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Walmart Inc. Takes on Amazon.com

At the start of 2018, Walmart faced critical decisions about its future as e-commerce continued to explode. Walmart just lost its long-held crown as the most valuable retailer in the world to online leader Amazon. With Amazon's recent acquisition of Whole Foods for $13 billion, Amazon moved aggressively into the offline world to challenge Walmart in its biggest business, grocery. Walmart was not standing still, making moves like buying Jet.com for $3 billion in 2016. While Walmart's U.S. e-commerce revenues grew to $11.5 billion in 2017, there was no debate in Bentonville, AR: Walmart remained far behind. The question for Walmart CEO Doug McMillon and Walmart.com head Marc Lore was how to respond to its most aggressive competitor ever (**Exhibits 1a** and **1b**).[1]

Amazon

The Early Years (1994–2001)

Jeff Bezos founded Amazon in 1994 to exploit the Internet, still a relatively nascent technology. He determined that selling books online was most promising, because the number of titles available was greater than even the largest brick-and-mortar store could stock. Bezos and his wife drove west to start "Earth's Biggest Bookstore" in Seattle, WA.

Amazon offered 1 million titles for sale on its opening day in July 1995. Next year, the company had over 2.5 million book titles for sale, with revenue doubling every quarter (**Exhibit 2**). Amazon initially held little inventory in its warehouse, relying on a local book wholesaler to source its vast selection. Beyond variety, Amazon offered lower prices—Washington state had no sales tax so when shipping to states with sales tax, prices averaged 6% lower—but Bezos's philosophy was that "there are two kinds of companies, those that work to try to charge more and those that work to charge less. We will be the second."[2] Amazon went public in May 1997 at a valuation of $438 million to fund growth, building out its own national network of fulfillment centers and acquiring movie review site IMDB whose data could help video sales on Amazon.

By 1997, in pursuit of becoming "Earth's most customer-centric company,"[3] Amazon introduced a secure and easy interface for first-time online buyers, customer reviews, and a recommendation

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algorithm leveraging purchase history data. Amazon filed a controversial patent for its one-click checkout process (**Exhibit 3**). In 1999, to broaden the product categories offered, Amazon launched zShops for third-party merchants to set up their own storefronts for a fee. In the same year, Bezos introduced an auction platform and signed partnerships to let e-commerce startups, like Drugstore.com and Pets.com, list under their own name on Amazon.

The Internet Bubble Bursts (2001–2005)

Bezos focused on the long term, noting in Amazon's first annual report in 1997 that, "when forced to choose between optimizing the appearance of our GAAP accounting and maximizing the present value of future cash flows, we'll take the cash flows." However, when the Internet bubble burst in 2000, the market questioned whether Amazon would ever see future cash flows. Amazon shares dropped from $100 to $20 as it lost $1.4 billion that year. Its strategic partners filed for bankruptcy or sold for pennies on the dollar. Bezos diagnosed those failures in his annual letter to shareholders:

> We believed passionately in the ''land rush'' metaphor for the Internet. Indeed, that metaphor was an extraordinarily useful decision aid for several years starting in 1994. In retrospect, we significantly underestimated how difficult it would be for single-category e-commerce companies to achieve the scale necessary to succeed. Online selling is a scale business characterized by high fixed costs and relatively low variable costs. This makes it difficult to be a medium-sized e-commerce company.[4]

Bezos doubled down on building out scale (**Exhibit 4**). He improved logistics by hiring talent from Black & Decker, Delta Air Lines, and Walmart, who analyzed data to identify unprofitable or expensive-to-ship items. Amazon introduced free shipping (3–5 days) for orders over $100.

Building Platforms (2006–2016)

Amazon always thought of itself as a technology company. Bezos said, "we've had three big ideas at Amazon that we've stuck with . . . and they're the reason we are successful: Put the customer first. Invent. And be patient."[5] This mantra came with a belief in risk taking since, "a small number of winners pay for dozens, hundreds of failures."[6]

Amazon itself systematically expanded into additional categories, from books and videos to electronics, CDs, and sporting goods. Amazon Marketplace launched to allow third parties to sell products displayed alongside Amazon's own offerings. These third parties could arrange delivery themselves, or they could ship using Amazon's logistics network for a 15% fee and per-item fulfillment fee of about $5 depending on weight and time spent in the Amazon warehouse; merchants paid for shipping to the Amazon fulfillment center. By 2017, more than half the value of all goods sold—referred to as gross merchandise value (GMV)—came from third-party vendors (**Exhibit 5a** and **5b**). Amazon tended to give preferential listings to vendors that used Amazon's system, but it was believed to list best-selling items of other vendors. Amazon later sold its own private-label products, e.g., Happy Belly pasta, Wickedly Prime snacks, and Mama Bear baby food.

In 2005, Amazon introduced Prime: an annual subscription for free two-day delivery on millions of Amazon items. Six years later, Amazon still lost $10 per Prime customer.[7] By 2016, Prime customers spent an average of $1,200 per year, double the rate of non-Prime customers.[8] By 2017, Prime included music and video streaming, photo storage, and two-hour Prime New delivery for some items: estimates valued this package at more than $700.[9] However, Prime's $99 subscription encouraged separate purchases of single items that were expensive to ship. In 2017, Amazon shipped over 1.2 billion separate packages in the US.[10] Fulfillment costs approached an estimated 18% of an item's retail price.[11]

Amazon offered its first version of e-books in 2000, but it did not gain traction in digital media content until the 2007 launch of the $399 Kindle e-reader, which sold out in under six hours. By 2017, sales of digital books exceeded physical books, and Amazon had an 83% share of all online book sales.[12] The video streaming service took off when it was included in the Prime offering. By 2017, Amazon offered video streaming globally and competed with Netflix, producing content through Amazon Studios and acquiring content with a $6 billion budget.

Amazon entered consumer hardware with mixed results. While Amazon made no profit on Kindle devices, Kindle owners spent four times what non-owners spent on both digital and paper books.[13] In contrast, the Fire smartphone sold only 35,000 units its first 20 days, and demand never took off even when offered for $1 with a service contract.[14] The failure did not reduce the appetite for experimentation. In 2014, Amazon introduced the Echo smart speaker and Alexa voice assistant, signing up hundreds of brand partners by 2017.

Amazon introduced Amazon Web Services (AWS) in 2006 to provide cloud computing services to external customers. The idea originated during an executive retreat at Bezos's house that identified of Amazon's core competency in running cloud infrastructure—e.g., databases, servers, physical data centers—originally build to support its cyclical e-commerce activity.[15] Amazon invested in AWS at a rate approaching an estimated $10 billion per year.[16] By 2017, AWS led with 35% of the global market for cloud infrastructure, by far the largest provider, with customers like Netflix and Unilever.[17] AWS was Amazon's largest source of operating income.

The relentless focus on customers and technology did not just apply to internal innovation. In 2009, Amazon acquired online shoe retailer Zappos, which offered free shipping, free returns, and personalized service with a "customer obsession" which Bezos wanted Amazon to learn.[18] Amazon later acquired Twitch, a video-game streaming service, and Body Labs, which 3D modeled body shapes for apparel.[19]

Fulfillment Amazon optimized its original fulfilment network to minimize state sales taxes, not shipping costs: from a few large fulfillment centers, Amazon used FedEx and UPS to ship across the country often by plane and deliver locally to homes by van.[20] Its original logistics system lacked local delivery points. However, by the end of 2013, Amazon started collecting sales tax. At the same time, the company shifted from massive fulfillment centers in remote locations with low cost and low sales tax towards a fulfillment network positioned close to large metropolitan areas.[a] By 2017, Amazon had a fulfillment node within 20 miles of 50% of the U.S. population, up from 5% in 2015. It established smaller centers to sort products by zip code for pallet delivery to a local post office to lower the cost of quick home delivery. The company built a $1.5 billion air cargo hub in Kentucky for its fleet of forty leased Prime Air planes that substituted for FedEx and UPS on long-haul shipments.[21] In 2017, more than 90% of goods went through fulfillment centers.[22]

Amazon continually upgraded its logistics. It acquired Kiva Systems, a manufacturer of warehouse picking and packing robots. By 2017, it installed 45,000 Kiva robots across facilities. Robots reduced the click-to-ship cycle from 65 to 15 minutes and supported 50% more inventory per sq. ft.[23]

Amazon complemented its online fulfillment logistics with physical stores. By 2017, Amazon opened 13 retail book stores. More futuristically, an 1,800 sq. ft. Amazon Go retail store in Seattle used computer vision to track what shoppers put in their baskets, eliminating the need for cashiers and checkout.[24]

[a] A company with operations in a state is by law required to collect sales tax for that state.

Nevertheless, Amazon's main move towards local fulfilment enabling same-day delivery came with big moves in the grocery business.

Amazon Enters Retail Grocery (2017)

In 2017, U.S. consumers spent $675 billion on groceries, yet only 2% of those sales took place on the Internet, equivalent to sales from 764 grocery stores.[25] Online grocers had a history of epic failures, like the Webvan bankruptcy in the dot-com bust after Webvan raised a billion dollars. Nevertheless, 12% of U.S. consumers shopped for groceries online at least once during 2016.[26] An estimated 43% of millennials expected to buy groceries from the web in 2017.[27]

Amazon experimented with online grocery delivery since 2007 when it launched Amazon Fresh in an affluent Seattle suburb. By 2017, Amazon Fresh was available for $299 per year, offering same-day delivery of groceries and 500,000 other items in seven major urban areas. Prime Now first launched in New York City to deliver limited products for $7.99 in one hour and for no fee in two hours. By 2017, Prime Now was available in dozens of large cities, and customers could have over 25,000 items delivered—including goods from brick-and-mortar stores and food from local restaurants—sometimes using its contract workers to deliver the last mile.[28] Outcomes were mixed: Amazon Fresh suspended operations in several regions in November 2017.[29]

The June 2017 acquisition of Whole Foods Markets for $13.4 billion eclipsed Amazon's internal grocery experiments.[30] Whole Foods dominated the organic groceries niche, with EBITDA margins of 9.5% compared to the conventional supermarket margin of 4.5%. Known humorously as "Whole Paycheck," its prices were an estimated 19–37% higher than Walmart.[31] Upon acquiring Whole Foods, Amazon lowered in-store prices nearly 30% on select products, such as organic bananas, avocados, and organic rotisserie chicken.[32] Longer term, observers expected deals for Prime members—60% of Whole Foods shoppers were already Amazon Prime subscribers[33]—and an online launch of Whole Food's 365 private label. Amazon gained data on grocery purchase trends and habits.[34] It now had access to Whole Foods's grocery supply chain network: 11 distribution centers, 18 million sq. ft. of fresh food storage space, and 465 stores. One analyst noted, "I suspect Amazon's ambitions stretch further: Amazon Grocery will be well-placed to start supplying restaurants, gaining Amazon access to another big cut of economic activity."[35] Amazon next looked towards the $412 billion pharmaceutical market.

Walmart

Retail Stores

In 1945, Sam Walton entered retailing by buying a Ben Franklin variety store, transforming it into the largest such store in Arkansas[36] as he pioneered a model of low prices and high volume.[37] In 1962, contrary to conventional wisdom that discount stores could only survive in big cities, Sam Walton opened his first-ever Walmart discount store in rural Arkansas.[38] The company's early success and continuous growth built on a core set of Walton's ideas, including "buy it low, stack it, and sell it cheap." Walmart practiced the policy of "everyday low price," offering a full set of branded products at low prices all year round, rather than lowering prices on a few products for promotional purposes. Walmart's prices averaged 2–10% lower than competitors.

In contrast to competitors who grew by leaping from one large city to another, Walmart expanded from Arkansas to contiguous rural areas, saturating each market with a large store in every small town.[39] The remote, isolated locations of many early Walmart stores made it costly for distributors to directly supply those stores. In response, Walmart set up its own distribution centers and trucking

service.[40] Between 1970, the year that Walmart constructed its first distribution center, and 2017, a total of 173 such centers were built in the U.S., extending over 125.8 million sq. ft. Each distribution center was a hub in Walmart's network, supplying all Walmart stores within a radius of about 150 miles with about 140,000 SKUs. Each store was reachable by a district manager and within a day of driving from a distribution center.[41] Supported by novel merchandise assembly and cross-docking systems at its distribution centers,[42] as well as computerized inventory tracking, and data-driven storage optimization, Walmart inventory turnover reached 11.5 times in 2011, compared to Amazon's 9.6 times.[43] By 2017, about 80% of Walmart's sales went through its own warehouses; the remainder was Direct Store Delivery (DSD) distributed directly to stores by suppliers.[44] 90% of the U.S. population was within 10 miles of a Walmart store.

In small, barren rooms at its Bentonville, AR headquarters, Walmart negotiated famously hard with its suppliers, aggressively pushing for low prices and high quality standards.[45] Some suppliers appreciated the direct negotiation style and consistent stream of orders.[46] Others felt the need to sacrifice anything to get access to Walmart stores. By 2017, Walmart's scale meant that it could be purchasing up to 40% of the entire volume of an SKU of even a national brand.

Walmart lead in adopting new retail technologies, dating back to Walton's belief in computers—Walton himself learned to code in the 1960s—and as an early adopter of barcodes at checkout.[47] Through the 1980s, Walmart introduced electronic data interchange (EDI) with suppliers. EDI provided real-time information on the sale of a product in store, available warehouse storage capacity, notification of shipment, and forecasting. EDI provided Walmart with the latest market trends, enabling it to make rapid adjustments to pricing and supply. In 1983, it launched its own private satellite network to provide managers with live data on and video communication with its distribution centers, stores, and employees.[48] By 2017, Walmart had one of the largest private databases in the US and used it, for example, to order all the U.S. national flags available for sale after 9/11.

In the early years, Sam Walton had a familial relationship with employees, known as associates, although the firm was later criticized for its part-time labor, low wages, and anti-union stance. Walmart offered internal promotions, incentives and bonuses based on store profitability, which reduced shrinkage (primarily stolen inventory) to half the industry average.[4950] Store managers could use local sales data to order merchandise as needed, known as traiting, and had the authority to beat local competitor prices.[51] With a culture that emphasized extreme frugality, executives minimized travel expenses, such as by sharing hotel rooms. All regional managers had to be in Bentonville for the Saturday morning meeting where plans for the following week were reviewed.[52]

In the 1980s, Walmart expanded into suburban locations, building 100–150 stores yearly and covering the entire US by 2017.[53] In 1983, Walmart launched Sam's Club, a warehouse selling high-volume items at wholesale prices.[54] Sam's Club required an annual membership fee, had low (6%) profit margins, limited SKUs, and items in basic displays.[55] In 1990, Walmart surpassed Kmart in revenue to become the largest retailer in the US and marked 16 years of earning a 30% return on stockholder's equity, while growing at 30% p.a (**Exhibit 6**).[56]

In 1987, Walmart introduced Supercenters, which combined traditional discount retailer merchandise with grocery in large stores (160,000 sq. ft.) providing everything (120,000 SKUs). By 2017, the majority of stores were Supercenters, where low-margin groceries drew traffic to sell high-margin hardware.[57] 56% of Walmart's total sales in the US were grocery (**Exhibit 7**).[58] Its Sam's Club warehouse stores represented 16% of North American retail sales. International retail made up 24% of sales.

Walmart.com

In 2000, Walmart opened its own online shopping site, placing its e-commerce headquarters in Silicon Valley. By 2004, Walmart.com continued to grow sales despite continuous losses. CEO Lee Scott admired the success of Amazon and e-Bay, but he viewed Walmart's online business model differently. Walmart's internet operations supported its physical stores, by helping customers understand the quality and price of items in the stores and enabling them to buy in-store or online.[59] From 2007 onwards, Walmart.com introduced free in-store pickup for items ordered online at over 750 of its U.S. stores.[60] When customers went to Walmart stores to pick up an online order, nearly half of them would spend an additional $60 in the store.[61] Walmart explored efficiency improvements for in-store pickup, such as a drive-through window.

Walmart.com did not create a marketplace for third-party vendors until 2009, when it allowed a select group of vendors, such as ebags.com, to sell on its website.[62] That year, Walmart.com accelerated growth when it implemented a low-price buy online, pick up in store approach—which represented 40% of their online sales—while also signaling a commitment to price leadership, particularly in books, personal care, and beauty products.

In 2012, Walmart recognized the need to overhaul its online business. At $7 billion in revenue, it was a fraction of both Amazon's and Walmart's total revenue. Part of the problem was the limited selection of goods available on Walmart.com: Boston Consulting Group found at the time that Amazon offered 2,870 facial moisturizers online, while Walmart.com offered only 20.[63] This was partly due to the organizational separation of Walmart.com and partly because Walmart.com still relied on off-the-shelf software. Then Walmart.com CEO Raul Vazquez noted, "There was a time when the online and offline businesses were viewed as being different. Now we are realizing that we actually have a physical advantage thanks to our thousands of stores, and we can use it to become No. 1 online."[64]

In response, Walmart introduced the massive Pangaea project in 2012, named after the ancient supercontinent, led by Jeremy King, CTO of Walmart's e-commerce operation. Pangaea implemented a new cloud infrastructure to support transactions, databases, and analytic tools, and it was the foundation for digital customer service and experience on Walmart.com. "Given how rapidly this place is changing, we did not have time to screw around," said King.[65] In the next four years, Walmart made 14 acquisitions to support e-commerce, rebuilt its underlying e-commerce technology, developed a mobile application, and hired many employees including 3,000 were Silicon Valley engineers.[66] Acquisitions included Kosmix, later renamed Walmart Lab, which applied algorithms to personalize search results and boost search-related online sales by 10–15% (**Exhibit 8**).[67]

In parallel, Walmart began to build out the logistics to support two-day shipping to online customers. By 2017, it built 22 fulfillment centers to handle small orders picked and packed for individual shoppers. Its largest fulfillment center in Bethlehem, PA covered over 1 million sq. ft., employed over 350 full-time staff members, and stored more than 500,000 items. Walmart.com fulfilled three-quarters of its sales with this system, instead of the traditional store distribution network.[68]

Beginning in 2016, Walmart launched a free three-day shipping service. In 2017, Walmart launched free two-day shipping in response to Amazon Prime; there was no membership fee, but free delivery required a $35 minimum purchase. In-store pick up continued to be free with no minimum purchase requirement,[69] with free same-day grocery pickup in over 1,000 stores. Grocery made up 26% of Walmart's U.S. e-commerce sales in 2017.

Jet.com and Beyond

While Walmart online sales growth increased in early 2016, it still underperformed the industry. In August that year, it announced the $3.3 billion acquisition of Jet.com. Its well-known founder Marc Lore started the online retailer Quidsi in 2005. Quidsi's focused retail websites, such as Diapers.com, Soap.com, or Wag.com, featured frequently repurchased bulky products. Amazon felt pressure from Diapers.com, engaging in a price war before acquiring it in 2011 for $545 million. After the acquisition, Marc Lore worked at Amazon for two years before leaving with about thirty former Quidsi employees to create Jet.com and challenge Amazon again with lower prices.

Jet.com functioned as a marketplace for other retailers without having its own warehouses and used sophisticated Smart Cart pricing technology to provide customer discounts according to order size, distance to partner warehouses, etc. Customers saved money by adding more items to their virtual cart. Jet.com had an urban, young, millennial customer base that was more likely to purchase online and increasingly via mobile device. However, there was a limited number of sellers on the website and no consistent price advantage; fluid price-setting made it sometimes less and sometimes more expensive than competitors.

Observers suspected that Walmart's motive for the acquisition was to gain Marc Lore's inside knowledge of Amazon. Lore became CEO of Walmart's entire domestic e-commerce business with over 15,000 employees[70] and he was tasked with accelerating online growth by integrating online and physical store resources. He integrated Jet.com and Walmart.com operationally—though leaving them as separate websites—and filled key positions with managers from both companies, causing some Walmart managers to exit.[71] Lore established new functional teams to improve the ordering process, returns, and fraud prevention.[72]

In 2017, Walmart acquired Bonobos, an e-commerce apparel company focused on high-end men's clothing through innovative distribution channels. Acquiring this and others specialty retailers, like Moosejaw and Hayneedle, aligned with Walmart's e-commerce strategy of having category experts to manage the entire online category for the company and elevate its brand image.[73]

In September 2017, Walmart partnered with Google to enable purchase of Walmart products via voice shopping from Google Express and Google Home.[74] Walmart also partnered with Uber, Lyft, and Dely to launch a grocery home delivery service from Walmart stores, tested in six cities in August 2017. After a customer placed an online order, an in-store employee picked out the ordered items and called Uber or Lyft to deliver them to the customer's home for a $7–10 fee.[75] To complement this service, Walmart explored the idea of using its employees to make deliveries.

Lore believed that Walmart was in a strong position in online retailing. As the stores were already profitable, any incremental online sales shipped from there was, as Lore said, "at an incredible profit."[76] The combined logistics system also allowed Walmart to serve 87% of the country overnight and 99% in two days. Lore added, "we already have trucks moving orders from fulfillment centers to stores for pickup, those same trucks could be used to bring ship-to-home orders to a store close to their final destination, where a participating associate can sign up to deliver them to the customer's house."[77] In support, Walmart spent $1.2–1.5 billion on e-commerce and digital initiatives in 2016.[78]

Consumer Behavior

In 2017, the overall e-commerce share of total U.S. retail sales was 7–8%, and the average consumer spent $1,800 online each year.[79] However, the penetration of online purchases differed widely among consumers and across product categories (**Exhibit 9**).

One determinant of the *willingness to purchase online* was the need to be informed about a good before purchase as opposed to simply experiencing its use. Buying a television might require a store visit to a store to see it in operation and learn about different specifications from a store clerk. Consumers could then check online prices on their mobile phone while still in the store, a practice known as showrooming. As a result, electronics retailer Best Buy simply sought to match prices of its online competitors. In contrast, consumers who already used an item, like bleach, could easily decide to repurchase that brand online. Consumers wanted to see, feel, and smell fresh foods, like a pineapple, before selecting one. The average grocery shopper visited their local store 83 times a year, while Amazon Prime customers placed orders an average of 60 times a year.[80] The huge variety of items (562 million on Amazon) that could be displayed online as compared to in a store (142,000 in a Walmart store) affected where consumers went to buy different goods.[81]

Predictability and frequency of purchase made online purchases more attractive. Quidsi successfully sold diapers online, a bulky item for which parents could reasonably estimate the number and frequency of their children's needs. Placing regularly bought items on the "Alexa shopping list" made more sense for repeat purchases like toothpaste. In contrast, a more impulsively purchased item like chocolate might be less frequently bought online.

Consumers differed in terms of the *value of the convenience of online shopping* by income level—with wealthier households more likely to buy online and willing to pay a higher premium for the service—and geography—with metropolitan areas spending more online annually on average ($853) than suburban shoppers ($768) or those in rural areas ($684).[82] Age also played a role, with younger people more willing to buy online: 44% of millennial shopping budgets were spent online, compared to 39% by Gen X, 31% by baby boomers, and 22% by seniors.[83]

Consumer preferences also differed according to their *willingness to pay for rapid delivery*. One study found that about 30% of consumers would pay a significant premium, up to $3, for same-day delivery, but the remaining 70% preferred the cheapest option for home delivery regardless of speed.[84] Another study found that nine out of ten consumers regarded free shipping as the top incentive that would make them shop online more.[85]

A final dimension of consumer choice concerned *where the item was delivered or picked up*, regardless of how it was purchased. Part of that decision was driven by price: picking up in a store was in principle cheaper than having an item delivered to the doorstep. Part of the decision depended on the size of the item: most people willingly paid for home delivery (and setup) of furniture, because it could be physically challenging to get furniture home and into the house. Consumers worried about theft and freshness when packages were dropped off on doorsteps, front yards, or porches; many apartment buildings lacked a safe common space to leave packages. In turn, last-mile delivery companies concentrated deliveries at the end of the day or offered a specific delivery time window chosen by the consumer. They experimented with a variety of lockers and bins for the porch or garage that would be more secure than simply dropping a package in plain sight, and could potentially be refrigerated. They established pickup locations in more convenient places, like Mail Boxes Etc. retail centers.

A consumer's choice also depended on the *price comparison*. Such comparisons were notoriously difficult given continual price alterations and promotions. However, prices in Walmart stores were

usually cheaper than Amazon's online prices—16% on average in one study—though that varied by category (**Exhibit 10**).[86] Online, one study of 52,000 items, showed on average Amazon prices were about 3% to 4% below those of Walmart.com.[87] Bain & Company had Amazon as the cheapest source for 70% of best-selling items and 25% of all items online.[88] Other sources found Walmart.com up to 5% cheaper than Amazon.[89]

Retailers continually scanned each other's sites to monitor prices and dynamically adjust their own prices. As opposed to weekly price changes in stores, Amazon changed prices several times a day as demand ebbed and flowed for certain items.[90] This activity led to a cyberwar: bots crawled competitor sites which were in turn blocked by other software. Other optimization software pushed certain items when a customer made online purchases or offered discounts on items that would fill a package and not incur additional shipping charges.

Distribution Economics

A critical part of a retailer's cost structure concerned the logistics of getting products from the manufacturer into the home (**Exhibit 11**). The expense of last-mile delivery was not to be underestimated. In the Internet bubble, startups like Webvan appeared to ignore the true cost of delivering items to the home and suffered accordingly. While the Internet changed consumer access to retailers, technology had not yet done much to change the economics of distribution.

Distribution costs for the entire supply chain included: warehouse storage at each stage; picking and unpacking whenever an item moved from or into a warehouse or stocked onto shelves; transport at each step including long-haul and last-mile delivery; and packaging into a final delivery box. There were working capital charges for inventory sitting in warehouses and on shelves, lost revenue from retail markdowns on surplus goods, and lost sales from out-of-stock situations.

Returns were an important but often overlooked aspect of distribution costs. Some categories of purchases, like fashion clothing, could see 40% or more items being returned. Returns incurred not only the additional shipping cost but also customer service and handling costs. When online retailers, like Zappos shoes, offered a free return service, the cost was perhaps 3% to 4% of the retail price. Other categories, like detergent, saw very little in the way of returns.

The cost of getting any particular purchase from the place where it was manufactured to the buyer's home depended on the size, weight, and value of an individual item, as well as the total size of the purchase—single items were more expensive than a bundle of goods going to the same location. It was estimated in 2017 that an order had to be over $85 to be profitable for an online retailer.[91] In addition, the freshness of the product influenced cost, determining how quickly an item had to be moved through the logistics system and whether it required refrigerated storage.

In choosing among the four modes of logistics systems currently in use (**Exhibit 12**), retailers traded off between speed, variety, and cost (**Exhibit 13**). While seeming to perform the same task, a distribution center for a retail store which cost between $100 and 150 million[92] was very different from a fulfillment center designed for home delivery of online purchases, which cost between $150 million and $250 million (**Exhibit 14a** and **14b**).[93] Distribution centers handled bulk loads of full pallets with forklifts and typically stored 100,000 SKUs. Combined with truck delivery, this was the low-cost way to handle logistics into a given locality. Fulfilment centers picked from over 500,000 individual items on shelves, either by hand or increasingly with some robotic assistance. With individual handling and air freight, fulfilment centers were the most effective way to deliver a wide variety of products direct

to the home. In both, software optimized the location of items in the warehouse and minimized the distance travelled to pick an order, and automation of the picking process increased dramatically.

Retailers held out hope that combining both systems in an omnichannel approach—as opposed to multi-channel retailing with parallel but separate online and physical store systems—would maximize the benefits of national scale. Efficiently deploying inventory between distribution centers, fulfillment centers, sort facilities, physical stores, and pick-up locations could, in principle, reduce logistics costs. Doing so required intense data analytics to dynamically match products to storage and delivery points.

Scale economies potentially gave a 3–5% cost advantage to a large national retailer.[94] More fulfillment or distribution centers reduced shipping distances, and hence cost, and accelerated delivery times. Optimized inventory control placed fast-moving items in multiple centers closer to the customer. However, an increase in fulfilment points generally reduced the number of items shipped in each package; for Amazon, an average of just 2.3 items out of a 6 item order were sent per package in 2015 vs. 3.1 items per package in 2013. Scale also gave retailers purchasing power over shippers and service providers. A brick-and-mortar retailer with over 1,000 stores and ten distribution centers could get close to this cost position. McKinsey estimated that with 12 optimally located distribution centers, a retailer could cost effectively offer one-day delivery to about 80% of the U.S.[95]

For last-mile delivery, costs depended on the geographic density, local market share, and desired delivery speed for the area being served. Rural areas with long distances between houses were most expensive to serve, but apartment buildings and traffic and parking delays also made delivery in dense urban and downtown areas expensive. Local market share determined the density of drop offs on a route. To deliver in less than one hour, a small vehicle from a local warehouse or store was perhaps the only feasible way, at a cost of $7–10 per delivery.[96]

The last mile was perhaps the area where there was most technological uncertainty. Currently UPS, FedEx, and the U.S. Postal Service delivered directly to the home via a small van. Retailers experimented with Uber or other local delivery operations. More futuristically, both Walmart and Amazon experimented with autonomous robots. McKinsey suggested that autonomous vehicles dropping items in lockers would be the future low-cost alternative for home delivery (40% cheaper in a high labor cost country).[97] Others explored 3D printing and locally manufacturing items.

Walmart vs. Amazon in 2018

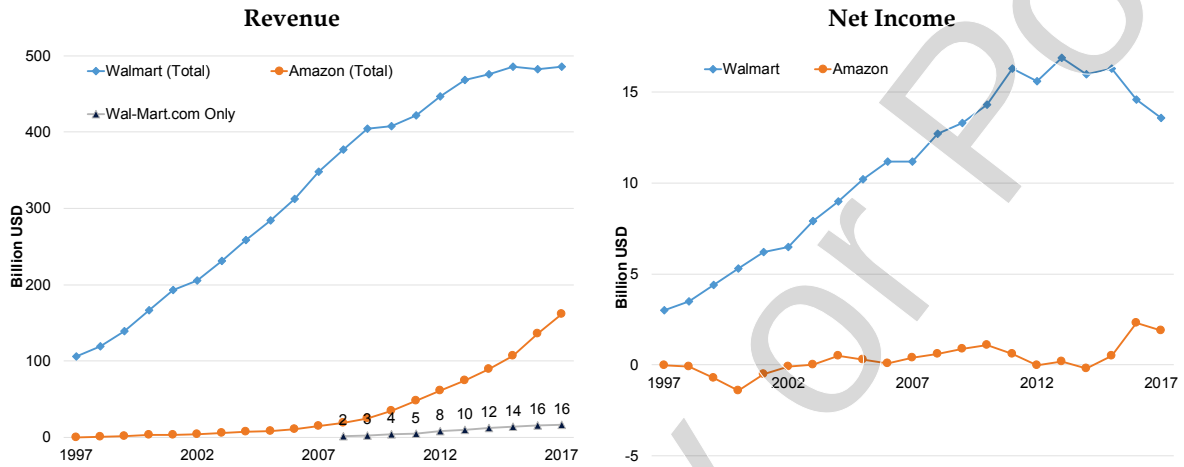
By 2018, total US retail sales through Amazon approached an annual rate of $200 billion, of which more than half were from third-party retailers who paid Amazon for listing their products and providing fulfillment and billing services.[98] Amazon Prime membership in the U.S. exceeded 60 million customers, double the number of members in 2015. In contrast, Walmart's e-commerce sales in 2017 reached $16 billion, an online market share of 3.3% behind Amazon and Apple[99] and representing 4.3% of Walmart's total revenue, up five times from what it had been in 2009. Walmart.com brought in 92 million monthly visitors,[100] yet only 13% of store customers shopped weekly at Walmart.com while one-third did so at Amazon.[101] Other differences included customer demographics, logistics systems and capabilities, as well as customer satisfaction: Amazon had a 54 net promoter score (60 for Prime) compared to 40 for other online retailers and 36 for physical store retailers (**Exhibits 15** to **19**).[102]

As Black Friday and Cyber Monday approached in November 2017, traditionally the busiest retail and online shopping days of the year respectively, Jeff Bezos became the world's richest person, with a net worth of $100 billion. Lore and McMillon had to implement a long-term strategy to address the

Amazon threat. Renaming the corporation "Walmart Inc." from "Wal-Mart Stores" that month gave a clue to the importance they attributed to getting the online strategy right.

Some observers felt that Walmart was in a strong position. Citi Research noted that, "Walmart's aggressive omnichannel strategy will continue to drive significant sales growth and (that) Walmart's ecommerce operations are emerging as a true challenger to Amazon," citing Walmart's biggest strengths as its grocery offering, everyday low-price positioning and "increasingly seamless integration" of its stores and website.[103] Others disagreed, noting that, "more than two decades since the company's founding, Jeff Bezos still runs Amazon like a startup, sacrificing profitability in order to steadily gain market share,"[104] while Amazon's "significant competitive advantages that are hard to replicate included a) scale in both demand and fulfillment capacity; b) logistics; c) growing adoption of Prime; and d) leadership in Cloud through AWS."[105]

Exhibit 1a Amazon, Walmart, and Walmart.com Revenue and Net Income, 1997–2017 (billions USD)



Source: Casewriter; compiled from Capital IQ.

Exhibit 1b Amazon and Walmart Market Capitalization, 1997–2017 (billions USD)

Source: Casewriter; compiled from Capital IQ.

Exhibit 2 Amazon Financials, 2006–2017 (millions USD)

Fiscal Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Income statement											
Total revenue	14,835	19,168	24,509	34,204	48,077	61,093	74,452	88,988	107,006	135,987	177,866
North America	8,095	10,288	12,828	18,707	26,705	34,813	44,517	50,834	63,708	79,785	106,110
International	6,740	8,938	11,681	15,497	21,372	26,280	29,935	33,510	35,418	43,983	54,297
Amazon Web Services	NA	NA	NA	NA	NA	NA	NA	4,644	7,880	12,219	17,459
Cost of Goods Sold	(11,482)	(14,896)	(18,978)	(25,561)	(37,288)	(45,971)	(54,181)	(62,752)	(71,651)	(88,265)	111,934
Gross Profit	3,353	4,270	5,531	7,643	10,789	15,122	20,271	26,236	35,355	47,722	65,932
Gross Margin	22.6%	22.3%	22.6%	22.3%	22.4%	24.8%	27.2%	29.5%	33.0%	35.1%	37.1%
SG&A Expenses	(1,871)	(2,419)	(3,060)	(4,397)	(6,864)	(9,723)	(12,647)	(16,650)	(20,411)	(27,284)	(38,992)
SG&A over Revenue	12.6%	12.6%	12.5%	12.9%	14.3%	15.9%	17.3%	18.7%	19.1%	20.1%	21.9%
Operating Income	635	789	1,180	1,406	862	676	745	178	2,233	4,186	4,106
North America								360	1,425	2,361	2,837
International								(640)	(699)	(1,283)	(3,062)
Amazon Web Services	NA	NA	NA	NA	NA	NA	NA	458	1,507	3,108	4,331
Operating Margin	4.4%	4.1%	4.8%	4.1%	1.8%	1.1%	1.0%	0.2%	2.1%	3.1%	2.3%
Net Income	476	645	902	1,152	631	(39)	274	(241)	596	2,371	3,033
Distribution											
Shipping Revenue	740	835	924	1,193	1,552	2,280	3,097	4,486	6,520	8,976	NA
Shipping Cost	(1,174)	(1,465)	(1,773)	(2,579)	(3,989)	(5,134)	(6,635)	(8,709)	(11,539)	(16,167)	(21,700)
Fulfillment Cost	1,292	1,658	2,052	2,898	4,576	6,419	8,585	10,766	13,410	17,619	25,249
Balance Sheet											
Total Cash & ST Inv.	3,112	3,727	6,368	8,762	9,576	11,448	12,447	17,416	19,808	25,981	30,986
Inventory	1,200	1,399	2,171	3,202	4,992	6,031	7,411	8,299	10,243	11,461	16,047
Total Current Assets	5,164	6,157	9,797	13,747	17,490	21,296	24,625	31,327	35,705	45,781	60,197
Total Assets	6,485	8,314	13,813	18,797	25,278	32,555	40,159	54,505	64,747	83,402	131,310
Total Current Liabilities	3,714	4,746	7,364	10,372	14,698	19,002	22,980	28,089	33,8887	43,816	57,883
Long-Term Debt	1,282	409	109	184	255	3,084	3,191	8,265	8,227	7,694	24,743
Total Liabilities	5,288	5,642	8,556	11,983	17,521	24,383	30,413	43,764	51,363	64,117	103,601
Working Capital	1,450	1,411	2,433	3,375	2,594	2,294	1,645	3,238	2,575	1,965	2314
Total Equity	1,197	2,672	5,257	6,654	7,757	5,192	9,746	10,741	13,384	19,285	27,709
Cash Flow Statement											
Cash from Operations	1,405	1,697	3,293	3,495	3,903	4,180	5,475	6,842	12,039	17,272	18,434
Capital Expenditure	(224)	(333)	(373)	(979)	(1,181)	(3,765)	(3,444)	(4,893)	(5,387)	(7,804)	(11,955)
Cash Acquisitions	(75)	(494)	(40)	(352)	(705)	(745)	(312)	(979)	(795)	(116)	(13,972)
Cash from Investing	42	(1,199)	(2,337)	(3,360)	(1,930)	(3,595)	(4,276)	(5,065)	(6,450)	(9,876)	(27,819)
Issue of Common Stock	91	11	0	0	0	0	0	0	0	0	0
Net Debt Issued	(50)	(260)	(385)	(78)	(267)	2,790	(617)	4,426	(3,882)	(3,740)	9,860
Net Change in Cash	1,517	230	675	333	1,492	2,815	574	5,899	1,333	3,444	1,188
Number of employees	17,000	20,700	24,300	33,700	56,200	88,400	117,300	154,100	230,800	341,400	566,000

Source: Amazon financials, Capital IQ, Inc., a division of Standard & Poor's cited by John R. Wells, Galen Danskin, Gabriel Ellsworth, "Amazon.com, 2016," HBS No. 716-402 (Boston: Harvard Business School Publishing, rev. 2016), https://cb.hbsp.harvard.edu/cbmp/product/716402-PDF-ENG, accessed December 2017.

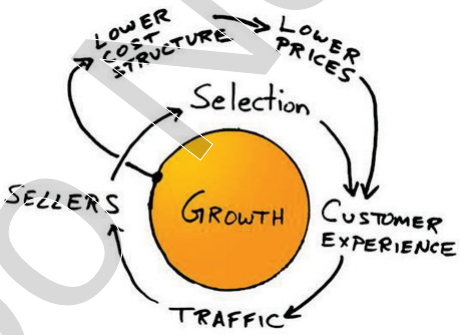
Note: Amazon's fiscal year ended on December 31. Amazon raised $50 million in an IPO in 1997; all other issuances were for employees. Disclosure of Amazon Web Services revenue began in 2014.

Exhibit 3 Amazon's Innovations, Active and Abandoned, 1995–2017

Year	Innovation (Year Abandoned, if Applicable)
1995	Customer reviews
1997	1-Click ordering; Recommendations
1999	Wish lists; Electronic store; Amazon Auctions (abandoned 2000); zShops (abandoned 2007)
2001	"Where's My Stuff?"
2002	Free shipping
2003	Marketplace
2004	A9 search portal (abandoned 2008)
2005	Amazon Prime; Private labels
2006	Elastic Compute Cloud web service; Fulfillment by Amazon; Askville (abandoned 2013); Unbox (abandoned 2015)
2007	Subscribe & Save; Amazon Kindle; Amazon Music; AmazonFresh; Endless.com (abandoned 2012); Amazon WebPay (abandoned 2014)
2009	Local Express Delivery (same day); PayPhrase (abandoned 2012)
2010	Price Check; Amazon Studios; Webstore (abandoned 2016)
2011	Appstore for Android; Kindle Owners' Lending Library; Amazon Lockers; MyHabit (abandoned 2016); Amazon Local (abandoned 2015); Test Drive (abandoned 2015)
2012	Amazon Media Group; Music Importer (abandoned 2015); AmazonSupply (later Amazon Business)
2013	Exclusive Prime Instant Video; Sunday delivery; Anticipatory shipping; Kindle Mayday; AmazonSmile
2014	"Flow" image recognition in mobile app; Amazon Prime New (1-2 hours); Prime Pantry; Fire TV; Fire Phone (abandoned 2015); Amazon Elements diapers (abandoned 2015); Prime Photos; Prime Music; Amazon Local Register (abandoned 2015); Amazon Wallet (abandoned 2015)
2015	Amazon Echo; Dash Buttons; Amazon Launchpad; Amazon bookstore; Amazon Destinations (abandoned 2015); Amazon Restaurants; Handmade at Amazon; Amazon Home Service
2016	Prime Air; Amazon Go; Wickedly Prime; Apparel private label
2017	Amazon STEM Club; Amazon Chime; Echo Look; Echo Chime

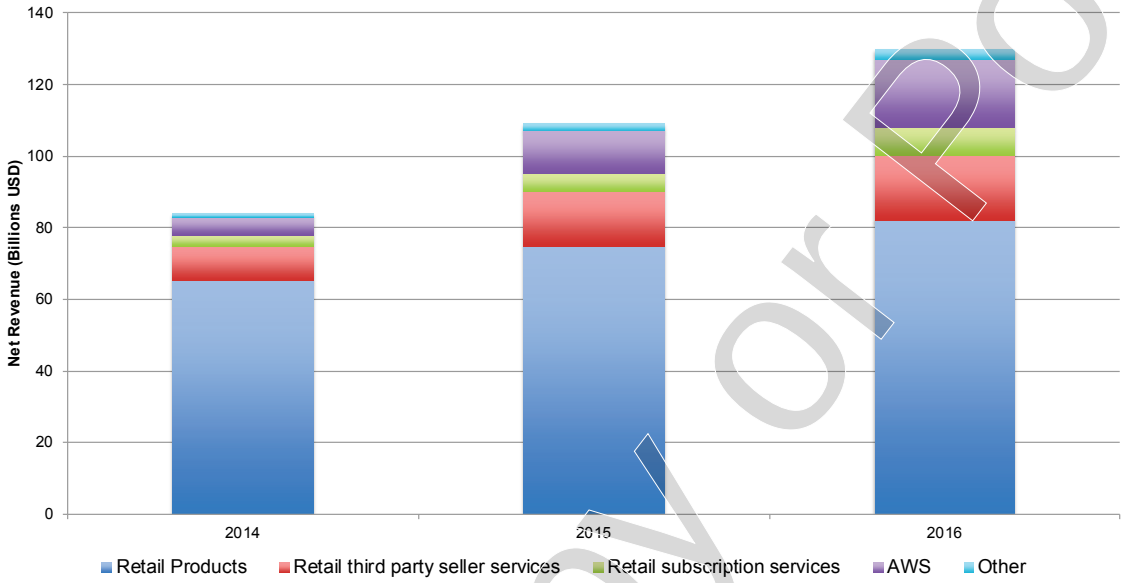
Source: Adapted by casewriter from Bain Analysis of Amazon.com cited in Darrell K. Rigby, "The Amazon-Whole Foods Deal Means Every Other Retailer's Three-Year Plan Is Obsolete," *Harvard Business Review*, reprint H03QOS published on HBR.org, June 21, 2017, p. 4, https://cb.hbsp.harvard.edu/cbmp/content/sample/H03QOS-PDF-ENG, accessed December 2017.

Exhibit 4 Amazon's Virtuous Circle



Source: Cited in Sam Seely, "The Amazon Flywheel: Part 1," May 2, 2016, http://www.samseely.com/blog/2016/5/2/the-amazon-flywheel-part-1, accessed December 2017.

Exhibit 5a Amazon Global Net Revenue 2014–2016 (billions USD)



Source: Casewriter. Amazon Global Net Revenue from Statista, "Global net revenue of Amazon.com from 2014 to 2016, by segment (in billion U.S. dollars)," https://www.statista.com/statistics/672747/amazons-consolidated-net-revenue-by-segment/, accessed December 2017.

Note: Retail third-party seller services are fees charged third parties for listing and distributing their products. Retail subscription services are primarily Prime subscriptions. AWS is Amazon Web Services.

Exhibit 5b Amazon Gross Merchandise Value (GMV) 2015–2016 (mm USD)

	U.S. E-Commerce Total	Amazon Share of U.S. E-Commerce		Amazon GMV	
Category	2016	2015	2016	2016	% of Total
Apparel & Accessories	$61,960	20%	28%	$17,039	11%
Books & Magazines	11,241	70%	70%	7,868	5%
Computer	98,866	65%	70%	69,206	46%
Consumer Goods	30,105	45%	53%	15,805	10%
Event Tickets	22,886	0%	0%	0	0%
Flowers & Gifts	5,741	15%	18%	1,005	1%
Furniture & Appliances	15,469	10%	13%	1,934	1%
Home & Garden	10,329	20%	23%	2,324	2%
Jewelry & Watches	8,886	20%	23%	1,999	1%
Music, Movies & Videos	5,678	70%	70%	3,975	3%
Office Supplies	14,810	15%	23%	3,332	2%
Sports & Fitness	7,337	25%	28%	2,018	1%
Toys & Hobbies	9,080	50%	53%	4,767	3%
Other	61,831	29%	32%	19,878	13%
Total	**$364,219**	**37%**	**41%**	**$151,150**	**100%**

Source: Amazon Gross Merchandise Value is a casewriter summary of JP Morgan Analyst Report, May 17, 2017.

Note: The Gross Merchandise Value includes the actual retail value of product sold by third-party retailers, who only pay Amazon a 15% fee plus fulfillment costs.

Exhibit 6 Walmart Financials

Fiscal Year	2012	2013	2014	2015	2016	2017	2018
Net Sales	443,854	466,114	473,076	482,229	478,614	481,317	495,761
International	125,435	134,748	136,513	136,160	123,408	116,119	118,068
United States	264,186	274,433	279,406	288,049	298,378	307,833	318,477
Sam's Club	53,795	56,423	57,157	58,020	56,828	57,365	59,216
U.S. e-Commerce	NA	NA	NA	NA	NA	8,000	11,500
Sales per Sq. Ft.	428	435	430	425	417	413	428
Net Sales Growth (decline)	*5.9%*	*5.0%*	*1.5%*	*1.9%*	*(0.8)%*	*0.6%*	*3.0%*
U.S Same-Store Sales Growth (decline)	*0.3%*	*2.0%*	*(0.6)%*	*0.5%*	*1.0%*	*1.4%*	*2.2%*
Cost of Sales	335,127	352,488	358,069	365,086	360,989	361,256	373,396
SG&A Expenses	85,265	88,629	91,353	93,418	97,041	101,853	104,698
Net Income	15,699	16,999	16,022	16,363	14,697	13,643	9,862
Current Assets	54,975	59,940	61,185	63,278	60,239	57,689	59,664
Inventory	40,714	43,803	44,858	45,141	44,469	43,046	43,783
Total Assets	193,406	203,105	204,751	203,490	199,581	198,825	204,522
Total Liabilities	117,241	120,848	121,921	117,553	115,970	118,290	123,700
Long-Term Debt	44,070	38,394	41,771	40,889	38,214	36,015	30,045
Shareholders' Equity	76,165	82,257	82,830	85,937	83,611	80,535	80,822
Return on Assets	*8.4%*	*8.7%*	*8.2%*	*8.3%*	*7.5%*	*7.1%*	*6.9%*
Return on Equity	*21.2%*	*22.4%*	*20.1%*	*19.9%*	*18.1%*	*17.2%*	*12.7%*

Source: Adapted by casewriter from David B. Yoffie and Eric Baldwin, "Wal-Mart Update, 2017," HBS No. 717-468 (Boston, MA: Harvard Business Publishing, 2017), originally using data from Thomson One/Reuters and Wal-Mart Form 10-K and 10-Q. US eCommerce data from Walmart Fourth Quarter Fiscal Year Earnings," February 20, 2018, 8; http://s2.q4cdn.com/056532643/files/doc_financials/2018/q4/Q4FY18-Combined-Doug-and-Brett-final.pdf.

Exhibit 7 Wal-Mart Sales Mix in 2012

Category	% of Sales
Grocery	56%
Entertainment	12%
Health & Wellness	11%
Hard Goods (e.g., Toys)	11%
Apparel	8%
Home Goods (e.g. Furniture)	5%

Source: Wal-Mart Stores 2012, 10K.

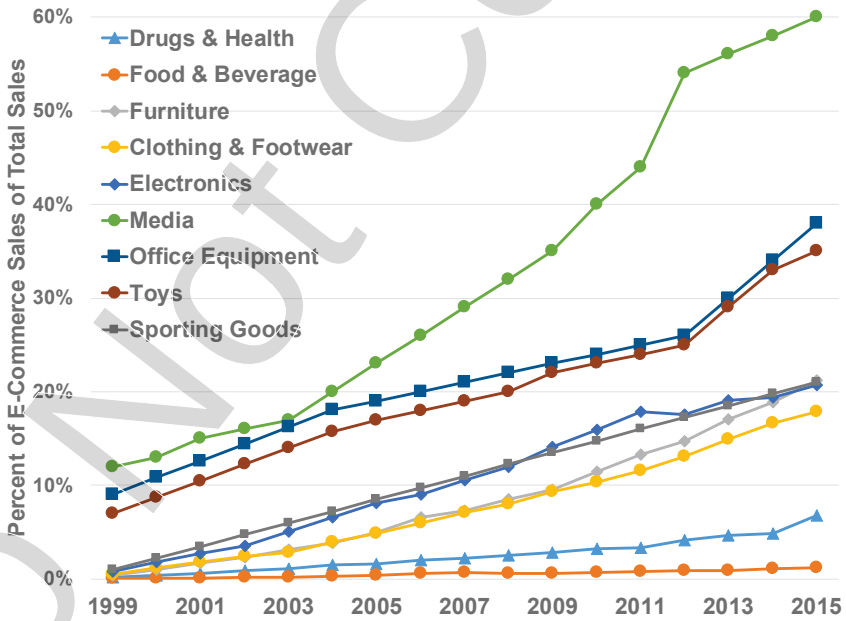
Exhibit 8 Selected Walmart (and Jet.com) Acquisitions, 2010–2017

Announced Date	Target	Description	Size (mm $)
October 2017	Parcel Inc.	Technology-based, same-day, and last mile delivery company that specializes in perishable and non-perishable delivery	-
June 2017	Bonobos, Inc.	Online clothing focused on menswear	310.0
	Moosejaw	Outdoor retailer	50.0
	Shoebuy.com	Online shoe retailer	70.0
	Hayneedle.com	Online furniture retailer	90.0
August 2016	Jet.com Inc.	E-commerce retailer, founded by Marc Lore	3300.0
July 2015	Niuhai E-commerce Co., Ltd	(Shanghai) Chinese B2C website: clothes, grocery products, and consumer electronics	760.0
April 2011	Kosmix Corp.	Platform to filter social network content to connect people with real-time information (aka:Walmart Labs, Inc.)	300.0
February 2010	VUDU, Inc.	Delivers entertainment content directly to broadband high-definition TVs	-

Source: Compiled by casewriter.

Note: Niuhai E-commerce (Shanghai) Co., Ltd was sold to JD.com in 2016.

Exhibit 9 E-Commerce Percentage of Total US Sales over Time (1999–2015)



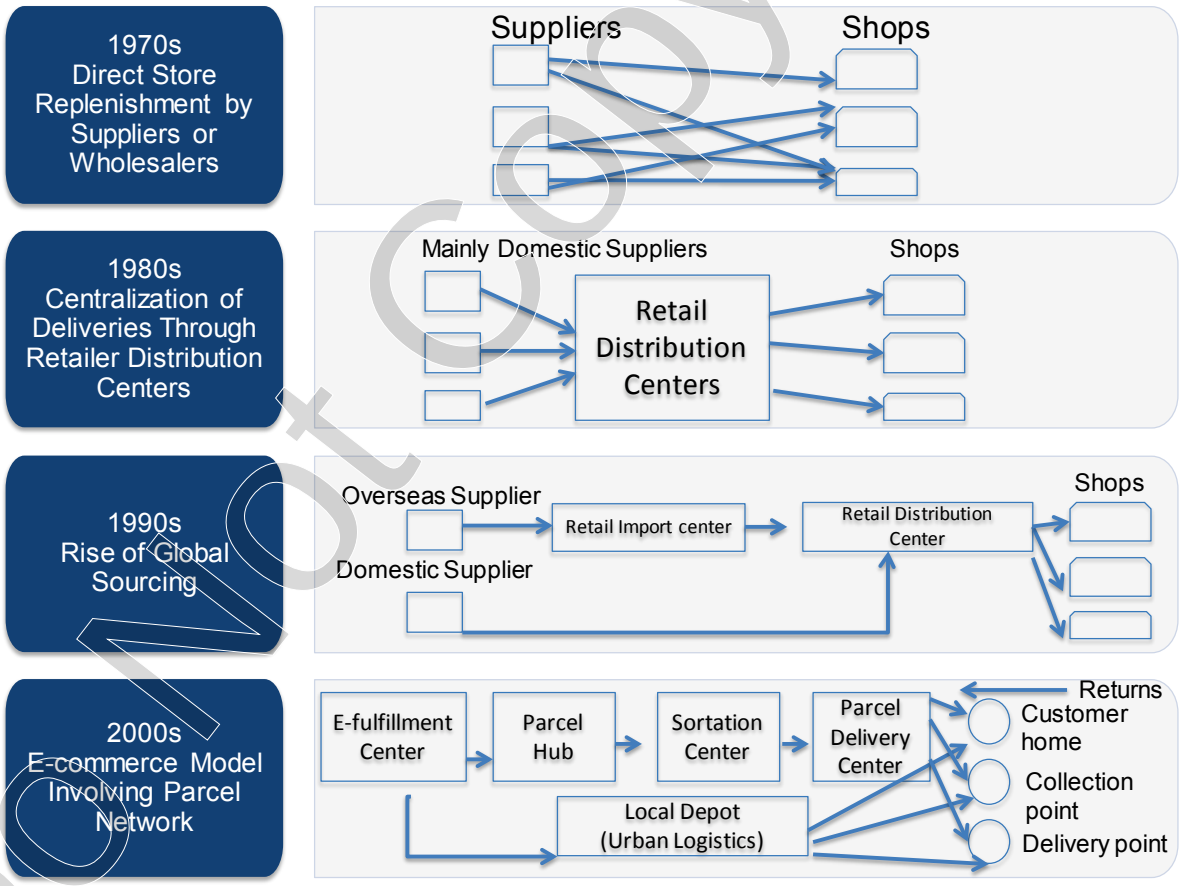
Source: Casewriter estimates based on Drugs & Health, Food & Beverage, Furniture, Clothing & Footwear, and Electronics data are from U.S. Census E-Commerce Statistics (E-STATS) multi-sector data tables, 2016. Media, Office Equipment, Toys, and Sporting Goods are from *The Economist* October 28th, 2017, E-Commerce Special report (derived from Cowen and Company; U.S. Census Bureau).

Exhibit 10 Walmart vs. Amazon Pricing Comparison

Amazon.com Online vs.	Walmart In-Store	Walmart.com Online
Home Goods	67%	99%
Food & Beverage	122%	95%
Kitchen & Appliance	79%	111%
Technology & Entertainment	95%	96%
Miscellaneous	84%	105%
Total	**89%**	**98%**

Source: Adapted by casewriter from Max Vanegas, "Walmart vs. Amazon: Which is Cheaper?," LendEDU, January 30, 2018, https://lendedu.com/blog/walmart-vs-amazon/, accessed January 20, 2020; Ted McCarthy, "Amazon vs. Walmart vs. Target Price Comparison," LendEDU, June 25, 2019, https://lendedu.com/blog/amazon-walmart-target-price-comparison/, accessed January 20, 2020.

Exhibit 11 Evolution of Retail Logistics, 1970s–2000s



Source: Casewriter. Adapted from Adam Robinson, "E-Commerce Logistics: The Evolution of Supply Chains from Direct to Store Models to E-Commerce," Cerasis.com, April 30, 2014, http://cerasis.com/2014/04/30/e-commerce-logistics/, accessed December 2017.

Exhibit 12 Four Routes to the Home

Route	Description
Brick-and-Mortar Retail	Goods delivered from manufacturing factory to retail distribution center warehouse. From this center, goods trucked to retail store, placed on shelves by employees, then picked up by consumer, paid for at checkout, and taken home by consumer. J.C. Penney CEO Marvin Ellison noted, "It's always cheaper to ship from a distribution facility to a store than to a consumer."
Online Retail	Goods delivered from factory to online fulfillment center, where it was picked by an employee and packaged for direct home shipping. A logistics company (FedEx, UPS, or USPS) then takes the items; their operations included a sort facility at origination point for long haul transport (generally by plane) to sort facility near destination, then delivered to a home in a van. Faster than usual two-day delivery or for fresh goods required a fulfillment center close to the customer, with the actual delivery performed by a local service provider (e.g., courier, Uber/Lyft driver).
Buy Online, Pick Up in Store (BOPIS)	Also known as "click and collect." An item followed the traditional bricks and mortar routing until it reached the store, where it was placed in a separate part of the store, then picked by an employee who passed it to the consumer at a dedicated pickup point. In 2017, 78% of consumers had used this mode in the last six months, 21% used it regularly.
Manufacturer Dropship	Manufacturers increasingly avoided the retailers' own distribution networks, through direct consumer orders with the manufacturer or drop shipping by the manufacturer of online retail purchases. For example, paper towels could be packaged for home delivery at the manufacturer's factory or warehouse and delivered directly to the consumer by FedEx or UPS.

Source: The data on consumers buying online and picking in stores comes from Glenn Taylor, "NRF: 78% of Consumers Shop in Stores as Often as Last Year," *Retail Touchpoints,* https://www.retailtouchpoints.com/features/news-briefs/nrf-78-of-consumers-shop-in-stores-as-much-as-last-year, accessed June 6, 2018.

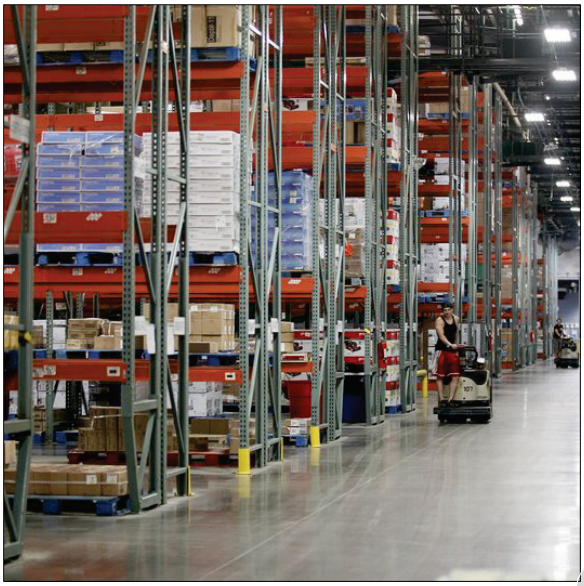
Exhibit 13 Comparative Cost Structure in US ($120 assortment of non-grocery goods)

Amazon	$	%	Walmart	$	%
Revenue	120	100.0	Revenue	120	100.0
COGS		69.6	COGS		68.2
Marketing		3.9	Marketing		0.5
SG&A		1.8	SG&A		2.3
IT		3.5	IT		1.0
Fulfillment		9.5	Logistics		2.5
Shipping (3rd party)		2.7	Store		2.0
Shipping (in-house)		6.0	Labor		12.9
Operating Income		3.0%	Operating Income		10.6%

Source: Casewriter estimates.

Note: $120 is the average value of a single Amazon delivery package and is for Amazon's own retail offerings. Product mix will differ between Walmart and Amazon. Amazon shipping costs as defined in their accounts "include sortation and delivery centers and transportation costs"; fulfillment costs are "primarily costs incurred in operating and staffing our North America and International fulfillment and customer service centers and payment processing costs."

Exhibit 14a Walmart (left) and Lidl (right) Distribution Centers



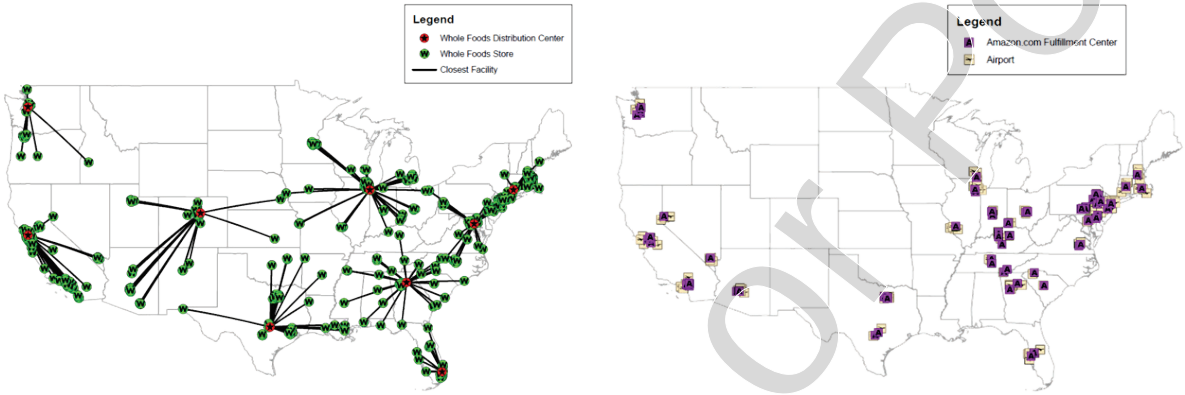
Source: Walmart distribution center from Fortune, June 2, 2016. http://fortune.com/2016/06/02/walmart-drones-warehouses/. Accessed January 2018. Lidl distribution center from Getty Images, March 14, 2014. Accessed January 2018.

Exhibit 14b Amazon Fulfillment Centers

Source: Left image from KQED June 29, 2011, https://ww2.kqed.org/news/2011/06/29/california-affiliates-tweeting-amazon-threatening-to-terminate/, accessed January 2018.

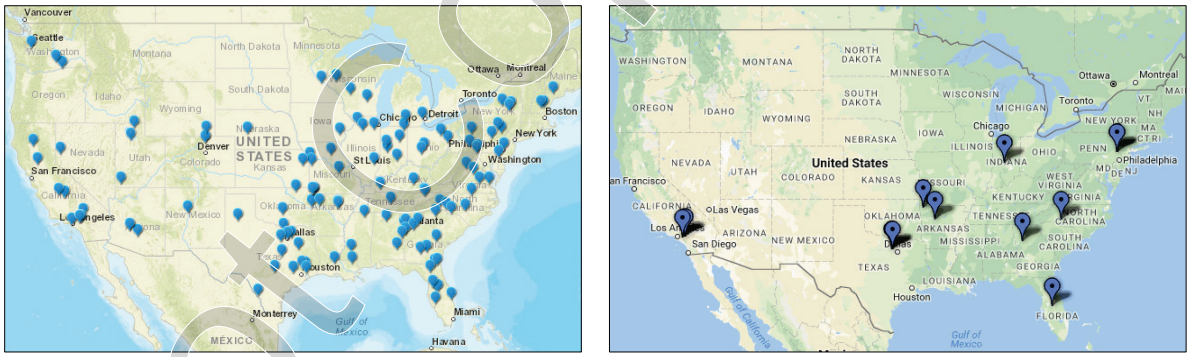
Right image from Daily Mail, November 2017, http://www.dailymail.co.uk/news/article-5111119/Amazon-s-new-warehouse-prepares-busiest-Black-Friday.html, accessed January 2018.

Exhibit 15 Whole Foods Distribution Center and Stores (left) and Amazon Fulfilment Centers (right), 2016



Source: Alex Evans, "The Everything Warehouse," Medium.com, June 25, no year, https://medium.com/@ahe4nc/the-everything-warehouse-9bdcf94446ff, accessed December 2017.

Exhibit 16 Walmart Distribution (left) and E-Commerce Fulfillment Centers (right) in U.S. (2016)



Source: Walmart distribution centers created in ArcGIS (last update 2016), http://www.arcgis.com/home/webmap/viewer.html?webmap=d5a46f348c55468d87e57288de6e4372, accessed December 2017. Walmart e-commerce fulfillment centers map created by case writer in Google Fusion Tables (last updated April 2017), MWPVL International Inc. "The Walmart Distribution Center Network in the United States," no date, http://www.mwpvl.com/html/walmart.html, accessed December 2017.

Exhibit 17 Walmart and Amazon Customer Demographics, 2015

	Walmart	Walmart.com	Amazon	Amazon Prime
Average Household Income ($)	56,000	61,000	62,900	69,300
Household Income (%):				
<$24,999	22	18	18	14
$25,000–$49,999	33	30	30	27
$50,000–$74,999	22	24	23	24
$75,999–$99,999	12	15	14	15
$100,000–$149,999	8	10	11	13
>$150,000	3	4	5	6
Median Age (years)	42.2	37.8	40.2	36.5

Source: Capital IQ, Cowen and Company Survey, December 3, 2015.

Exhibit 18 Walmart and Amazon Asset and Activity Comparison

	Walmart (U.S.)	Amazon
Employees	1.5 million in US (2.3 million worldwide)	542,000 worldwide including Whole Foods
Physical stores	4,672 with 700 million square feet; 3500 supercenters	13 Amazon Books; 1 Amazon Go; 456 Whole Foods
Distribution centers	147 (include Sam's club and all kind of distribution facilities)	Included in fulfillment centers
Fulfillment centers	15 large, dedicated and many partial conversions	299 warehouses of all forms in U.S.
Distribution area (sq. ft.)	130 million	70 million plus 18 million fresh food
Airplanes	For Distribution use: 0 For Corporate Traffic: 20	40 Prime Air cargo Planes
Trucks and trailers	Approximately 6,000-6500, 55,000 trailers	4,000 trailers, 0 trucks
Logistics partners	12 transportation companies; Uber	UPS; Fedex; USPS
Online SKUs	38 million, 2 million for free two day delivery	536 million; 30 million Prime Products
Third-party SKUs	67,000,000	Around 500 million
Private label SKUs	9,000–12,000	1,453 Amazon Basics SKUs, 10–20,000 SKUs overall
Pickup points	1,000 for grocery pickup 4,672 for general merchandise can be picked up at any stores	22 Instant Pickup Points; 1,800 Amazon lockers
Last-mile delivery method	Acquired parcel to offer same day delivery; partner with Uber; encourage employee to deliver; acquired August Smart Lock to give couriers access to homes	USPS; Fedex; UPS; Amazon Flex; Local Delivery Companies through Amazon Logistics; Amazon Key remote entry
Locations for two-hour delivery	Begin in New York City. Introducing "dark stores" in China	About 30 major cities

Source: Casewriter research, see endnotes.[106], [107]

Note: Walmart (U.S.) only includes U.S. operations and excludes Sam's Clubs.

Exhibit 19 Walmart and Amazon Service Comparison

	Walmart (U.S.)	Amazon
Voice ordering	Partnership with Google	Echo (Alexa)
Automatic reordering	Patented technology to automatically reorder and suggest additional products based on sensors placed on products	Dash Buttons; Amazon auto-ordering
Free shipping	2 day with $35 minimum purchase and items somewhat limited, 3–5 day with $35 minimum purchase	$99 Prime membership allows free two-day shipping on any order
Shipping fees: 2 hour	NA, testing $7–10 delivery by Uber or Lyft	Prime Now (25,000 products) free; 1 hour $7.99. Available in dozens of cities
Shipping fees: Same day	NA	Prime Now free
Shipping fees: Next day	NA	Free for select Prime products
Shipping fees: Two day	Two-day shipping requires no fee for 2 million items. No fee for orders over $35	Free with Prime for 40 million items
Pickup pricing	Free	NA
Additional Services	Streaming video services	Prime includes Amazon Music and Video Streaming; Prime Photos; Family; Kindle lending library; and *Washington Post* subscription
Pharmacy	Walmart Pharmacy and online ordering for pick up in store or home delivery	None, but entry likely.

Source: Casewriter research, see endnotes.

Note: Walmart (U.S.) only includes U.S. operations and excludes Sam's Clubs.

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