manager Ellie Botelho, "Consumers want to be able to engage with a company when and where it's personally convenient for them, meaning that businesses that are unable to respond quickly are leaving money on the table." Added Coffey, "The way folks communicate externally is shifting towards messaging. Large companies manage these via live chats with an army of employees responding in real time. Few smaller companies can pull that off."

## Delivering a Human Touch via Artificial Intelligence

### *A Preference for Humans?*

By 2017, consumers could order a Domino's pizza, hail an Uber, book a flight via Travelocity, and reorder their favorite lipstick from Sephora via chatbots, all without leaving Facebook Messenger. The B2C world was rapidly adopting chatbots as an efficient way to execute simple transactions with customers without devoting human resources to them and without forcing consumers to visit their websites or mobile apps. Chatbots could be deployed to help with many different types of customer interactions that were common in B2B customer relationships, such as booking meetings, qualifying leads, diagnosing problems, and providing customer service to solve them – but it was unclear whether B2B customers would be open to robotic rather than human support, as B2B customers were often more demanding than B2C customers. “It’s no secret that today’s consumers expect personalized, relevant, contextual, and empathetic brand interactions throughout the entire buying process,” proclaimed digital analyst PJ Jakovljevic.<sup>7</sup> B2B customer relationships were often more complex, more relational, and less transactional, so they often required the deft touch of a highly trained consultative salesperson.

“Chat is good when powered by humans. Chat is awesome when powered by AI,” claimed Christopher O’Donnell, HubSpot’s Vice President of Product. Bodnar, however, wasn’t so sure, responding, “Automation is a funny thing. Too little is the enemy of efficiency. Too much kills engagement.” He continued:

Think about email. Automated email nurturing campaigns were the answer to individually following up with every single person who downloaded a piece of content from your website. In the name of efficiency, marketers queued up a series of emails via workflows to automatically deliver ever-more-helpful content and insights, gradually increasing the person’s trust in the company and stoking the flames of their buying intent. If at any time they had a question, they could respond to the email and get routed to a person who could help. But as the number of inbound leads skyrocketed, this system became untenable. The dreaded noreply@company.com address was the solution for scalability. Over time, this set the expectation with buyers that marketers didn’t want to have a conversation with them via email. Automation made us more efficient, but at the cost of relationships – ultimately defeating the purpose.

Then came live chat. Buyers were empowered to get answers to their questions in real time from a real person. Better yet, this interaction took place directly on the company’s website – where they were already doing their research. We started using website chat at HubSpot in 2013. Over the past four years, live chat has facilitated countless conversations between curious prospects and our business. But, just like what happened with email nurturing, at a certain point the system started to strain. According to our usage data, one in every 30 website visits results in a chat. For companies that receive thousands of website visits a day, trying to keep up is daunting. And, customers are again the ones suffering when companies can’t manage the demands of live chat.

Recent research found that 21% of live chat support requests go completely unanswered. Even if the buyer gets a response, they can expect to wait an average of two minutes and 40 seconds for it. I wouldn’t call this “live” – would you? Responding slowly (or failing to respond at all) on a channel advertised as “live” is a contradiction in terms. Forcing customers to wait after we’ve set the expectation of immediacy is unacceptable. We can do better. Today, we’re at the same inflection point we came to with email. What

should companies do to accommodate the tidal wave of live chat conversations? Hiring an increasing number of chat coordinators clearly isn't a scalable answer. If marketers are going to advertise "live" channels—we need to step up and deliver.

Consumer research offered conflicting opinions. While 40% of people claimed they didn't care if they were serviced by a person or an AI tool as long as they were helped quickly and easily, 42% of people wanted a human agent to help answer complex questions and requests. Moreover, 75% of people didn't think chatbots would be sufficient for complicated troubleshooting, and 90% felt they should always have the option to transfer to a live agent. Direct experience with existing IVR phone systems and online chat demonstrated that many consumers still preferred speaking with a live customer service representative in an instantaneously synchronous manner, pressing "0" for an operator in IVR phone systems, and bailing out of online chat conversations to dial in to a call center for help.

### *Botched Bots*

Although bots were chatting with customers at astonishingly high rates in 2017, their record of success was less high-flying. Facebook reported that chatbots failed to serve customer needs 70% of the time. As another example, only 12% of bot interactions in the health care sector were completed without the need to pass off the customer to a human operator. Lamented Coffey:

Bots provide a scalable way to interact one-on-one with buyers. Yet, they fail when they don't deliver an experience as efficient and delightful as the complex, multi-layered conversations people are accustomed to having with other humans. Too often, bots today don't understand conversational context, or forget what you've said two bubbles later . . . . Consider why someone would turn to a bot in the first place. Of the 71% of people willing to use messaging apps to get customer assistance, many do it because they want their problem solved, quickly and correctly. And, if you've ever struggled to have Siri or Alexa understand what you're asking, you know there's a much lower tolerance for machines to make mistakes.

Despite rapid advances in artificial intelligence, most chatbots were still quite reactive and "dumb." Programmed to only recognize a very limited set of commands, they had difficulty with back-and-forth conversation with humans. According to Tim Tuttle of MindMeld, "The opportunity is clear, but today most companies still have huge challenges building chat applications that actually work. The industry is in a state of shock at how hard this is."<sup>8</sup> Explained Sarah Guo of Greylock Partners, "Language is hard to model (and program) because it is so ambiguous. Similar sentences can have very different meanings; seemingly different sentences can have the same meaning. Humans are strange, unruly, unconscious, and inconsistent in their communication, but make up for that by being so flexible in their ability to understand imperfect, ambiguous communications from others—based on context."<sup>9</sup> While humans effortlessly dealt with this complexity of language, bots stumbled.

While advancements in machine learning were helping, AI required "big data" to be effective, said Robert C. Johnson, CEO of TeamSupport: "Accurate machine learning requires a huge number of data points and experiences to pull on. Without that volume, you really can't do machine learning. In B2B interactions, you're dealing with a lower volume of interactions but higher complexity, which can lead to higher error rates. Chatbots are good for B2C interactions where there's a high volume and the value of each customer is not very high."<sup>10</sup> Bots also struggled to handle complex problem solving. Explained Daniel Polani of the University of Hertfordshire:

There is an art to handling the exception, and good customer service is often about the unusual or unanticipated cases involving potentially angry customers. While chatbots can convincingly source answers to basic questions, AI isn't yet smart enough to deal with the rare and exceptional examples . . . Automated systems might be able to handle regular cases. But they can't yet adapt themselves to exceptional circumstances or even recognize that the flexibility of human intervention is needed. And . . . some situations require not just human understanding and problem solving, but a level of compassion and empathy. A chatbot can be programmed to adopt a certain style of interaction, but that will still sound oddly out-of-place in unexpected or difficult contexts.<sup>11</sup>

However, much of the challenge of creating an effective chatbot derived not from the limitations of the technology, but rather from the difficulties associated with designing a conversational UI—one that anticipated the conversational flow that a bot would need to have with diverse customers. “The difficulty in building a chatbot is less a technical one and more an issue of user experience,” said Matt Harman, Director of Seed Investments at Betaworks.<sup>12</sup> Proclaimed Bodnar, “We need conversational strategy and the automation of bots. This is what will make us more efficient, but more importantly, more effective for our customers. This is automation that creates relationships instead of frustration.”

Coffey believed that chatting with a bot should be like talking to a human that knew everything. But, *Altimeter* suggested, emotional intelligence was as important as IQ: “Detecting emotion, expressed in word choice or tone, [is] also critical to ensure that conversational experiences are satisfying for users.”<sup>13</sup> A strong conversational UI could capture users’ attention through an engaging and evolving narrative that combined automation with intimacy. However, this required significant relational intelligence and the ability to perceive differential relational styles and trajectories. Clara de Soto of Reply.ai agreed, saying, “You’re never just ‘building a bot’ so much as launching a ‘conversational strategy’—one that’s constantly evolving and being optimized based on how users are actually interacting with it.”<sup>14</sup> And this was difficult, explained David Shingy of AOL: “The challenge [with chatbots] will be thinking about creative from a whole different view: Can we have creative that scales? That customizes itself? We find ourselves hurtling toward another handoff from man to machine—what larger system of creative or complex storytelling structure can I design such that a machine can use it appropriately and effectively?”<sup>15</sup> According to *Advertising Age’s* Annie Fanning:

Fully owning your conversational relationship with your customers requires building a brand-specific chatbot personality . . . you’ll need word nerds on both the front and back end to feed and teach your new baby chatbot. Not only does someone need to craft chatbot responses with personality (brand-guided voice and tone) but a writer/strategist/UX expert will need to think through the customer journey and provide sample customer input. To build an effective bot, every use case needs to be considered and a chatbot response written for every type of interaction you can think of . . . This means knowing what your customers are asking, and how they [will] phrase their questions, is just as important as knowing how the bot will respond.<sup>16</sup>

Consumers were getting frustrated with many of the bots with which they interacted. Said one after interacting with travel-related bots, “Every experience I’ve had has been a total waste of time. I would love to hear at least one positive anecdote about using artificial intelligence.”<sup>17</sup> Fanning cautioned marketers about the downside of bots, remarking, “When a chatbot guesses wrong and serves up content we didn’t ask for, it is at best hilarious, but at worst offensive and embarrassing.”<sup>18</sup> Echoed *USA Today*, “These early days of . . . bots . . . are a cautionary tale. Technology may be good and getting better but nothing replaces a person. That’s unlikely to change for a while, and maybe ever.”<sup>19</sup>

### *How Human Is Too Human?*

As HubSpot looked ahead to a world of chatbots, one thing it needed to address was to what extent bots should behave like humans. Some were suggesting that companies should not disclose that customers were interacting with AI, but rather, allow them to assume that they were chatting with a live human in order to reap the benefits of human-built relationships. Said Beerud Sheth of Gupshup, a bot creation platform, “Chatbots are everywhere. Inside a messaging app, everything is just a thread. If you’re chatting with an entity, it could be a human or just as easily be a program. Businesses can now develop a whole range of services that to the user seem like just another user you’re messaging.”<sup>20</sup> “People don’t even always know they’re interacting with bots. The whole thing only works when it’s just so easy that you don’t even think about the fact that it’s a bot,” said Matthew Hartman of Betaworks.<sup>21</sup> Left to their own devices, humans had a tendency to interpret computer-generated conversation as coming from a person anyway, so customers often anthropomorphized chatbots, observed Arte Merritt, CEO of bot analytics platform Dashbot: “People think about bots for customer service, but they’re so much more . . . Users treat the bots as people.”<sup>22</sup> In a humorous example, the company x.ai humanized its meeting scheduling bot so well that customers were asking “Amy” out on dates, not realizing that “she” was an AI-driven personal assistant.<sup>23</sup>

This often led to an uncomfortable situation labelled “the uncanny valley.” While people generally preferred to engage with computer programs that were more rather than less human-like, their response to an anthropomorphized robot would abruptly shift from empathy to revulsion if the robot suddenly failed to act human enough. Explained Justine Cassell of Carnegie Mellon, “When a bot is clearly a bot, the person interacting with it generally knows how limited its functions are . . . The bot’s narrowly defined purpose guides the human that’s interacting with it. By contrast, a smooth-talking virtual assistant that tries to mimic human speech . . . can create different assumptions. The more human-like a system acts, the broader the expectations that people may have for it.”<sup>24</sup>

However, hiding the fact that a customer was interacting with a bot might make it awkward to manage the handoff from bot to human when things went wrong. The chatbots of 2017 were not ready to handle most customer interactions from start to finish; in fact, marketers reported that chatbots were able to conduct less than 20% of a consumer interaction before they had to pass the conversation off to a live customer service representative. Advised Bodnar, “Businesses need to help bots and human service reps to ‘tag team.’ When a complex question arises, the right technology can loop in a human chat coordinator, and provide a unified record of everything that’s happened in this interaction as well as the customer’s entire history. This way, the context never gets left behind in the handoff between bot and human, or the switch from one communication channel to another.”

Thus, HubSpot had to decide whether to advise its customers to build their apps with a human-like conversational UI or a more utilitarian, non-human, “get things done efficiently” functional UI. People in the digital age had already been trained to use functional UIs such as search and menu-driven systems, which were efficient and straightforward and offered a streamlined path to an answer. Bots should be solution-focused, warned Coffey, particularly for busy B2B customers:

The challenge of building a bot often isn’t a technical one. It’s a conversational challenge. Your job is to understand the interactions your audience is already having with your brand. Then, harness the chat interface in a way that surfaces the information your audience needs effectively. Yes, witty banter is a plus. But, the ultimate mission of a bot is to provide a service people actually want to use. The best bots identify the core use cases consumers are looking to solve on a daily basis and provide a conversational approach to accomplishing that task. Whether it’s adjusting a reservation, updating shipping info for



an order, or giving medical advice, bots provide a less time-consuming solution than talking to a human, and a simpler one than digging through a whole website of content.

An alternative thesis was that a more conversational UI would encourage customers to engage more deeply. Advocated Altimeter, “Consumers have been conditioned to interact with businesses in ways that are often unnatural and inconvenient: typing in boxes within rigid interfaces that may or may not accomplish their objective. What experience wouldn’t be better if it were more natural and more attuned to the way people really communicate – by writing, talking – even gesturing?”<sup>25</sup>

## AI and Chatbots at HubSpot

The HubSpot team envisioned a number of roles that chatbots could play in HubSpot’s own business, ranging from taking inquiries from customers at early stages of the buying process, to assisting salespeople in gathering information about customers and competitors during the sales process, to providing convenient customer service when questions or problems arose after the sale. Including chatbots somewhere in the marketing process was the next frontier. Marketing communications had always evolved along with technology. After the birth of the telephone allowed people to talk to one another over long distances, marketers immediately used the device to prospect for new customers. After email was invented and allowed immediate written communication, marketers started promotional email campaigns. It was only a matter of time before the same would happen with chatbot communication, so there were a number of opportunities and risks that the team had to consider.

Coffey explained, “This time, unwelcome marketing has the potential to hit even closer to home. When you spam someone’s email, there is technology to filter out the noise. With bots functioning inside messaging apps, you’re invited into a historically personal space. If you use that invitation to push unwanted and interruptive spam, it can really hurt your brand.” Would consumers readily accept having chatbots become part of their messaging habits or would there be a revolt? This might be a particularly interesting challenge for HubSpot, given that the company had grown its brand with strong anti-spam messages in homegrown social media ads such as 2008’s “Dude, Cold Calling Is for Losers,” which criticized traditional marketers for intrusive outbound marketing techniques.

Dharmesh Shah, Co-Founder and Chief Technology Officer of HubSpot, was intrigued by the potential of this new technology, seeing it as the next horizon of marketing. In April 2016, he launched GrowthBot, which could help him and others within HubSpot answer many of the questions that he wanted to know – both about his customers and his competitors. GrowthBot was an intuitive, conversational interface that allowed users to answer questions by querying internal and external databases (see **Exhibit 5**). Unlike a website, in which users would point-and-click their way toward answers, GrowthBot allowed them to find information intuitively. For example, a user could ask, “What is my open rate on MailChimp?” and the bot would respond with the appropriate answer.

Through his experience with GrowthBot, Dharmesh learned several lessons about how bots needed to be constructed if they were going to switch people from the familiarity of search to the conversational interface of chatbots. First, the onboarding process had to be simple and example-based. When a user first started interacting with it, GrowthBot would immediately prompt the user with “Hi, My name is GrowthBot. For ideas, just ask: what can you do?” (see **Exhibit 6**). If the user typed this question, GrowthBot would instantly provide multiple ideas about how to use the software. A longer list of questions and commands that could be answered by GrowthBot can be found in **Exhibit 7**.

Second, the bot had to provide compelling reasons for the user to return. Part of this was simply ensuring that the bot could answer relevant questions for the user—that it was truly useful. Bots provided an interesting opportunity in this sense because users were always telling the bot what they wanted by asking questions, making them an important market research channel to understand what was on customers' minds. Paying attention to the chat log created by these interactions provided product designers with the consumer feedback they needed to develop product design roadmaps that better anticipated consumers' needs. Additionally, bots provided another opportunity for CRM because they could re-engage users that had gone dormant by suggesting new ways to interact.

Third, UI widgets, the suggestion boxes that bots presented, could simplify the user's experience if designed judiciously. Widgets were effective in suggesting new uses and reducing the amount of typing users needed to do to derive their desired information. However, relying on an interaction that was too scripted limited how broadly users were likely to interact with the chatbot and did not provide the designer with the same insights into users' thought processes as open-ended question designs did.

The HubSpot team was sure that other design principles would arise as they worked more with the technology. Could they design a bot that would help people abandon their search habit and develop a new chat habit to obtain information about the businesses with which they were interested in interacting? Did the rules governing behind-the-scenes, internal bots like GrowthBot differ from external customer-facing bots that interacted with customers along their purchase journeys?

## The Marketing and Sales Processes at HubSpot

Coffey, Bodnar, and Nelson were excited to think about how bots could be incorporated into HubSpot's own marketing and sales processes. They were certain that this new technology could significantly change how marketers and salespeople interacted with their customers. But where in the marketing and sales process could bots provide the most value? And what were the risks of inserting chatbots into these processes? Would different relational trajectories evolve if customers interacted with a machine rather than a person? How might this change the types and strength of relationships a customer formed with the company? Could HubSpot's customer relationships be handled by machines, and what might be the consequences to brand loyalty if they were?

Coffey encouraged the team to evaluate using chatbots at different points throughout a customer's purchase journey. As he thought about HubSpot's marketing and sales funnel, he thought about how to insert bots into the top of funnel, when the company's content had just attracted the attention of prospective customers; into the middle of the funnel, when prospects needed to be educated and nurtured as they shaped their needs and evaluated HubSpot's products versus competitive offerings; and through to the bottom of funnel, where consultative salespeople provided guided demonstrations of the product and helped prospective customers understand how to integrate the product into their existing systems. Bots could even possibly provide customer support following the purchase. He said:

At HubSpot, we study human behavior and then build products to match the way modern buyers shop, learn, and communicate . . . While the trend towards messaging was obvious, the key question remained, how could we make it work for our customers? To get there we started with a simpler question: How could we make it work for ourselves? We asked our marketing team to see if they could leverage this transition to find a new way to reach our prospects, have better conversations, and ultimately grow our business.

## *Using Chatbots in the Marketing and Sales Funnel*

HubSpot's prospective customers moved through a process that changed them from a *stranger* attracted by inbound marketing content to the company's website; to a *visitor* that could be engaged, educated, and tracked; to a *lead* that could be identified, nurtured, qualified, and then passed along to sales for further development, product demo, and the closing of the sale. HubSpot knew that there were many prospective people in the stranger stage, and designed its inbound marketing content to serve as magnets to draw them into its ecosystem. Its content was quite successful, and by 2017 this content was driving millions of website visits per month—amply filling the top of HubSpot's funnel, but creating a situation where the company's sales team couldn't possibly conduct one-to-one outreach.

**Top of the Funnel (ToFu)** Once visitors arrived, HubSpot tracked their interactions with its content through clickstream analysis and began constructing a customer profile for them in its CRM system. The company worked hard to encourage visitors to self-identify through landing pages and forms designed to capture prospects' information (such as contact information and qualifying information such as size and type of business) so that the company could decide whether to invest in a one-to-one relationship with a particular customer. However, form completion rates were low; only about 4% of people who visited hubspot.com filled out a form or interacted in live chat (when available). Each of these leads ended up costing HubSpot \$50 to generate. Bodnar wondered if using a bot with a more conversational tone in place of a landing page form could help the company garner more information: "A bot could make you feel like you were just talking to somebody at the company. It could say things like 'Oh, what's your email address so that I can send this to you?' rather than providing a utilitarian website form. We could even add in a joke or something in the request to make it representative of who we are in the kind of tone that our brand would take, so that it wasn't boring or stuffy." The additional upside of a bot was that it would be available 24/7 and wouldn't be constrained by the availability and bandwidth of the live chat reps the company was using.

Nelson saw great potential in scripting bots to speak with the voice of the brand, believing that a unique voice contributed to the formation of a stronger connection. He was also intrigued by the possibilities of dynamically adjusting a bot's tone to mimic the desired relational style of an individual consumer and of using artificial intelligence to perceive signals in consumers' speech patterns that would indicate whether they were eager to buy or more cagey and pensive, so that the persuasive technique that the bot used could be adjusted in real time. He remarked, "We can certainly envision doing more with real-time sentiment analysis to get to the point where we could refine the tone of the conversation based on input that we are receiving from the customer. Then, companies would have to decide whether they wanted to stay in their brand's voice or mirror the conversational style of the individual customer the bot is interacting with."

At the top of the funnel, customers often needed consultative assistance to define the business problems they were trying to solve and to specify the needs they had for HubSpot's products. Top of the funnel tasks included making customers aware of HubSpot's offerings and educating them about how these products might meet their needs. Could a chatbot serve this need, or would HubSpot forgo more profitable customer relationships if a salesperson didn't engage with customers early to upsell, cross-sell, and engage them in strategic discussions about the future of their businesses?

Additionally, industry experts noted that broad changes in buying patterns were coming as a result of the rise of digital technologies. Many prospective customers were delaying or eliminating physical contact with salespeople, choosing to progress along their purchase journeys without the perceived pressure of persuasive selling techniques. Digital access was empowering buyers to bypass direct interaction with a company altogether. The Corporate Executive Board estimated that, in general, 57%

of the marketing and sales process was often complete before a prospect made physical contact with a seller. This number was expected to rise as buyers gained greater access to information through the internet and other digital sources, so that they didn't need to rely on live interaction with salespeople to get the information they needed to make their decisions. The HubSpot team wondered if chatbots could be inserted early into the marketing and selling processes to ensure that the company had an opportunity to engage with prospects in a more interactive way during the crucial early stages of the buying process, thereby giving HubSpot a voice and a chance to form a relationship before customers were willing to speak with a live salesperson.

**Middle of the Funnel (MoFu)** In the middle of the funnel, customers were learning about what HubSpot could do for them, comparing HubSpot's products to competitive offerings, and developing a sense of the important attributes and evaluative criteria they should use in making their final choice. A combination of tools, both self service (such as search-driven frequently asked questions [FAQs] and webinars) and low-cost, light-touch service (such as live chat and email), was used to help prospective buyers move through the middle of the funnel without engaging too much of the company's valuable human resources. HubSpot's live chat representatives could handle up to three conversations at one time via email or chat, but as Bodnar noted, if they were handling three at a time, there was a noticeable delay in their ability to respond to each customer. The cost of a chat rep was approximately \$60,000 per year. Could chatbots replace these reps and still achieve the CRM functions they were providing? Or would there be a decrease in customer satisfaction with a bot versus a human?

HubSpot used lead qualification to determine which leads were more or less promising. Based on their responses to self-identifying questions and their interaction with HubSpot's content, prospects were ranked from 1 (low) to 10 (high) in terms of probability of converting to a customer. In 2017, HubSpot was attracting a pool of leads where 40% were graded with scores ranging from 7 to 10, making them worthy of a salesperson's attention. This scoring was often done in close to real time, giving chat reps valuable insights into which leads to pass on to sales.

Another challenge was that the nature of the customer interactions significantly changed throughout the marketing funnel. In the early stages of the buying process, prospects were often naïve, knowing very little about the HubSpot product, and therefore asked fairly simple questions. As prospects became more knowledgeable, however, they asked more complicated questions and would expect more sophisticated answers customized to their needs. Would allowing chatbots to be the first line of communication to handle simple questions change the nature of the resulting customer relationships that developed? A strength of chatbots was that they could provide a lot of basic information quickly, but it was likely that the company would bring humans into the process once questions got difficult or nuanced. The team wondered if it could seamlessly pass a prospect from a bot to a human or if the prospect would become frustrated and bail out of the relationship.

**Bottom of the Funnel (BoFu)** The transition from marketing to sales at the bottom of the funnel was a tricky part of the process, and how bots might be used to make this transition easier was an open question. The company was not willing to unleash its higher-priced salespeople (the cost of a highly trained salesperson was approximately \$120,000 per year, not including benefits) to interact with prospects in the bottom of the funnel until after it had converted visitors into leads and qualified the leads to determine whether expending sales resources on them made sense. Many visitors who engaged with HubSpot's content at the top of the funnel were not likely to become customers, so it was important to weed out those people before assigning salespeople to interact with them. Chat reps often played a role in engaging with qualified leads, and were able to set up meetings with the more expensive salespeople for 12.5% of these leads. As this program grew, there was approximately one salesperson for every three chat reps.

At the final stage of the sales process, a salesperson would guide the customer through a live demo of the software to help show how it could be used in the customer's business setting. Salespeople were available to answer technical questions about the product, such as how the software would integrate with the company's other systems, and provided advice on the buying decision, such as the right product package and price point for the buyer. This often included a lengthy, consultative selling process that could last up to 45 days, but which yielded a conversion rate of 20%. Each salesperson closed five customers per month.

The remainder of the leads were left untouched. Lead qualification was as much art as science, which meant that some leads that were not passed on to the salesforce likely had some residual value to HubSpot, particularly if those leads could be further nurtured and developed. However, the cost of doing so, given their lower probability of conversion, made this a difficult business case to support. Thus, many leads that HubSpot had spent money acquiring were ignored. Could chatbots pick up some customers in this lower scoring lead pool and work to further nurture them? Or would this require investing more money in chasing prospects who would likely never convert to customers? Additionally, how would HubSpot handle bot failure for these prospects? HubSpot could face significant staffing constraints if large numbers of lower quality leads suddenly began requesting human support as the bots failed to serve them well.

An early test of chatbots generated a conversion rate of 10% into sales meetings for qualified leads, an exciting result that HubSpot expected to be able to iterate and improve upon.

### *Chatbots in the Post-Sale Customer Service Process*

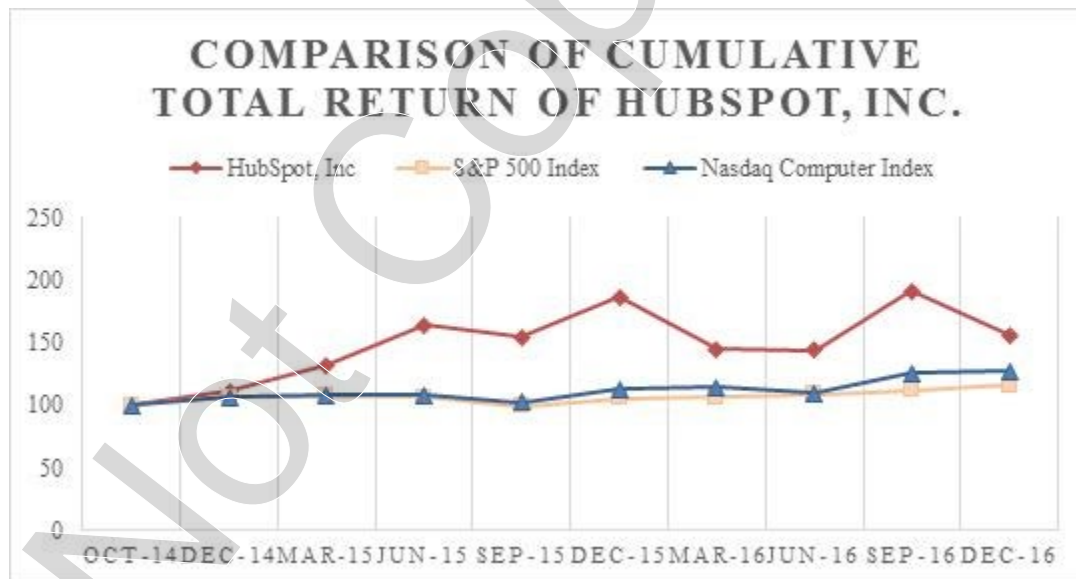
Once HubSpot signed a customer, it engaged in an onboarding process where a customer support team worked with customers to install the software, integrate it with existing systems, and train users on its capabilities. Customers paid a fee of \$500 for four hours of this high-touch support. Once the onboarding process was completed, HubSpot's relationship with its customers became much less high-touch. If issues arose, customers could log on to a website that offered additional training and resources, tune in to webinars, and/or talk to other users in web forums. The team wondered if there was a role for chatbots in this post-sale period. Because HubSpot was a SaaS company, customer retention was a critical part of its business model. Could chatbots help strengthen its customer relationships? Was there a way to continue to nurture customer relationships beyond the sale to encourage continuous usage of the software, to answer customers' questions and help them solve problems, and to reduce churn from dissatisfied customers who abandoned the product in frustration?

The HubSpot team was excited to explore how the role of machines and people would change throughout the entire marketing, sales, and customer service processes for their own business as well as that of their customers. Prior to the acquisition, HubSpot deployed Motion AI bots to take its customers through a journey specifically built for them, offering a more personalized, always-on buying experience (see **Exhibit 8**). HubSpot married chatbot technology with its repository of user-related data, which allowed the chatbot to customize the conversation to deliver more helpful information and meet individual customer needs. The chatbot test had generated six times as many qualified leads as the company had achieved using email to nurture customer relationships. Proclaimed Coffey, "As we were going through that, it just validated some of the assumptions we had in our belief that there was a massive opportunity here for marketers."

Nelson was optimistic, but at the same time cautious: “People appreciate the vast responsiveness of bots. But I think it is equally important that we are not trying to say that bots are the be all, end all of CRM. Being able to facilitate a personal relationship as only a person can is really important for the long-term health of a customer. Even with phenomenal technology, we still want to ensure that there is a personal relationship between the company and its customers.”

**Exhibit 1** HubSpot's Financial Performance (in \$ thousands)

	2012	2013	2014	2015	2016
Revenue	\$51,604	\$77,634	\$115,876	\$181,943	\$270,967
Cost of Revenue	15,693	27,504	35,080	47,923	61,865
Total Gross Profit	35,911	50,130	80,796	134,020	209,102
Operating Expenses					
R&D	10,585	15,018	25,638	32,457	45,997
Sales & Marketing	34,949	53,158	78,809	112,629	162,647
General & Administrative	9,117	16,204	24,958	35,408	45,120
Total Operating Expenses	54,651	84,380	129,405	180,494	253,764
Loss from Operations	(18,740)	(34,250)	(48,609)	(46,474)	(44,662)
Net Loss	(18,778)	(32,274)	(48,229)	(46,053)	(45,562)



Source: Company documents.

Note: HubSpot went public via an initial public offering (IPO) on October 8, 2014.

**Exhibit 2** How Firms Are Using Chatbots

Company	Chatbot	Purpose
1-800-Flowers		Enables customers to order flowers directly from Facebook Messenger. Makes gift suggestions and delivers updates on shipping.
Sephora	Color Match	Enables customers to find a color cosmetic that matches a color shade from a photograph.
H&M		Makes style recommendations based on a consumer's answers to a quiz. Styles a complete outfit based on a consumer's preference for one item.
Disney	Officer Judy Hopps	Provides the ability to solve crimes by chatting with a character from the <i>Zootopia</i> movie.
Casper	Insomnobot-3000	Talks to insomniac consumers about a range of fun topics from 11:00 p.m. – 5:00 a.m.
Hipmunk		Recommends travel destinations and books travel.
Starbucks	Barista	Orders coffee drinks for pickup.
Duolingo		Provides a foreign language speaking partner for those learning a new language.
Shopify	Kit	Provides a virtual employee that executes marketing tactics such as creating targeted Facebook ads, running reports, and emailing customers.
Microsoft	XiaoIce	Provides a virtual friend for conversations.
National Geographic	Genius	Allows customers to “converse” with Albert Einstein.
Whole Foods		Enables customers to search for recipes, products, and food inspiration by texting a food emoji.

Source: Casewriters.



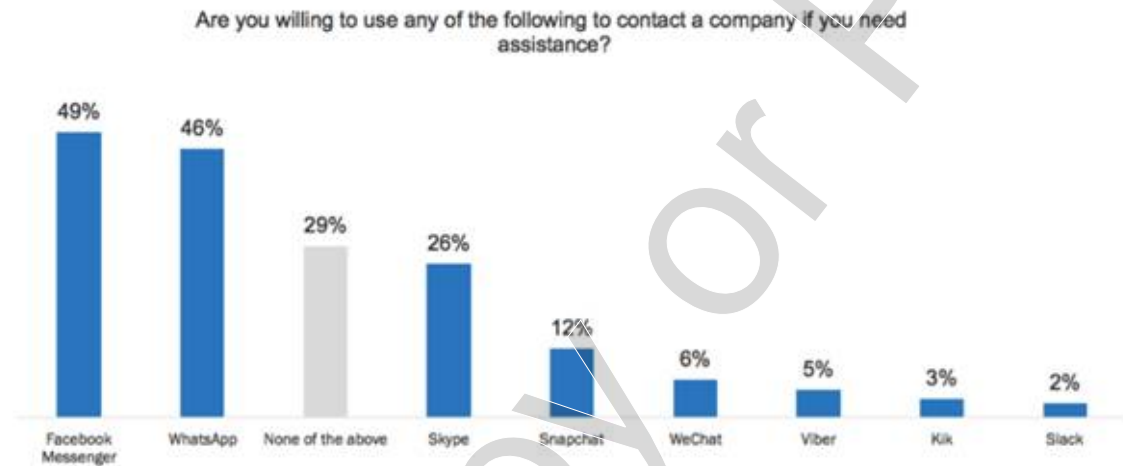
**Exhibit 3** What Can Chatbots Do?

 <b>Experience and Service</b> Handle customer service requests. Offer alerts and information. Manage account settings, preferences. Communicate in multiple languages.	 <b>Employee Productivity</b> Manage calendar. Manage email. Search. Plan resources.
 <b>Commerce</b> Place orders, process payments. Handle shipping preferences. Respond to questions.	 <b>Personal Assistant</b> Respond to questions. Search for information. Purchase products or services. Manage payments.
 <b>Sales &amp; Marketing</b> Deliver campaigns and offers. Make recommendations. Offer loyalty incentives. Deliver relevant content.	 <b>Personal Finance</b> Receive alerts. Check balances. Process transfers and payments.
 <b>Recruitment</b> Interact with candidates. Answer questions. Schedule meetings.	 <b>Smart Home Devices</b> Control heating. Manage security. Control home appliances. Control entertainment devices. Control fitness devices. Set medicine reminders.
 <b>Healthcare</b> Deliver medicine or safety alerts. Communicate with physicians. Provide status on staffing, resources.	 <b>Transportation</b> Retrieve information. Remotely lock vehicles. Call ride share service.
 <b>Government</b> Manage visa applications. Resolve parking tickets.	

Source: Etlinger, Susan, "The Conversational Business: How chatbots will reshape digital experiences," *Altimeter @ Prophet*, <http://www2.prophet.com/conversational-business-how-chatbots-will-reshape-digital-experiences>, accessed November 2017.

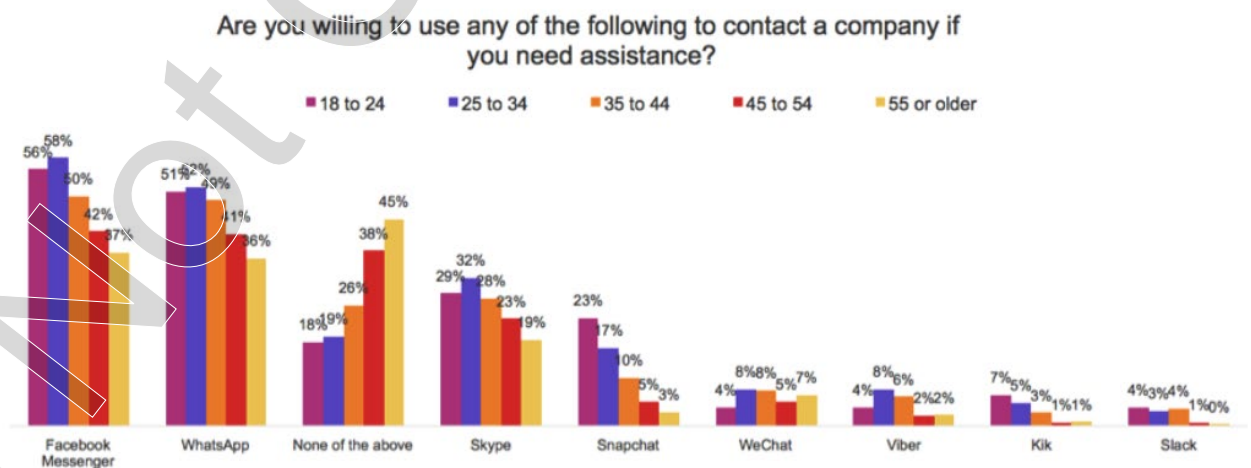
**Exhibit 4** Consumers' Willingness to Use Messenger Apps for Customer Assistance

71% of respondents are willing to use messaging apps to get customer assistance



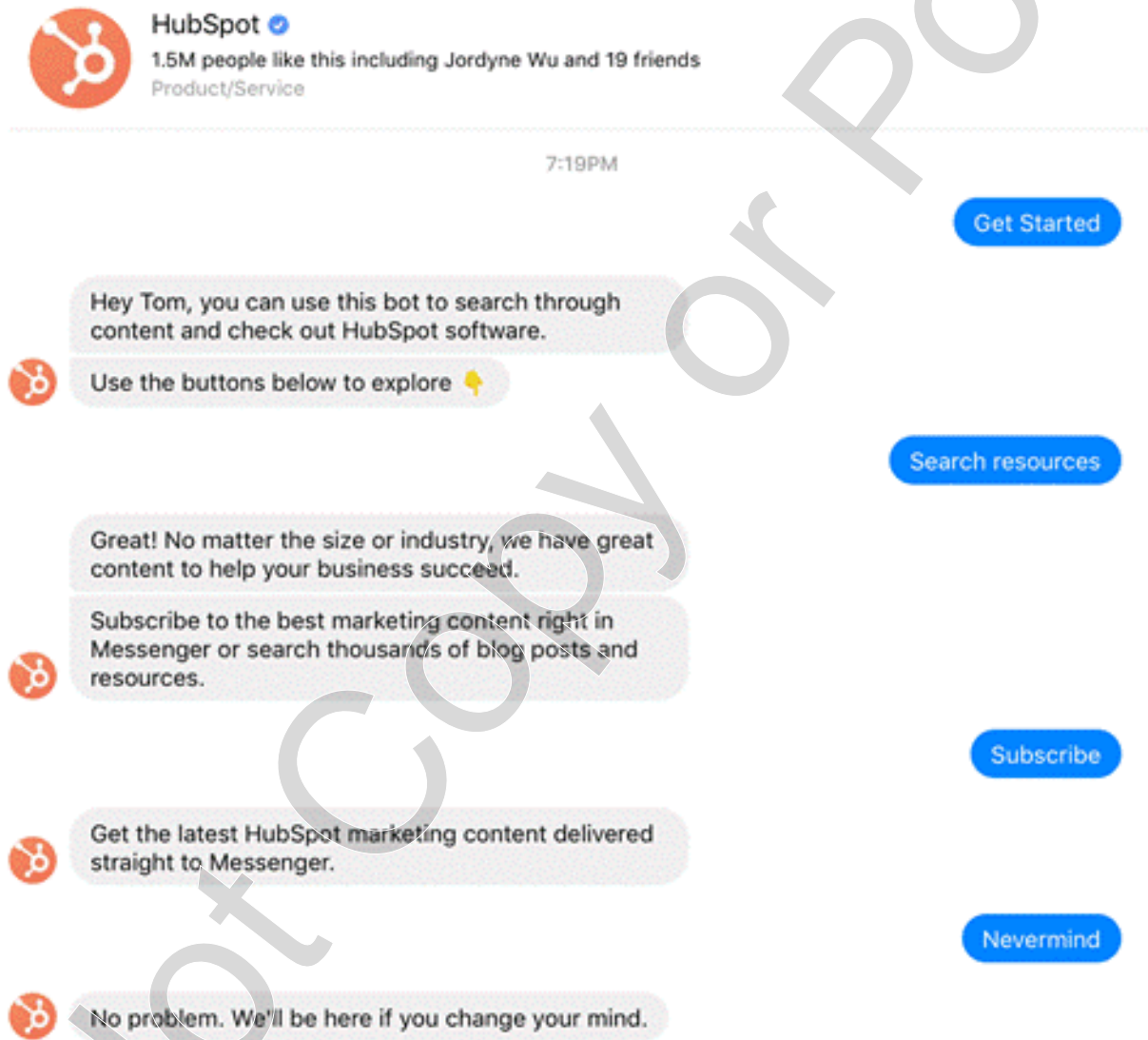
Base: 3010 consumers in the US, Germany, Colombia, and Mexico  
Source: HubSpot Content Trends Survey, Q3 2017

Younger respondents demonstrate greater interest in messaging companies

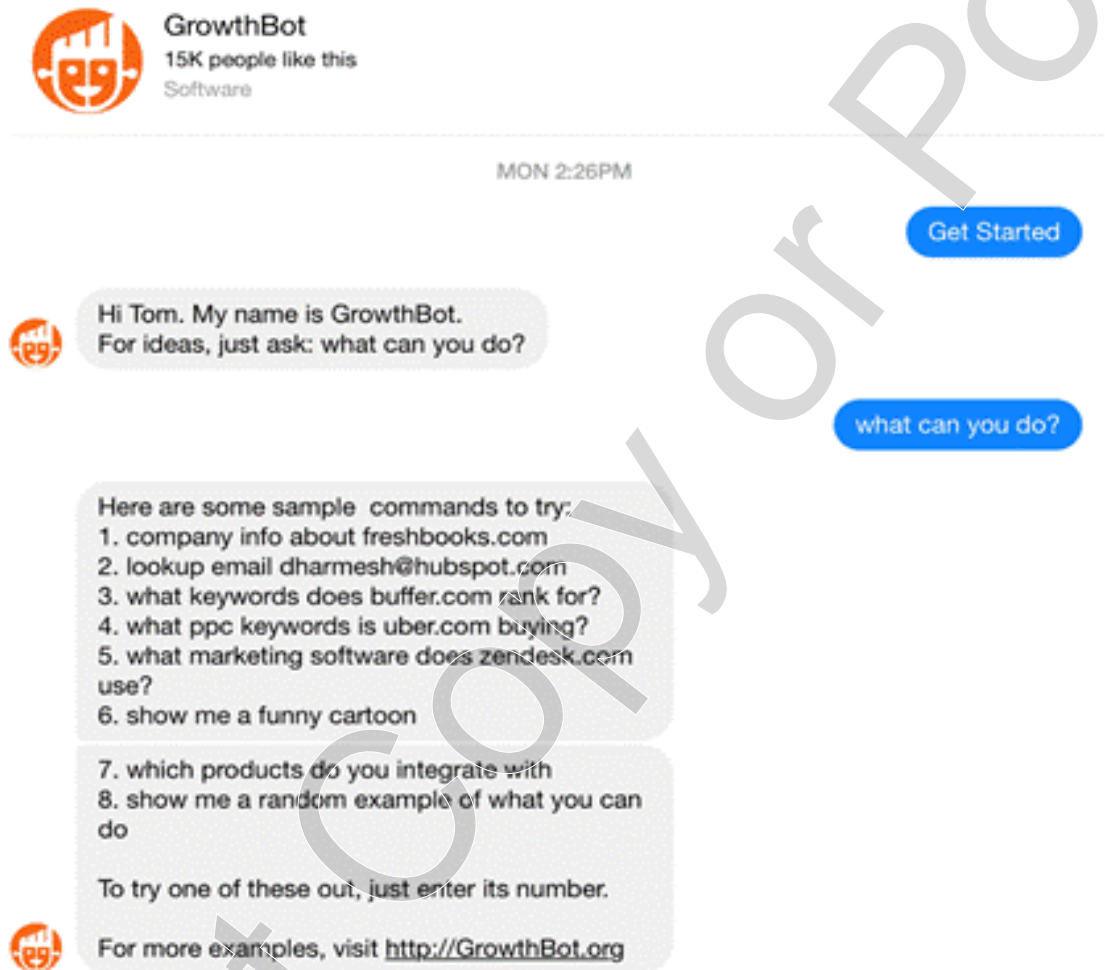


Base: 3010 consumers in the US, Germany, Colombia, and Mexico  
Source: HubSpot Content Trends Survey, Q3 2017

Source: Company documents.

**Exhibit 5** Interacting with HubSpot's GrowthBot

Source: Company documents.

**Exhibit 6** HubSpot's GrowthBot Prompts Users to Ask, "What Can You Do?"

Source: Company documents.

## Exhibit 7 Examples of GrowthBot's Ability to Respond to Different Queries

marketing examples

Here are some sample commands to try:

1. company info about freshbooks.com
2. lookup email dharmesh@hubspot.com
3. what keywords does buffer.com rank for?
4. what ppc keywords is uber.com buying?
5. what marketing software does zendesk.com use?
6. show me a funny cartoon
7. which products do you integrate with
8. show me a random example of what you can do

To try one of these out, just enter its number.

For more examples, visit <http://GrowthBot.org>

hubspot

sales/crm examples

Here are some sample sales commands to try:

1. connect hubspot account
2. show me public companies using hubspot
3. how many contacts do I have?
4. how many customers do I have in Indiana?
5. show me recent leads
6. company info on okta.com

To try one of these out, just enter its number.

For more examples, visit <http://GrowthBot.org>

hubspot

marketing examples

Here are some sample hubspot commands to try:

1. connect hubspot account
2. how was my traffic last week?
3. give me a traffic summary for last month
4. start blog 'my first blog post'
5. what is my hub id?
6. lookup lead dharmesh@hubspot.com
7. add contact dharmesh@hubspot.com

To try one of these out, just enter its number.

For more examples, visit <http://GrowthBot.org>

hubspot

sales/crm examples

Here are some sample integration commands to try:

1. connect hubspot marketing
2. connect hubspot crm
3. connect google analytics
4. connect twitter
5. connect mailchimp

To try one of these out, just enter its number.

For more examples, visit <http://GrowthBot.org>

hubspot

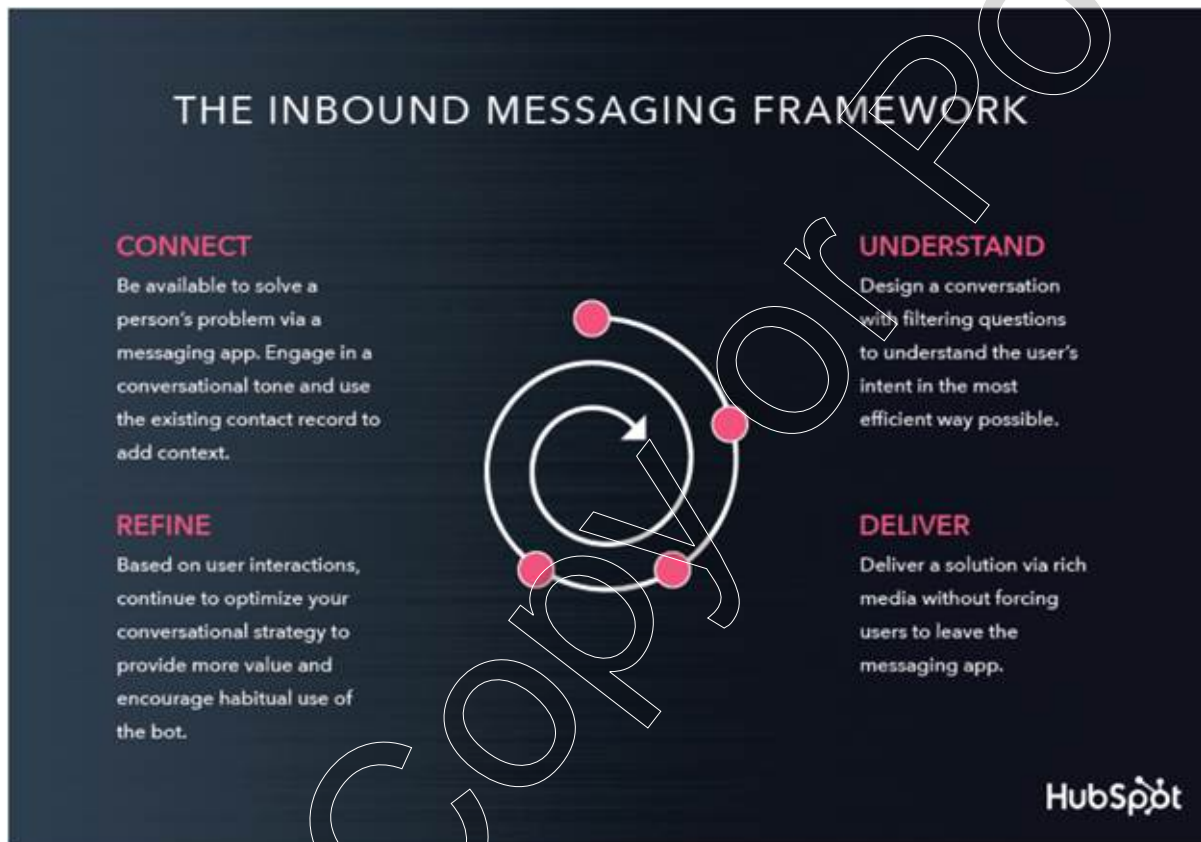
random example

Here's a random example of what you can try: what are the top posts on growth hacking?

hubspot

Source: Company documents.



**Exhibit 8** HubSpot's Customer Journey Assisted by Chatbot Technology

Source: Company documents.

## Endnotes

- <sup>1</sup> Amrani, David (2017) "Attack of the Chatbots," Digiday Research, August 7, 2017, <https://digiday.com/media/digiday-research-attack-chatbots/>, accessed 11/13/2017.
- <sup>2</sup> Bughin, Jacques et al. "Artificial Intelligence: The New Digital Frontier?" McKinsey Global Institute, June 2017, <https://www.mckinsey.com/~media/McKinsey/Industries/Advanced%20Electronics/Our%20Insights/How%20artificial%20intelligence%20can%20deliver%20real%20value%20to%20companies/MGI-Artificial-Intelligence-Discussion-paper.ashx>, accessed 11/17/2017.
- <sup>3</sup> Wang, Xiaofeng (2017) "Chatbots Are Transforming Marketing," Forrester, May 29, 2017, [https://go.forrester.com/blogs/17-05-29-chatbots\\_are\\_transforming\\_marketing/](https://go.forrester.com/blogs/17-05-29-chatbots_are_transforming_marketing/), accessed 11/17/2017.
- <sup>4</sup> Johnson, Khari (2017) "Facebook Messenger Hits 100,000 Bots," *Venture Beat*, April 18, 2017, <https://venturebeat.com/2017/04/18/facebook-messenger-hits-100000-bots/>, accessed 11/17/2017.
- <sup>5</sup> Wilson, H. James; Paul Daugherty; and Nicola Morini Bianzino (2017) "When AI becomes the new face of your brand," *Harvard Business Review*, June 27, 2017, <https://hbr.org/2017/06/when-ai-becomes-the-new-face-of-your-brand>, accessed 11/17/2017.
- <sup>6</sup> (2016) "More Than a Message: Messaging Means Business," Facebook IQ, December 1, 2016, <https://www.facebook.com/iq/articles/more-than-a-message-messaging-means-business>, accessed 11/02/2017.
- <sup>7</sup> Jakovljevic, PJ (2017) "INBOUND 2017: HubSpot announces that it's bolstering its AI chops" (blog post), Technology Evaluation Center, October 13, 2017, <https://www3.technologyevaluation.com/research/article/inbound-2017-hubspot-announces-that-its-bolstering-its-ai-chops.html>, accessed 10/30/2017.
- <sup>8</sup> Etlinger, Susan (2017) "The Conversational Business: How Chatbots Will Reshape Digital Experiences," *Altimeter @ Prophet*, <http://www2.prophet.com/conversational-business-how-chatbots-will-reshape-digital-experiences>, accessed 11/02/2017.
- <sup>9</sup> Guo, Sarah (2016) "The Conversational Economy: 5 Reasons Mobile Apps May Still Rule," Greylock Partners, June 26, 2016, <https://news.greylock.com/5-reasons-mobile-apps-may-still-rule-3a0f0469cb3f>, accessed 11/13/2017.
- <sup>10</sup> Marvin, Rob (2017) "How chatbots can transform your business," *PC Magazine*, August 18, 2017, <https://www.pcmag.com/article/355518/how-chatbots-can-transform-your-business>, accessed 10/31/2017.
- <sup>11</sup> Polani, Daniel (2017) "Emotionless chatbots are taking over customer service – and it's bad news for consumers," *The Conversation*, September 4, 2017, <http://theconversation.com/emotionless-chatbots-are-taking-over-customer-service-and-its-bad-news-for-consumers-82962>, accessed 10/31/2017.
- <sup>12</sup> Schlicht, Matt (2016) "The complete beginner's guide to chatbots," *Chatbots Magazine*, April 20, 2016, <https://chatbotsmagazine.com/the-complete-beginner-s-guide-to-chatbots-8280b7b906ca>, accessed 11/02/2017.
- <sup>13</sup> Etlinger, "The Conversational Business: How Chatbots Will Reshape Digital Experiences," p. 13.
- <sup>14</sup> Brandon, John (2017) "Why building an AI company should not remind you of a blind date," *Venture Beat*, July 12, 2017, <https://venturebeat.com/2017/07/12/why-building-an-ai-company-should-not-remind-you-of-a-blind-date/>, accessed 11/02/2017.
- <sup>15</sup> Shing, David (2016) "What Chatbots Are Teaching Us About the Future of Marketing," *Adweek*, October 30, 2016, <http://www.adweek.com/digital/what-chatbots-are-teaching-us-about-future-marketing-174309/>
- <sup>16</sup> Fanning, Annie (2017) "Someone has to feed the chatbots," *Advertising Age*, September 12, 2017, <http://adage.com/article/digitalnext/feed-chatbots/310427/>, accessed 10/31/2017.
- <sup>17</sup> Elliot, Christopher (2017) "For travelers, chatbots and AI can't quite take you there," *USA Today*, August 27, 2017, <https://www.usatoday.com/story/travel/advice/2017/08/27/travel-chatbots-ai/602262001/>, accessed 11/02/2017.
- <sup>18</sup> Fanning, "Someone has to feed the chatbots."
- <sup>19</sup> Elliot, "For travelers, chatbots and AI can't quite take you there."
- <sup>20</sup> Marvin, "How chatbots can transform your business."
- <sup>21</sup> Coldewey, Devin (2016) "What Are Chatbots? And Why Does Big Tech Love Them So Much?" *NBC News*, May 11, 2016, <https://www.nbcnews.com/tech/innovation/what-are-chatbots-why-does-big-tech-love-them-so-n572201>, accessed 11/17/2017.

<sup>22</sup> Marvin, "How chatbots can transform your business."

<sup>23</sup> Ehrenkranz, Melanie (2016) "Amy the virtual assistant is so human-like, people keep asking it out on dates," *Mic*, April 1, 2016, <https://mic.com/articles/139512/xai-amy-virtual-assistant-is-so-human-like-people-keep-asking-it-out-on-dates#.hFCLHsvpp>, accessed 11/17/2017.

<sup>24</sup> Waddell, Kaveh (2017) "Chatbots have entered the uncanny valley," *The Atlantic*, April 2, 2017, <https://www.theatlantic.com/technology/archive/2017/04/uncanny-valley-digital-assistants/523806/>, accessed 11/02/2017.

<sup>25</sup> Etlinger, "The Conversational Business: How Chatbots Will Reshape Digital Experiences."