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Amazon Go: Disrupting retail?

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Abstract

In January of 2018, AMAZON.COM Inc. (Amazon) opened its first self-service Amazon Go convenience store in Seattle, Washington. Armed only with a smartphone app tied to a credit card, a customer could enter the store, select merchandise from the aisles and refrigeration cases, and just walk out—no lines, no waiting, no cashier. A can of coke, chocolate bar, or chicken sandwich placed in a shopper's bag, is identified, accounted for, and charged to a payment card, all facilitated by computer vision, deep learning, and sensor-based information technologies (IT). Based on extensive public sources, the Amazon Go case provides a rich opportunity to explore an IT-enabled startup that potentially threatens three industries: convenience stores, grocery stores, and fast food outlets. In the future, the technology, either by licensing or expansion by Amazon, arguably could disrupt the broader retail industry and its millions of employees. Students have an opportunity to explore the boundary between IT and business strategy, while seeing the potential economic implications of fixed cost investments in IT. They will see how one company, Amazon, strategically develops, deploys, and extends its growing arsenal of IT weapons. The case also catalyzes discussions of social issues, including the impact of technology on employment and the tradeoffs between personal privacy and customer service.

Keywords

Robots, retail, POS, Amazon

In 1937, grocer Clarence Saunder, founder of the Piggly Wiggly grocery store chain, opened, Keedoozle, a revolutionary new store. Keedoozle automatically dispensed groceries and created a bill. But lurking in the back of the store was a manual, labor-intensive stocking and fulfillment system—one that, unfortunately, was unable to keep up with the growing demand spurred by the novel frontend. Nevertheless, the obituary penned by the retail press of the day instead described Keedoozle as too advanced for the public (Engelking, 2018). While Keedoozle parallels today's self-checkout lines, Amazon.com's (2018a) new retail startup, Amazon Go is a far closer reincarnation of Saunders' vision.

Opened in December 2016 to employees and in January 2018 to the general public, Amazon Go employed computer vision, deep learning, and sensors to automate much of the purchase, checkout, and payment steps associated with a grocery transaction. Customers downloaded the Amazon Go app (available on smartphones supporting Android or iOS operating systems) and then linked it to their Amazon.com account.

In the prototype store, located in Seattle, near Amazon's headquarters, a grocery-retailing consultant recounted his observations of a shopper making a friction-free purchase:

> I timed 12 seconds: the hipster guy walking in, immediately going to the ready – made lunch meal shelf, taking a few seconds to determine his choice, then to the beverages shelf next to it – and then walking out. Just like that. His only human interaction was saying "hello" to the Amazon greeter when entering, and "have a great day" when leaving. (Jacobs, 2018b)

Cameras on the ceiling and shelves watched the customer select and place items in his shopping bag, or, if he changed his mind, return it to a shelf. Every item placed in the bag was mirrored in his virtual shopping cart. As he exited the store, the credit card associated with the Amazon.com account was charged for the purchase. No checkout lines, no cashiers (Wingfield, 2018). If "hipster guy" later was dissatisfied with his purchase, he could virtually return the item via the app for a full refund—no return to the store required (Machkovech, 2018).

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Amazon Go was the creative coalescence of several technologies that Amazon referred to as "Just Walk Out" (Roemmele, 2017). These included:

- 1-click-like Web shopping in retail
- A powerful app using location-based services
- QR Code IDs
- Integrated payment
- Image recognition
- Multiple sensor technology
- Artificial intelligence
- Machine learning.

By February 2018, Amazon already had established several beachheads in its invasion of grocery retailing. Amazon had years earlier included grocery items on its website and, by 2018, the search query "food and grocery" identified over 100,000 items. In 2016, *Fortune* magazine reported that Amazon *Wants to Open 2,000 grocery stores across the US* (Addady, 2016); in that same year, the *Wall Street Journal* trumpeted: *Amazon to Expand Grocery Business With New Convenience Stores* (Bensinger and Stevens, 2016). In March of 2017, Amazon announced Amazon Fresh Pickup, which by February of 2018 was providing grocery home delivery service in many major American and international cities. In July of 2017, the AmazonFresh service had been extended to include meal kits, thus threatening startups Blue Apron and Plated (Gartenberg, 2017). In August of 2017, Amazon acquired Whole Foods and its 400+ stores for US$13.7 billion. Among Whole Foods' assets was an ongoing 5-year partnership and a small ownership position in Instacart, a grocery home delivery service; subsequent to the Whole Foods' acquisition, Instacart found itself competing directly with AmazonFresh Pickup in Whole Foods stores (Zaleski and Huet, 2018).

An Amazon Go store

Amazon Go's first store reportedly had about 2400 sq ft (223 m^2), including 1800 square foot (167 m^2) in the sales area and a small dining area (Brick Meets Click, 2018). As of February 2018, their phone app listed 1540 unique stock keeping units (SKUs),[1] described in their marketing literature as:

> Delicious ready-to-eat breakfast, lunch, dinner, and snack options made by our chefs and favorite local kitchens and bakeries. Our selection of grocery essentials ranges from staples like bread and milk to artisan cheeses and locally made chocolates. For a quick home-cooked dinner, pick up one of our chef-designed Amazon Meal Kits, with all the ingredients you need to make a meal for two in about 30 minutes.

Nearly all items in the store were food or beverage; among the latter were 63 SKUs of beer and 132 of wine. There were, however, 25 commonly requested health and home items, including pain medications, dog treats, paper towels, and laundry detergents. Absent were common convenience store staples such as disposable diapers, tobacco products, lottery tickets, and ice. Exhibit 1 shows prices for 20 Amazon Go items and comparative prices at the Amazon.com Website,[2] at Walmart's online store, at two regional grocery chains in Houston, Texas, at two national grocery chains in Seattle, Washington, and at a regional grocery chain in Los Angeles, California.

In addition to Amazon Basic AA and AAA batteries, other Amazon-related products included Amazon Go branded coffee mugs, thermos bottles, a dark chocolate bar, and several Whole Foods 365 Everyday Value® branded items. National brands, such as Coke, Nabisco, Pepperidge Farm, Haagen-Dazs, and Chobani, were well represented. In the category of "chocolate," for instance, customers found national brands Ghirardelli, Hershey's, and Reese's as well as two local chocolatiers: Seattle Chocolates and Theo.

The grocery industry

A typical grocery store measured between 40 and 50,000 sq ft (between 3716 and 4645 m^2) and carried 30,000 to 50,000 SKUs. By comparison, SKU counts for wholesalers such as Costco were in the range of 5000–7000. Smaller footprint specialty retailers like Whole Foods carried about 25,000 and Trader Joe's between 3000 and 3500 SKUs (Steenkamp, 2017). Online retailers could provide access to many more products than brick and mortar outlets and were increasingly moving into grocery lines. Walmart, for instance, listed about 67 million different SKUs on its e-commerce site (Garcia, 2017), while Amazon's own warehouses carried over 562 million different products (ScrapeHero 2018).

At the other end of the size scale were discount stores like Aldi with about 10,000 stores in 18 countries of which 1600 were in the United States, and Lidl, also with about 10,000 stores worldwide with plans to open 100 stores a year in the United States (Springer, 2017). Both stores maintained SKU counts of about 1500 (Worstall, 2017). Other small-scale retailers were convenience stores, which typically offered between 500 (NACS, 2018b) and 2000 SKUs in an average sales area of 2768 sq ft (257 m^2).[3] Lidl and Aldi, like Trader Joe's, Aldi's sister store, mostly carried store brands purchased directly from manufacturers. Direct purchasing combined with minimized assortments reduced cost-of-goods sold and inventory carrying costs while permitting operations in smaller, but often seemingly less confined, properties. The two German-owned firms were rapidly catching on with American consumers, with 10-year market share gains from 1.8% to 3.8% for Lidl and 1.4% to 5.4% for Aldi (Springer, 2017).

The convenience store industry

In 2018, there were almost 155,000 convenience stores in the United States, representing 34% of all brick and mortar

	Amazon Go	amazon.com	Walmart online	Houston Regional 1	Houston Regional 2	Seattle National 1	Seattle National 2	LA Regional
Gray Poupon Mustard Country Dijon 8 oz	3.29	5.85	2.98	3.28	3.79	4.59	4.59	4.19
Carr's Table Water Crackers 4.25 oz	3.99	3.48	3.48	3.28	3.49	5.79	5.79	3.99
Lotus Biscoff Cookies 8.8 oz	3.19	3.99	3.28	na	3.49	3.49	3.49	na
Barilla Tri-color pasta 12 oz	1.59	7.58	1.48	1.46	2.09	2.29	2.29	1.5
Arm & Hammer Pure Baking Soda	0.87	4.91	1.48	0.5	1.19	1.09	1.09	0.99
Ghiradelli Brownie Mix Dble Choc 18 oz	2.34	1.79	1.88	2.14	2.89	4.29	4.29	3.79
Cheez-it Baked Snack Crackers 6 oz	2.99	8.98	1.98	1.98	2.29	Na	2.29	na
Advil Ibuprofen 200 mg, 100 ct	8.49	6.93	7.97	9.09	13.79	10.19	10.19	12.49
Milk-Bone Dog Biscuits Medium Size 24 oz	2.69	6.59	2.58	2.57	5.59	4.58	4.59	2.99
Nivea Smooth Daily Moisture Body Ltn Shea Butter,16.9 fl oz	6.99	5.48	5.48	5.84	7.39	8.09	8.09	7.99
Tillamook Medium Cheddar 8 oz	3.69	5.75	na	3.98	4.99	4.99	4.99	4.29
Honey Nut Cheerios, 17 oz	3.74	10.98	3.64	4.53	5.79	5.79	5.79	4.69
Best Foods Real Mayonnaise, 15 oz	3.64	na	2.98	3.4	3.79	4.59	4.59	3.79
Kikkoman Less Sodium Soy Sause, 10 oz	2.49	8.14	2.72	3.28	3.49	3.89	3.89	4.99
Log Cabin Original Syrup, 24 oz	4.49	6.8	2.98	3.4	4.09	4.59	4.59	4.99
Chex Mix Traditional Snack Mix, 8.75 oz	3.49	10.48	2.73	2.26	3.49	3.49	3.49	3.59
Bonne Maman Strawberry Preserves, 13 oz	4.49	4.95	3.98	4.01	5.79	4.59	4.59	5.19
Jiff Creamy Peanut Butter, 16 oz	2.69	3.89	2.5	2.58	3.29	3.69	3.69	3.29
Nutella Hazelnut Spread, 13 oz	3.69	10.18	3.48	3.41	4.99	4.59	4.59	3.99
illy Ground Expresso Coffee, 8.8 oz	14.99	12.72	90.99	15.89	13.79	10.29	na	15.99

Exhibit 1. Price comparisons for 20 Amazon Go items (28 March 2018).

retail operation (NACS, 2018c) with total revenues of US$550 billion and in-store sales of US$233 billion (NACS, 2017).[4] The top 10 convenience stores, by number of stores, accounted for 26.3% of the US total, while the top 100 accounted for 64.9%, an increase of over 5 years from 23.7% and 58.9% respectively (Kress, 2017). The average convenience store saw 1100 customers per day and, together, served 160 million customers per day (Statista 2017a). Convenience stores also sold 80% of the gasoline within the United States, with an average customer filling up his gas tank four to five times a month. Despite the common sight of major oil company signs adorning convenience store properties, 59% of convenience stores selling fuel were single-store operators (NACS, 2016).

7-Eleven, Inc. was the world's largest convenience store chain operating, franchising, and licensing more than 64,319 stores in 18 countries, nearly 10,500 of which are in North America. The company had more outlets than any other retailer or food service provider. Among their grocery offerings were many store brands. Three 7-Eleven stores were located within a 15-minute walk of Seattle's new Amazon Go store.

The revenue mix in convenience stores shifted over time, at least partially due to changes in fuel price, as the National Association of Convenience Stores reported for 2016:

> The convenience store industry is a destination for food and refreshments. With falling revenues from fuels and tobacco products, foodservice sales are increasingly becoming convenience stores' most profitable category. In fact, convenience store foodservice contributed 21.7% of in-store sales in 2016, with prepared food and cold dispensed beverages driving the category's growth.

In 2016, Statista reported convenience stores sold US$35.7 billion in food service, including US$24 billion in "prepared food prepared in-site or off-site." Other grocery-related products, not counting tobacco, totaled over US$100 billion (Statista 2017b).

Location and speedy service were key success criteria in the convenience store industry. Self-service pumps helped to ensure speed for fuel sales, but inside the store, cashiers and line waiting took up nearly half of a buyer's time (NACS, 2018a). Line waiting was a ubiquitous problem throughout retail, with Americans spending 37 billion hours a day waiting in line and reporting it as their top shopping frustration (Bensinger and Stevens, 2016).

Some convenience stores focused on food to eat immediately (e.g. sandwiches, salads), while others targeted customers in search of items to take home (e.g. milk, eggs, diapers). One observer remarked that Amazon Go served both market segments:

> The assortment supports two eating occasions—grab-and-go and heat-and-eat. What makes this work especially well is that both options are available during the entire day, and it's so easy to get in and out that shoppers give no thought to visiting a couple of times a day. (Brick Meets Click, 2018)

The fast food industry

Grab-and-go eating occasions were dominated more by fast food establishments than convenience stores. In 2016, there were close to 187,000 fast food stores in the United States, serving 50 million customers daily and providing jobs for over 4 million employees. The total US fast food restaurant revenues were close to US$200 billion (Statista, 2018).

In 2017, Subway, with nearly 25,835 franchised stores, was the fast food retailer with the most US stores, a decline from 26,744 in 2016 (QSR, 2017). Subway reported US revenues of US$11.3 billion in 2016, the third year of declining sales from US$12.3 billion in 2013. McDonald's had fewer stores, 14,146, but its 2016 US system-wide revenues of US$36.4 billion were far higher than Subway (Peterson and Taylor, 2017). But, like Subway, McDonald's had also closed more stores than it had opened in the recent years, showing declines from 14,248 in 2015 and 14,339 in 2014.

Fast food got its start with a very minimal menu, but changing tastes and customers' increasing demands for more nutritional foods, as well as the chains' interest in expanding their reach to more upscale customers was resulting in larger menus and greater complexity in ordering and order preparation. McDonald's, for instance, reported adding over 100 SKUs in the decade up to 2014 (Little, 2014).

Fast food options within a short walk of Seattle's Amazon Go store included Subway, McDonalds, Jimmy Johns, Yumbit, Potbelly, and at least five other fast food retailers. Seven Starbucks outlets were also within a 10-minute walk.

Food and grocery shopping customers

According to the Food Marketing Institute (2017), customers are increasingly purchasing groceries online. Nearly half of all millennials shop at online-only retailers—a nearly 80% growth between 2015 and 2017. Meanwhile, sales in traditional supermarkets fell, although the frequency of customers saying they often shopped at convenience stores grew from 8% to 11% during that same time period.

Research predicted that 62% of millennials would shop at a store like Amazon Go and *56% of Target customers, 54% of Kroger's and 44% of Costco's customers would consider trying* ***Amazon Go*** *or a similar service* (Dawson, 2018). The market researchers further revealed that:

> Current usage of six e-commerce options (home delivery, in-store pickup, drive-through pickup, curbside pickup, virtual supermarket and automatic subscription) is greatest among the youngest respondents, and they are also the most willing to use all of the e-commerce options in the future. For example, 30% of Millennials (ages 21-34) and 28% of Generation Z (ages 15-20) respondents say they're ordering groceries online for home delivery, compared with 22% of Generation X (ages 35-49), 17% of Baby Boomers (ages 50-64) and 9% of Silent Generation (ages 65+) respondents. Younger respondents are also the most willing to use all of the e-commerce options in the future. (The Nielsen Company, 2015)

Disruption

One retailing expert described Amazon Go as a potentially huge disruption:

> This is similar to how Uber disrupted the taxi industry by removing the friction and creating a better experience. It didn't kill off all taxi companies, but it captured a big portion of the market. (Sterling, 2018)

Some feared that "Just Walk Out" technology could also be an upsetting change for the approximately 3.5 million cashiers in the United States. However, as some Amazon Go observers have noted:

> A typical convenience store might employ as few as one employee per shift, yet **Amazon Go** employees check IDs for alcohol purchases, greet customers, answer questions, and stock items as soon as they deplete. (Karsten and West, 2018)

Indeed, at Amazon Go, workers can be seen making salads and other ready-to-eat items, checking IDs in the wine section, and stocking shelves.

Still, Louise Herring, a partner at McKinsey specializing in retail, thinks that Amazon Go, rather than looking for ways to speed up the checkout process, is looking at:

> How do you remove the checkout entirely, which has massive benefits, both on the labor task—30 percent of the labor task in store—and also it's one of the top pain points in the shopping experience of the customers. It's the right question to be asked and the right approach. Which is the right technology? Only time will tell. But it's the place to be focusing. (Herring et al., 2017)

Amazon Go was not the only retailer trying to short circuit checkout. Both Walmart and Kroger were rolling out Scan and Go technologies in hundreds of stores (Thomas, 2018), while Apple had for several years allowed customers to use a smartphone app to scan a barcode before walking out of the store. But, the fully automated "scan" technology employed by Amazon Go involved far less friction.

Amazon Go might also be described as disruptive, or maybe as self-limiting, in its payment options. A cashless

transaction is not an option for consumers without credit cards. Although the use of cash in retail was declining, the COO of Paysafe, an online and mobile payments firm, cautioned that:

> Only 5 percent of consumers who purchase their groceries in store prefer to pay for them using contactless payments, and 32 percent still prefer to pay with cash. (Sterling, 2018)

Moreover, the Seattle Amazon Go store does not accept food stamps.

The scanning systems employed at Amazon Go might also prove a further disruption to personal privacy, as every customer in the store was identified, their every movement tracked, and every purchase recorded.

AiFi

Days after Amazon Go opened its Seattle store, a startup, AiFi, announced that it would soon provide a technology similar to Amazon Go's Just Walk Out technology. AiFi claimed it *can support tracking up to 500 people, and tens of thousands of SKU item numbers*, all housed in tens of thousands of square feet (Perez, 2018). Unlike Amazon Go, the AiFi system was to be made available as a subscription service to mom-and-pop stores and big chains alike. The AiFi system was described as being able to:

> track shoppers' behavior in the store, including if they're shopping in groups, what items they're picking up and putting back, their gait, their body poses, where they go in the store, and identify if they're doing something abnormal, like shoplifting. (Perez, 2018)

In addition to facilitating the shopping transaction, AiFi claimed to provide *more insights and real-time statistics for stores so they can better serve customers and manage operations* (Financial Express, 2018). Steven Gu, the CEO and co-founder of AiFi, who saw AiFi's offering as eventually providing the brain or operating system for a retail store, described his long-range vision as well as his near-term plans (Lempert, 2018):

> Consumers and businesses alike want to be efficient and with a checkout-free store, consumers have an incredible shopping experience. Because our technology is massively scalable, tens of thousands of stores worldwide can become a "grab and go" type of retailer. Our pilot will roll out in one very large store, orders of magnitude bigger than the Amazon Go store, at the end of the year, with many more large stores to follow.

About Amazon

Amazon is an e-commerce and cloud computing company based in Seattle, Washington, and the largest Internet retailer measured by revenue and market capitalization. Founded in 1994, Amazon started out as a bookstore, later diversifying into music, audiobooks, video, and eventually, into physical products. In 2015, it surpassed Walmart as the most valuable retailer in the United States (Kantor and Streitfeld, 2015). As of 1 March 2018, it was the third largest firm, by market capitalization, in the United States and Jeff Bezos, its founder, was estimated to be the richest man in the world (Jacobs, 2018a). Its 2018 annual report describes Amazon's operating vision:

> We seek to be Earth's most customer-centric company. We are guided by four principles: customer obsession rather than competitor focus, passion for invention, commitment to operational excellence, and long-term thinking. (Amazon.com, 2018b)

Amazon's revenues as shown in Exhibit 2 had been rising at a nearly exponential rate. In addition to the operating expenses that had also risen, Amazon had continued to invest in research and development and in 2017 spent more on R&D than any other company (Fox, 2018). Exhibit 3 shows Amazon's Net Profit and Research and Development investments. Exhibit 3 highlights that Amazon's R&D expenses had begun growing faster than net profits. Many of the R&D developments had been patented making Amazon one of the top 20 patent holders in the United States at 1983 (Coresight Research, 2018). By 2018, of the 84 companies that Amazon has acquired, the majority were technology related. R&D investments and the acquisition of patents and other innovations created the perception that Amazon was less focused on short-term returns. According to CEO Bezos:

> Percentage margins are not one of the things we are seeking to optimize. It's the absolute dollar free cash flow per share that you want to maximize, and if you can do that by lowering margins, we would do that. So if you could take the free cash flow, that's something that investors can spend. Investors can't spend percentage margins.

> If everything you do needs to work on a three-year time horizon, then you're competing against a lot of people. But if you're willing to invest on a seven-year time horizon, you're now competing against a fraction of those people, because very few companies are willing to do that. (Ghosh, 2017)

This philosophy about investments into infrastructure and revenue streams can be seen throughout Amazon's organization, including the technologies seen in Amazon Go.

Amazon had a number of separate subsidiaries: Amazon Maritime, Audible.com, Beijing Century Joyo Courier, Brilliance Audio, ComiXology, Goodreads, Shelfari, Twitch, and Whole Foods Market. Amazon products included AmazonFresh (grocery delivery), Amazon Prime, Amazon Flex, AWS, Alexa, Appstore, Amazon Drive,

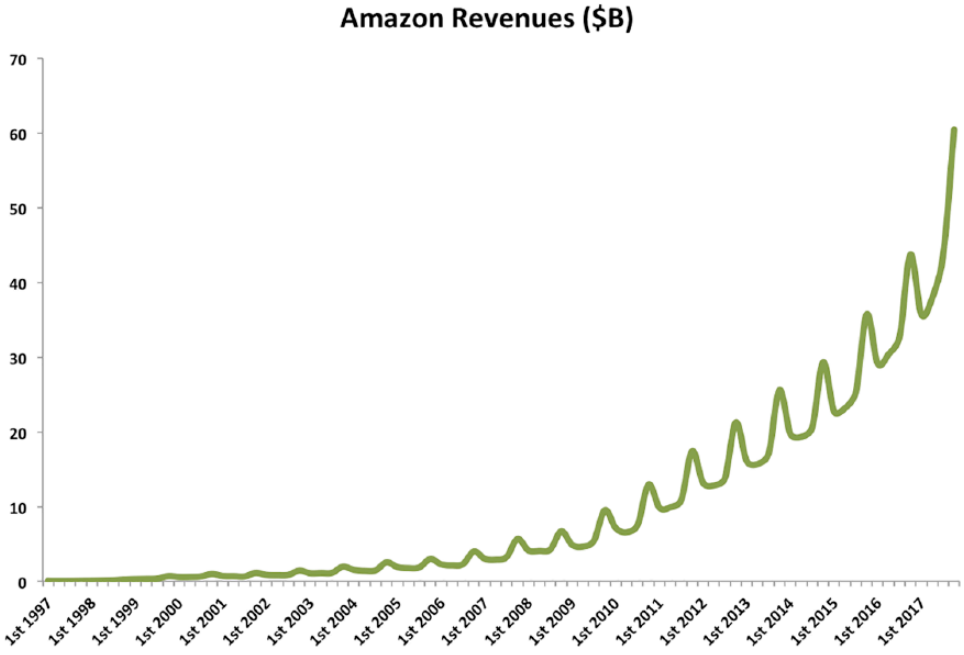

Exhibit 2. Amazon quarterly revenues (1997–2017) (YCharts, 2018c).[5]

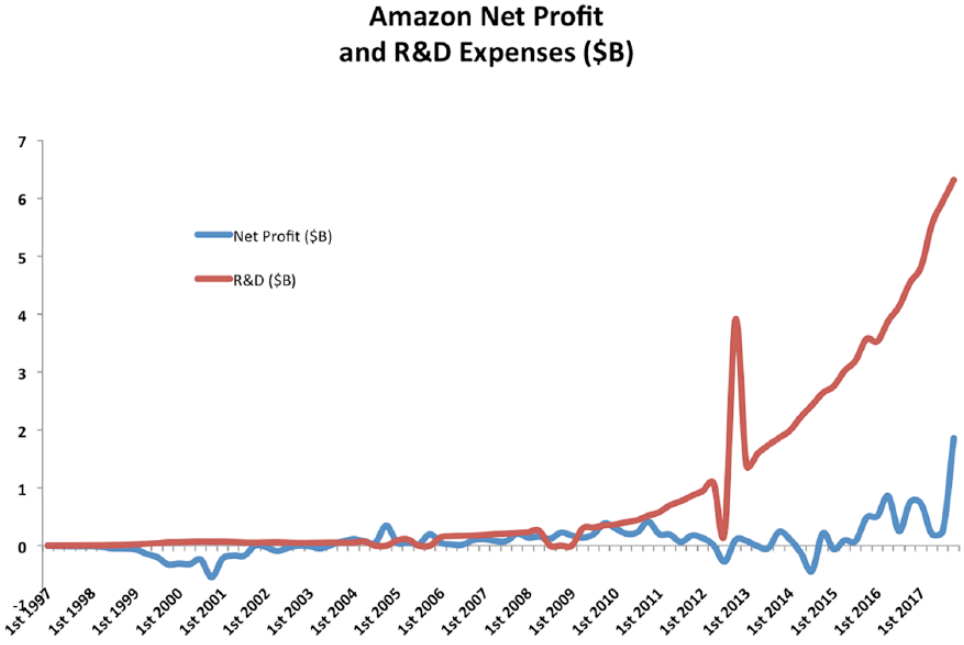

Exhibit 3. Amazon quarterly net profit and R&D expenses (YCharts, 2018b).

Echo, Kindle, Fire Tablets and TV, Amazon Studios, and Amazon Music. In late January of 2018, they announced a partnership with Berkshire Hathaway and J.P. Morgan to develop a healthcare management system, initially to serve the employees of the three partners.

Amazon's entry into a new market invariably put considerable pressure on existing market players. Walmart, Target, Kroger Costco, and Ahold saw their single-day share prices decline precipitously after Amazon's various food and grocery-related announcements. Similar punishing market reactions were foreshadowed by Amazon's announcements impacting incumbents in the healthcare, prescription drug, package delivery and logistics, meal kit delivery, and auto parts industry (Ovide et al., 2017).

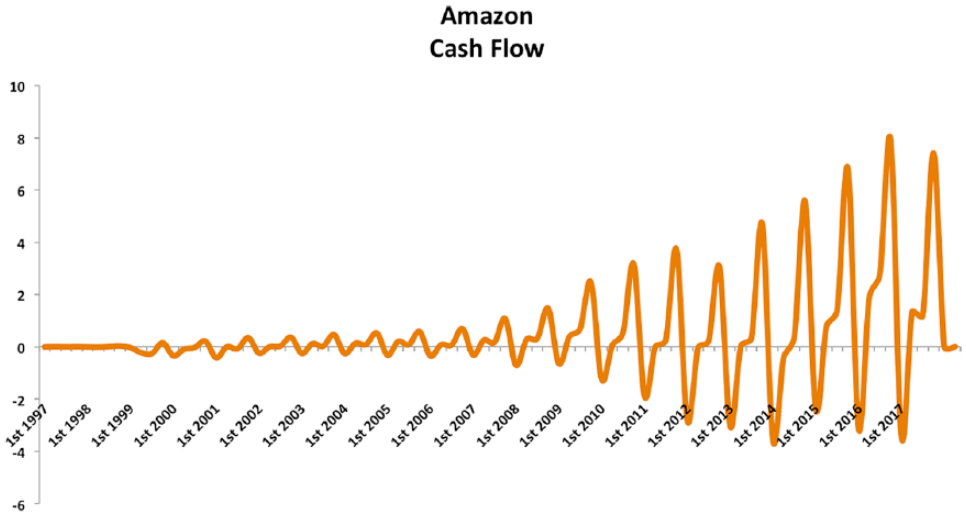

Exhibit 4. Amazon free cash flow (YCharts, 2018a).

Amazon technology

Amazon harnessed a wide variety of technologies to drive their various businesses. In 2012, Amazon acquired Kiva Systems, a company that manufactured mobile robotic fulfillment systems. The automated storage and retrieval systems are in use throughout Amazon's warehouses.

Amazon Web Services (AWS) provide on-demand cloud computing platforms and storage to individuals, organizations, and governments. A sampling of the services that are provided by AWS included computation, networking, content delivery, contact center, storage, database, mobile services, deployment, management, application services, and analytics (Amazon Web Services, Inc, 2018). Machine Learning is a recent addition to AWS, providing AI camera and machine learning tools for businesses (Vincent, 2017). AWS is an outgrowth of Amazon's e-commerce platform and has become a service that is widely sold.

The future of Amazon Go

As of February of 2018, reports mention that additional Amazon Go stores would soon open in Seattle and Los Angeles (Del Rey, 2018). In that same month, Amazon Go advertised for more than 40 employment positions (Levy, 2018), among them, *an innovative **Amazon Go** Store Designer to join the **Amazon Go** ACE (Architecture, Construction & Engineering) team* (Amazon, 2018).

Perhaps the greatest uncertainty surrounding Amazon Go was how, or if, the underlying technology would migrate to other retailers. In March of 2018, Amazon Executives reiterated that there are no plans to migrate the scanning technology to Whole Foods (Newsday 2018). But one retail analyst, after visiting the Seattle store, predicts that Amazon might license the Go scanning technology to other retailers:

> Our experience was flawless, leaving us increasingly confident that Amazon is best positioned to own the operating system of automated retail. Eventually, we expect Amazon to make this technology available to other retailers, as they have with Fulfillment by Amazon (FBA) and Amazon Web Services (AWS), expanding their dominance into brick and mortar. (Murphy, 2018)

Amazon has a history of making decisions to share technology strategically. For instance, prior to the acquisition by Amazon, the Kiva warehouse robots were sold on the open market, but after the acquisition they were no longer available; presumably they had been deemed by Amazon to provide a distinctive, and therefore potentially sustainable, competitive advantage. Amazon's significant investments in the hardware and software underpinning Amazon Go might also provide such a sustainable advantage. Alternatively, greater advantage might instead lie in strategically marketing the technology to retail partners, and to do so quickly. If AiFi's emerging competing technology lives up to its promise, or other startups in this space gain traction, Amazon's advantage might be fleeting.

Case discussion questions

1. Who do you envision as target customers for Amazon Go? Why/when will they go there?
2. Why position the first store in downtown Seattle?
3. Who do you see as Amazon Go's biggest potential competitors? Who does A-Go threaten? Pick a competitor. How should it respond?

4. What competitive strengths does Amazon bring to the initiative? What distinctive competencies do they have? What synergies might be exploited with other Amazon businesses?
5. What are the fixed, variable, and marginal costs associated with opening an Amazon Go store? How would they compare with opening a 7-Eleven or a Subway?
6. How is Amazon Go going to make money? Should Amazon license its retailing technology?
7. Think about the grocery store where you shop. What are the employees doing? What are the workers who don't work directly for your grocery store doing? Who do those workers work for? What do the Amazon Go employees do?
8. What data do you think Amazon is collecting while you are shopping at Amazon Go? What other data does Amazon already have about you? How might they use this data?
9. What are the pros and cons of Amazon Go's approach to handling customers who are dissatisfied with a purchase?
10. If you were advising the AiFi startup, what advice might you give them?
11. How do you think Amazon's use of free cash flow factors into their investment into initiatives like Amazon Go?

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Notes

1. A stock keeping unit, or SKU, is a series of letters and/or numbers that uniquely identifies a product in inventory (e.g. a 17 oz. box of Honey Nut Cheerios).
2. Products listed on the Amazon. Com website were not always provided directly by Amazon, and prices for particular items shown there were sometimes (e.g. Nutella Hazelnut Spread), way out of line with grocery store prices or only available at similar unit prices if purchased in large quantities. In other cases, the particular size packaging carried by Amazon Go may not have been available from other sellers (e.g. Tillamook Medium Cheddar 8 oz) and is shown as "na."
3. Newer convenience stores often included additional square footage for non-sales area as retailers were "recognizing the importance of creating destinations within the store that require additional space—whether coffee islands, food service areas with seating or financial services kiosks." Source: https://en.wikipedia.org/wiki/Convenience_store
4. The remaining revenue was largely generated from the sale of fuel, which 79% of convenience stores sold and which made up 80% of US fuel sales.
5. Raw data for Exhibits 2–4 can be found in the Appendix.

References

Addady M (2016) Amazon wants to open 2,000 grocery stores across the U.S. Available at: http://fortune.com/2016/10/27/amazon-2000-grocery-stores/ (accessed 19 February 2018).

Amazon (2018) Store designer [Job Posting]. Available at: https://www.amazon.jobs/en/jobs/621890/store-designer (accessed 23 March 2018).

Amazon.com (2018a) Amazon Go. Available at: https://www.amazon.com/b?node=16008589011 (accessed 10 January 2018).

Amazon.com (2018b) Form 10-K for the fiscal year ended December 31, 2017. Available at: http://services.corporate-ir.net/SEC.Enhanced/SecCapsule.aspx?c=97664&fid=15414896 (accessed 20 March 2018)

Amazon Web Services, Inc (2018) Amazon Web Services. Available at: https://aws.amazon.com/ (accessed 5 March 2018).

Bensinger G and Stevens L (2016) Amazon to expand grocery business with new convenience stores. Available at: https://www.wsj.com/articles/amazon-to-expand-grocery-business-with-new-convenience-stores-1476189657 (accessed 19 February 2018).

Brick Meets Click (2018) Reverse-engineering Amazon Go: What you should know. Available at: http://www.brickmeetsclick.com/reverse-engineering-amazon-go–what-you-should-know (accessed 12 March 2018).

Coresight Research (2018) Amazon's patents: Measuring the tech giant's intellectual property. Available at: https://www.fungglobalretailtech.com/research/amazons-patents-measuring-tech-giants-intellectual-property/ (accessed 5 April 2018).

Dawson G (2018) What to expect from Amazon Go. Available at: http://www.supermarketnews.com/news/what-expect-amazon-go (accessed 15 March 2018).

Del Rey J (2018) Amazon plans to open as many as six more cashierless Amazon Go stores this year. Available at: https://www.recode.net/2018/2/22/17019274/amazon-go-6-new-stores-seattle-los-angeles-the-grove-rick-caruso-cashierless (accessed 28 March 2018).

Engelking C (2018) Long before Amazon Go, there was Keedoozle. Available at: http://blogs.discovermagazine.com/crux/2018/01/23/amazon-go-keedoozle/ (accessed 3 February 2018).

Financial Express (2018) This start-up is providing a checkout-free solution for shops. Available at: http://www.financialexpress.com/industry/this-start-up-is-providing-a-checkout-free-solution-for-shops/1087288/ (accessed 20 March 2018).

Food Marketing Institute (2017) US grocer shopper trends. Available at: https://www.fmi.org/docs/default-source/webinars/trends-2017-webinar-7–18–2017.pdf (accessed 30 January 2018).

Fox J (2018) Amazon's great R&D gift to the nation. Bloomberg View. Available at: https://www.bloomberg.com/view/articles/2018-04-05/amazon-s-technology-and-content-spending-a-huge-gift-to-economy (accessed 6 April 2018).

Garcia T (2017) Wal-Mart and Amazon go head-to-head as e-commerce competition heats up. Available at: https://www.marketwatch.com/story/wal-mart-and-amazon-are-going-head-to-head-as-e-commerce-competition-heats-up-2017-08-17 (accessed 15 March 2018).

Gartenberg C (2017) Amazon's prepackaged Meal Kits are reportedly already on sale. Available at: https://www.theverge.com/2017/7/18/15988408/amazon-prepackaged-meal-kits-on-sale-fresh-prime-blue-apron (accessed 2 March 2018).

Ghosh S (2017) The importance of building companies with a long-term focus on free cash flow. Available at: https://medium.com/hype-cycle/the-importance-of-building-companies-with-a-long-term-focus-on-free-cash-flow-2ea4d8588894 (accessed 13 March 2018).

Herring L, Moulton J, Toriello M, et al. (2017) The future of grocery–in store and online. Available at: https://www.mckinsey.com/industries/retail/our-insights/the-future-of-grocery-in-store-and-online (accessed 6 March 2018).

Jacobs H (2018a) These are the 50 richest people in the world right now. Available at: http://www.businessinsider.com/richest-people-world-billionaires-list-2017-11 (accessed 20 March 2018).

Jacobs K (2018b) Experiencing Amazon Go. Available at: https://www.capgemini.com/2018/02/experiencing-amazon-go/ (accessed 27 March 2018).

Kantor J and Streitfeld D (2015) Inside Amazon: Wrestling big ideas in a bruising workplace. Available at: https://www.nytimes.com/2015/08/16/technology/inside-amazon-wrestling-big-ideas-in-a-bruising-workplace.html (accessed 6 February 2018).

Karsten J and West DM (2018) Amazon Go store offers quicker checkout for greater data collection. Available at: https://www.brookings.edu/blog/techtank/2018/02/13/amazon-go-store-offers-quicker-checkout-for-greater-data-collection/ (accessed 28 March 2018).

Kress M (2017) Top 10 chains tower above in 2017 CSNews Top 100. Available at: https://csnews.com/top-10-chains-tower-above-2017-csnews-top-100 (accessed 19 February 2018).

Lempert P (2018) Amazon Go epands and other retailers want in: AiFi is one such company. Available at: http://www.supermarketguru.com/the-lempert-report/amazon-go-expands-and-other-retailers-want-in.html (accessed 1 May 2018).

Levy N (2018) As Amazon Go makes its public debut, job postings point to future expansion. Available at: https://www.geekwire.com/2018/amazon-go-makes-public-debut-job-postings-point-future-expansion/ (accessed 16 March 2018).

Little K (2014) Just how bloated is McDonald's menu?. Available at: https://www.cnbc.com/2014/12/15/just-how-bloated-is-mcdonalds-menu.html (accessed 23 February 2018).

Machkovech S (2018) Amazon Go debuts, and its prying cameras foil our shoplifting attempts. Available at: https://arstechnica.com/information-technology/2018/01/we-test-the-worlds-first-amazon-go-watch-you-shop-grocery-store/ (accessed 2 March 2018).

Murphy A (2018) Amazon Go extends Amazon's dominance to Brick and Mortar. Available at: http://loupventures.com/amazon-go-extends-amazons-dominance-to-brick-and-mortar/ (accessed 28 March 2018).

NACS (2016) NACS 2016 retail fuels report. National Association of Convenience Stores. Available at: https://www.convenience.org/Topics/Fuels/Documents/2016/2016-Retail-Fuels-Report (accessed 15 February 2018).

NACS (2017) Fact sheets. National Association of Convenience Stores. Available at: http://www.convenience.org/Research/FactSheets/Pages/default.aspx (accessed 24 February 2018).

NACS (2018a). Convenience stores offer more convenience. *National Association of Convenience Stores*. Available at: http://www.convenience.org/Research/FactSheets/ScopeofIndustry/Pages/Convenience.aspx (accessed 12 March 2018).

NACS (2018b) U.S. convenience store count. *National Association of Convenience Stores*. Available at: http://www.convenience.org/research/factsheets/scopeofindustry/pages/industrystorecount.aspx (accessed 24 February 2018).

NACS (2018c) U.S. convenience stores continue growth. *National Association of Convenience Stores*. Available at: http://www.convenience.org/Media/Daily/Documents/2018/ND0125181_StoreCount.pdf (accessed 5 March 2018).

Newsday (2018) Amazon Go execs share insights into shopper behavior. Available at: https://www.newsday.com/business/technology/amazon-go-store-shopper-behavior-1.17501120 (accessed 2 April 2018).

Ovide S, He E and Felsted A (2017) Here's a $69 billion question is Amazon coming for you. Available at: https://www.bloombergquint.com/gadfly/2017/06/26/here-s-a-69-billion-question-is-amazon-coming-for-you (accessed 2 March 2018).

Perez S (2018) AiFi emerges from stealth with its own take on cashier-free retail, Similar to Amazon Go. Available at: https://techcrunch.com/2018/02/27/aifi-emerges-from-stealth-with-its-own-take-on-cashier-free-retail-similar-to-amazon-go/ (accessed 27 March 2018).

Peterson H and Taylor K (2017) The most successful fast-food chains in America. Available at: http://www.businessinsider.com/most-successful-fast-food-chains-in-america-2017-8#1-mcdonalds-20 (accessed 16 March 2018).

QSR (2017). Report: Subway closed over 900 restaurants in 2017. Available at: https://www.qsrmagazine.com/news/report-subway-closed-over-900-restaurants-2017 (accessed 25 January 2018).

Roemmele B (2017) Brian Roemmele's answer to will no-checkout stores like Amazon Go be commonplace by 2025?. Available at: https://www.forbes.com/sites/quora/2017/02/10/will-no-checkout-stores-like-amazon-go-be-commonplace-by-2025/ (accessed 27 March 2018).

ScrapeHero (2018) How many products does Amazon sell?. Available at: https://www.scrapehero.com/many-products-amazon-sell-january-2018/ (accessed 12 March 2018).

Springer J (2017) Aldi, Lidl growth to spark industry change. Available at: http://www.supermarketnews.com/retail-financial/aldi-lidl-growth-spark-industry-change (accessed 15 March 2018).

Statista (2017a) Convenience stores in the U.S.—statistics & facts. Available at: https://www.statista.com/topics/3869/convenience-stores-in-the-us/ (accessed 12 March 2018).

Statista (2017b) In-store foodservice sales of convenience stores in the United States in 2016, by category (in million U.S. dollars). Available at: https://www.statista.com/statistics

/308792/in-store-foodservice-sales-of-us-convenience-stores-by-category/ (accessed 12 March 2018).
Statista (2018) Number of establishments in the United States fast food industry from 2014 to 2018. Available at: https://www.statista.com/statistics/196619/total-number-of-fast-food-restaurants-in-the-us-since-2002/ (accessed 13 March 2018).
Steenkamp J (2017) Innovation in hard discounting from America: Trader Joe's. Available at: https://www.linkedin.com/pulse/innovation-hard-discounting-from-america-trader-joes-steenkamp (accessed 20 March 2018).
Sterling G (2018) How should retailers respond to Amazon Go? 7 experts weigh in. Available at: https://marketingland.com/retailers-respond-amazon-go-seven-experts-weigh-234245 (accessed 27 March 2018).
The Nielsen Company (2015) The future of grocery. Available at: https://www.nielsen.com/content/dam/nielsenglobal/vn/docs/Reports/2015/Nielsen%20Global%20E-Commerce%20and%20The%20New%20Retail%20Report%20APRIL%202015%20(Digital).pdf (accessed 25 January 2018).
Thomas L (2018) Between Walmart and Kroger, 500 stores are about to ditch cashiers. Available at: https://www.cnbc.com/2018/01/09/between-walmart-and-kroger-500-stores-are-about-to-ditch-cashiers.html (accessed 6 March 2018).
Vincent J (2017) Amazon unveils $250 AI camera and machine learning tools for businesses. Available at: https://www.theverge.com/2017/11/29/16715688/amazon-ai-camera-developer-enterprise-tools (accessed 15 March 2018).
Wingfield N (2018) Inside Amazon Go, a store of the future. Available at: https://www.nytimes.com/2018/01/21/technology/inside-amazon-go-a-store-of-the-future.html (accessed 2 March 2018).
Worstall T (2017) Aldi to spend $3.4 billion making Americans very much richer—just like Walmart did. Available at: https://www.forbes.com/sites/timworstall/2017/06/12/aldi-to-spend-3-4-billion-making-americans-very-much-richer-just-like-walmart-did/ (accessed 27 March 2018)
YCharts (2018a) Amazon.com free cash flow (Quarterly). Available at: https://ycharts.com/companies/AMZN/free_cash_flow (accessed 5 April 2018).
YCharts (2018b) Amazon.com net income (Quarterly). Available at: https://ycharts.com/companies/AMZN/net_income (accessed 5 April 2018).
YCharts (2018c) Amazon.com revenue (Quarterly). Available at: https://ycharts.com/companies/AMZN/revenues (accessed 5 April 2018).
Zaleski O and Huet E (2018) Amazon squeezes instacart in whole foods delivery push. Available at: https://www.bloomberg.com/news/articles/2018-03-06/amazon-squeezes-instacart-in-whole-foods-delivery-push (accessed 27 March 2018).

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Appendix

Date	Net profit (US$B)	Revenues (US$B)	R&D (US$B)	Cash flow (US$B)	Date	Net profit (US$B)	Revenues (US$B)	R&D (US$B)	Cash flow (US$B)
3rd 1997	–0.0096	0.0379	0.0036	–0.0059	4th 2007	0.2070	5.6720	0.2220	1.0750
4th 1997	–0.0108	0.0661	0.0052	–0.0014	1st 2008	0.1430	4.1350	0.2340	–0.7060
1st 1998	–0.0093	0.0874	0.0073	–0.0095	2nd 2008	0.1580	4.0630	0.2580	0.2780
2nd 1998	–0.0212	0.1160	0.0081	–0.0176	3rd 2008	0.1180	4.2640	0.0000	0.3230
3rd 1998	–0.0452	0.1536	0.0134	0.0050	4th 2008	0.2250	6.7030	0.0000	1.4690
4th 1998	–0.0464	0.2528	0.0169	0.0248	1st 2009	0.1770	4.8890	0.0000	–0.6400
1st 1999	–0.0617	0.2936	0.0235	–0.0363	2nd 2009	0.1420	4.6510	0.2990	0.3900
2nd 1999	–0.1380	0.3144	0.0343	–0.2290	3rd 2009	0.1990	5.4490	0.3150	0.6960
3rd 1999	–0.1971	0.3558	0.0446	–0.2619	4th 2009	0.3840	9.5200	0.3500	2.4740
4th 1999	–0.3232	0.6760	0.0574	0.1492	1st 2010	0.2990	7.1310	0.3660	–1.2380
1st 2000	–0.3084	0.5739	0.0612	–0.3470	2nd 2010	0.2070	6.5660	0.4080	0.0540
2nd 2000	–0.3172	0.5779	0.0671	–0.0992	3rd 2010	0.2310	7.5600	0.4420	0.5400
3rd 2000	–0.2405	0.6379	0.0712	–0.0293	4th 2010	0.4160	12.9500	0.5180	3.1600
4th 2000	–0.5451	0.9724	0.0698	0.2103	1st 2011	0.2010	9.8570	0.5790	–1.8840
1st 2001	–0.2236	0.7004	0.0703	–0.4264	2nd 2011	0.1910	9.9130	0.6980	–0.0100
2nd 2001	–0.1684	0.6676	0.0647	–0.0079	3rd 2011	0.0630	10.8800	0.7690	0.2670
3rd 2001	–0.1699	0.6393	0.0539	–0.0773	4th 2011	0.1770	17.4300	0.8620	3.7190
4th 2001	0.0051	1.1150	0.0523	0.3416	1st 2012	0.1300	13.1800	0.9450	–2.8240
1st 2002	–0.0240	0.8474	0.0555	–0.2459	2nd 2012	0.0070	12.8300	1.0820	–0.0630
2nd 2002	–0.0936	0.8056	0.0582	–0.0028	3rd 2012	–0.2740	13.8100	0.2300	0.2270
3rd 2002	–0.0351	0.8513	0.0529	0.0268	4th 2012	0.0980	21.2700	3.9020	3.0550
4th 2002	0.0027	1.4290	0.0491	0.3571	1st 2013	0.0820	16.0700	1.3830	–3.0420
1st 2003	–0.0101	1.0840	0.0501	–0.2582	2nd 2013	–0.0070	15.7000	1.5860	0.0240
2nd 2003	–0.0433	1.1000	0.0521	0.1189	3rd 2013	–0.0410	17.0900	1.7340	0.3500
3rd 2003	0.0156	1.1340	0.0538	0.0216	4th 2013	0.2400	25.5900	1.8620	4.6990
4th 2003	0.0732	1.9460	0.0518	0.4637	1st 2014	0.1080	19.7400	1.9910	–3.5820
1st 2004	0.1111	1.5300	0.0551	–0.2602	2nd 2014	–0.1260	19.3400	2.2260	–0.4280
2nd 2004	0.0765	1.3870	0.0710	0.1282	3rd 2014	–0.4370	20.5800	2.4230	0.3890
3rd 2004	0.0541	1.4630	0.0000	0.0890	4th 2014	0.2140	29.3300	2.6360	5.5700
4th 2004	0.3467	2.5410	0.0000	0.5200	1st 2015	–0.0570	22.7200	2.7540	–2.3700
1st 2005	0.0520	1.9020	0.0920	–0.3200	2nd 2015	0.0920	23.1800	3.0200	0.7840
2nd 2005	0.0520	1.7530	0.1060	0.1970	3rd 2015	0.0790	25.3600	3.1970	1.4140
3rd 2005	0.0300	1.8580	0.0000	0.0770	4th 2015	0.4820	35.7500	3.5690	6.8240
4th 2005	0.1990	2.9770	0.0000	0.5750	1st 2016	0.5130	29.1300	3.5260	–3.1320
1st 2006	0.0510	2.2790	0.1460	–0.3490	2nd 2016	0.8570	30.4000	3.8800	1.8670
2nd 2006	0.0220	2.1390	0.1670	0.0720	3rd 2016	0.2520	32.7100	4.1350	2.8180
3rd 2006	0.0190	2.3070	0.1720	0.0690	4th 2016	0.7490	43.7400	4.5440	7.9150
4th 2006	0.0970	3.9860	0.1770	0.6940	1st 2017	0.7240	35.7100	4.8130	–3.4510
1st 2007	0.1110	3.0150	0.1860	–0.3130	2nd 2017	0.1970	37.9600	5.5490	1.3280
2nd 2007	0.0780	2.8860	0.2010	0.2510	3rd 2017	0.2560	43.7400	5.9440	1.1910
3rd 2007	0.0800	3.2620	0.2090	0.1680	4th 2017	1.8560	60.4500	6.3140	7.4110