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CASE STUDIES

Case Study: Examining Airbnb

Robert Plant, Associate Professor, School of Business Administration, University of Miami
8/21/2013
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Airbnb is a community marketplace that brings hosts, people with a room or a house to rent, together with renters, people who are looking for a unique accommodation experience.

The company was founded in August 2008 by the team of Brian Chesky, an industrial designer, Nathan Blecharczyk, a computer scientist, and Joe Gebbia, who has a background in a graphic and industrial design. The company is located in San Francisco. Airbnb was founded when a prominent design conference was going to happen in San Francisco. Chesky and Gebbia, with their backgrounds in design (they were both graduates of the Rhode Island School of Design), predicted that the hotels near the venue would be full. They offered air-bed accommodation at their loft. The uptake was overwhelmingly positive.

Since the company's founding is has grown as a corporation by opening 11 new offices in 2012 and by offering accommodations in more than 33,000 cities in 192 countries. In 2012 alone Airbnb underwent more than 100 percent growth, from 120,000 listings at the beginning of the year to more than 300,000. Guest uptake has also been staggering, with over 4 million guests since the company started -- 3 million of those having used the company's services since 2012.

Airbnb and data

From a data perspective Airbnb as a company could be seen as a cross between a travel marketplace, such as Orbitz, and an entertainment exploration space, such as Netflix. At Netflix you're frequently not sure exactly what movie you're looking for. You just know the genre, for example, a sci-fi movie. In Airbnb's case you may not know exactly what kind of accommodation you're looking for beyond perhaps a bed in South Beach. Using Netflix or Airbnb individuals look at reviews, but the value is in the quality of system-made recommendations.

Following this logic, the next step in Airbnb's evolution has to be in the personalization space. This method delivers value, cuts down on the search time for the renter, and improves the yield for the hosts, while promoting higher satisfaction scores. To achieve this Airbnb recruited Mike Curtis as vice president of engineering at the beginning of 2013. Curtis was previously at Facebook, where he was director of engineering and focused on promoting user growth, following eight years at Yahoo.

In an interview with TechCrunch, Nathan Blecharczyk, Airbnb's CTO commented that while their engineering team was composed of only 50 engineers, Curtis had been brought in to create a world-class collaborative team of "folks from different disciplines." Airbnb uses a data scientist engineering model similar to that used at companies like Netflix. (See my BDR post Data Scientist Wanted: Are You Qualified? It discusses Netflix's talent-management strategy in more detail.)

Data team personalization challenges

Curtis will face a number of personalization challenges: matching hosts with guests, setting price levels based on demand, screening hosts and guests, overseeing ranking and review mechanisms, as well as monitoring feedback systems. With over 4 million guests and the company's ever changing host/guest interaction, this is clearly a company that is awash in data. It recently released some numbers on the most hospitable cities, with Tampa, Florida, appearing at the top, followed by Mendocino, California, and Eugene, Oregon.

To identify these cities, the company used metrics from their reviews, labeled as "cleanliness," "check in," "communication," and "accuracy." Managers were intrigued to learn what determined the distribution of scores, and so they drilled down into the data, examining seven more metrics: guest age, host age, guest gender, host gender, group size, length of stay, and booking lead-time. Results indicated that older hosts (aged more than 50 years), younger guests (from 30 to 39), stays of three to six days, and smaller group sizes (of one or two guests) were the demographics that drove the best reviews. The

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question for the Airbnb team then is what can it create to address the other, less positive, review demographics? Was it better personalization? Better prices? Perhaps more variety?

To analyze the approximately 20 terabytes of new data created daily and the approximate 1.2 petabytes of archived data Airbnb, has employed a variety of technologies. Brenden Mathews and Henry Cai, engineers at Airbnb, have detailed these at a presentation to a Meetup group. The systems they have used include Hadoop on Apache's Mesos cluster manager, an operating system known for its ability to provide efficient resource isolation across distributed applications. Mathews and Cai note that it is advantageous for its "formalized scaling capabilities, as well as its familiarity to many engineers working in Big Data." They describe it as the gold standard.

Additionally, they incorporate a system with their Mesos implementation known as Chronos, a communication framework built by Google for achieving improved throughput and low latency for applications and systems created to access data across thousands of servers. They also use Storm, an open-source (EPL license) software solution that enables them to reliably process unbounded streams of data. Storm also enables users to develop real-time analytics and online machine learning algorithms. It is extremely fast, having been benchmarked at over a million tuples processed per second per node. Storm is scaleable as well as fault tolerant, giving extremely high degrees of reliability.

Airbnb's engineers also use Jenkins CI (Continuous Integration), an open-source integration SCM and testing tool written in Java with a very large number of plugins (approximately 784) to support complex upgrades and frequent code merging. The engineering team also utilizes Hive, Pig, Cascading, and other tools on their Hadoop implementation.

Beyond the crunching of Big Data, the engineering teams at Airbnb are also facing other business-related technology challenges, successfully avoiding the temptation to become so engrossed in the big data projects that they ignore what drives revenue. One of these key areas was mobile data. While the company had initially developed a mobile iPhone app, it recognized that, since the firm operates in over 192 countries, and since Android is the world's most popular smartphone operating system, it would need to create an in-house development team to address this opportunity. This was achieved through building a first-class UI that presents property descriptions, uses filters for searches, lists property details and amenities, and has booking facilities and contact mechanisms for connecting with the host.

Airbnb has great lessons for start-ups and established firms alike. First, building a business on data is an imperative in order to create a competitive position. Second, building a great engineering team to develop that architecture is essential -- half-measures in big data don't work. Third, never lose track of who is really important -- the customer. The data is there to support business decision-making and that is always focused on driving value in the marketplace for the consumer.

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technetronic, User Rank: Blogger
9/28/2013 | 5:11:14 PM

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Re: They've avoided the creep-factor, too
yep i'm with you -- they're probably doing that testing too

keep in mind the legal factors that are non-digital and yet are playing into airbnb -- check out this legislation in new york that verifies that you can only rent a space if the owner is also living in the same space!

http://money.cnn.com/2013/09/27/technology/innovation/airbnb-new-york/index.html

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Saul Sherry, User Rank: Blogger
9/3/2013 | 7:33:50 AM

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Re: They've avoided the creep-factor, too
@technertoinc - sounds like a great space for Airbnb to multivariate test the information they share and run satisfaction metrics on the users.

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AlphaEdge, User Rank: Exabyte Executive
8/26/2013 | 9:07:51 AM

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Re: They've avoided the creep-factor, too
Business model is indeed unique, and have never had experience on this site. Would like to explore more on this though!

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Susan Fourtané , User Rank: Blogger
8/25/2013 | 9:49:47 AM

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Re: They've avoided the creep-factor, too
James,

"Before you rush out to rent that spare room to tourists, keep her experience in mind. Her Facebook post noted that she suddenly has become a combination tour guide, entertainment director, and chamber maid."

I would dare to say that her experience was her choice. The host is not asked to provide tour guide, entertainment, or chamber maid services, unless that's what she offered on her Airbnb profile.

Coincidentally, I just came back from London, and from my first experience with Airbnb. Not always your friends can host you, so I tried this. I had a good experience, and all what I needed, i.e. a peaceful room in a peaceful house, in a peaceful and nice neighborhood, conveniently

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located close to public transport (one stop from London Bridge, and 15 minutes to Canary Wharf), excellent shower, and water pressure, and hosts who don't intrude in your privacy.

I worked, and had breakfast in a nice garden, complimentary tea and coffee, and free WiFi. :)

It's also an alternative for a longer stay. I have saved a few places where I can stay for longer (a month) renting a studio apartment.

-Susan

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James M. Connolly, User Rank: Blogger
8/23/2013 | 11:29:21 AM

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Re: They've avoided the creep-factor, too
@Robert. Airbnb's ability to avoid any major issues in terms of mismatches or the refusal to allow someone into the rental property. From what you describe in the case study, it appears that the company has done their homework when it comes to big data. So, the odds are that their work has contributed to what we could call a good lack of failure. However, I wouldn't rule out a little bit of luck too.

Has anyone else heard of how Airbnb's match-making is working in the real world?

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Robert Plant, User Rank: Blogger
8/23/2013 | 11:27:38 AM

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Re: They've avoided the creep-factor, too
Good point, when you run a bnb as a business the price point often is considered by the host without their own labor costs and in many cases the tax is perhaps a vague issue. When the actual price of providing the business to clients is presened the true price would probably be more closely aligned to a hotel. The data would be very interesting to see, of course people dont stop at a hotel precisely because they are interested in an experiece rather than another night at a corporate chain.

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Robert Plant, User Rank: Blogger
8/23/2013 | 11:24:44 AM

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Re: They've avoided the creep-factor, too
Yes, the start up idea always grows into a wide range of problems the founders never expected, luckily the firm is very well capitalized and being guided through the growth process. Pricing is most likely driven by the market forces in a local market, the host is tasked with doing the work on value pricing.

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Robert Plant, User Rank: Blogger
8/23/2013 | 11:22:29 AM

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Re: They've avoided the creep-factor, too
Great point. What are the metrics that can define trust between two parties not known to each other. Its basically the eHarmoney or match.com problem, but you dont get to chat so much with the guests before they arrive and you dont get to ask 72 questions in a frofile form. Trust by profile is a challenge as the whole cross section of society is capable of being a bad actor. And unlike dating sites these guests are coming into your home or property. Refusal of entry would be an interesting legal issue, seems Airbnb has managed to avoid any really bad issues as of this point, luck or big data?

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technetronic, User Rank: Blogger
8/22/2013 | 7:23:58 PM

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Re: They've avoided the creep-factor, too
it looks like an emerging model of hosts becoming more like partners with airbnb, since they're the crucial key to making airbnb work. makes sense that airbnb would want to help their hosts, but I wonder what insights hosts are currently *not* getting that they would prefer to see.

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dcawrey, User Rank: Exabyte Executive
8/22/2013 | 6:21:47 PM

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Re: They've avoided the creep-factor, too
Interesting background on Airbnb. It's nice to read about some of these companies starting out on a lark, often via circumstance.

I've often wondered how Airbnb does its pricing, I guess I assumed that it was the lodging provider that has a lot of influence on price. But it's probably based more upon demand than I thought, which is why Airbnb is providing the back-end that helps people sell their space!

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