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AMAZON.COM: SUPPLY CHAIN MANAGEMENT[1]

On January 31, 2018, the market capitalization of Amazon.Com Inc. (Amazon) hit $702 billion, the highest level ever.[2] When its fourth-quarter results were released on February 1, 2018, Amazon showed a 30-per-cent increase in revenues, to $60.5 billion for the quarter, and net income for the quarter had increased by 150 per cent, to $1.9 billion.[3] From its start as a venture looking to build "earth's largest bookstore" in 1994, Amazon was now one of the most valuable companies in the world, and founder Jeff Bezos was the richest person on earth.

In 2018, Amazon had an online store that sold its own products and listed products for sale by more than two million third-party sellers.[4] Since its founding, Amazon had added more than 30 store categories, ranging from electronics to furniture, selling millions of different products and making an estimated 1.2 billion domestic customer shipments in 2017.[5] Amazon Web Services, the company's on-demand cloud-computing service, generated $17.5 billion in sales in 2017. Amazon Prime Video had become a leader in video-streaming services, with original-content series and movies that rivalled the offerings of Netflix. Its Echo devices, powered by the artificial-intelligence assistant Alexa, had more than 30,000 skills and could be used to control smart-home devices. The popular Kindle e-reader boosted sales of Amazon e-books. Amazon had increased its number of brick-and-mortar stores with the acquisition of Whole Foods Market (Whole Foods) in 2017. It had also opened AmazonFresh and Amazon Go grocery stores, as well as Amazon bookstores.

With total shipping costs that exceeded $21 billion in the most recent fiscal year,[6] the company was taking steps to gain greater control of its supply chain—a strategy that could eventually put Amazon in direct competition with United Parcel Service of America Inc. (UPS) and Federal Express Corporation (FedEx). In recent years, it had expanded into ocean freight forwarding, opened an air cargo hub, built a truck fleet, and established a parcel delivery network.[7] The company offered its third-party sellers fulfillment services called Fulfillment by Amazon (FBA), which provided transportation, warehousing, picking, packing, shipping, customer service, and returns for products sold through its website. The company's latest initiative, Shipping with Amazon, was a new service for any business offering package delivery to customers, regardless of whether they sold products on the Amazon site.[8]

From a standing start, Amazon—with 566,000 employees (referred to as "Amazonians")—had become more valuable than Walmart Inc. (Walmart), the world's largest retailer. However, given the broad variety and volume of products Amazon was selling through a range of formats, a key challenge for the

company's founder and chief executive officer, Jeff Bezos, was how to structure Amazon's supply chain to support the company's strategy and growth objectives. What supply chain capabilities would Amazon need as its business model continued to evolve?

THE RETAIL INDUSTRY

Total U.S. retail sales were estimated at $5.1 trillion in 2017,[1] of which e-commerce represented approximately $450 billion.[9] U.S. e-commerce sales were forecast to reach $640 billion by 2020.[10] Globally, retail sales were projected to reach $27.73 trillion in 2020,[11] and e-commerce's share was expected to increase from 10.2 per cent in 2017 to 15.5 per cent in 2020.[12]

Amazon was the world's largest online retailer and a competitor to traditional retailers, such as Walmart and Target Corporation (Target) (see Exhibits 1 and 2). By comparison, Walmart had generated an estimated $11.5 billion from e-commerce sales in the fiscal year ending January 2018, representing a 44-per-cent increase over the previous year.[13] Walmart had been working to catch up to Amazon; it had purchased the online retailer Jet.com for $3.3 billion in August 2016 to augment its Walmart.com site.[14] As an indication of Amazon's lead in the e-commerce space, Target had generated $706 million in e-commerce sales for the second quarter of 2017, an annualized run rate of $2.8 billion.[15]

Traditional Retail Supply Chain

The standard supply chain for retailers such as Walmart, Target, and Tesco PLC (Tesco) was driven by the orders retail buyers placed with suppliers, who coordinated the delivery of goods for sale. A significant portion of general merchandise was manufactured in Asia, and in 2016, U.S. retailers imported $479 billion of goods from China.[16]

Deciding what to place on shelves was a significant task for a store that could have more than 100,000 different items. Category buyers were responsible for selecting and pricing merchandise. Large retailers had approximately 40 categories, including housewares, toys, and fashion. A buyer normally set the assortment plan from quarter to quarter, accounting for changes in customer demand due to seasonal events such as Christmas, Easter, and back-to-school sale periods. In order to clear out inventory to make room for new product for the next season, retailers used a variety of approaches, including price discounts or markdowns, selling product to discount stores such as Nordstrom Rack, or returning goods to suppliers. It was estimated that end-of-season markdowns and discounting cost U.S. fashion retailers an average of 30 per cent of revenues.[17]

Since the 1990s, retailers had partially offloaded the responsibility for category management to category captains—key supplier partners with the capabilities to analyze, review, and plan the assortment recommendations for product categories such as toothpaste, shaving products, and cough and cold medication. At Walmart, for example, there were 40,000 suppliers; this included just 200 strategic suppliers, such as large consumer packaged goods firms Procter & Gamble Company and General Mills Inc.[18] Retailers provided suppliers with access to sales, inventory, and other data in real time, using online information portals such as Walmart's Retail Link network. Analysts working for suppliers downloaded and reviewed this data and then brought their recommendations to category buyers, who had the final say over approving these assortment recommendations, called "planograms."

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[1] U.S. retail trade statistics were broadly based and included retail stores, food services, and automobile dealership sectors.

It was often challenging for small and medium-sized businesses to sell products to large retailers. First, it was difficult to secure meetings with buyers, who were likely to stay with proven product assortment plans and less likely to devote shelf space to unproven new items. It generally took six to eight months for new products to be added to shelves, as assortment plans were developed and current merchandise was phased out.

Retailers and large suppliers tended to outsource a large portion of their logistics needs, starting at the suppliers' factory gates and ending at retailers' distribution centres (DCs). They relied on third-party logistics providers and freight forwarders to ensure timely shipping and delivery of goods, which could involve a combination of marine, rail, and truck transport. Goods were shipped in bulk—in container loads—from supplier factories and then consolidated, broken apart into cases, and stored. Retailers shipped mixed batches of cases from their DCs in full trucks to stores. At the store, employees placed the goods in inventory in the backroom warehouse, re-stocking shelves as required. While money was collected from customers immediately, payments to suppliers were generally made in 30 to 60 days.

Retailers had to deal with one final logistics piece after the product was sold: the returns process. Retailers worked with manufacturers to determine how best to handle returns. This service was often outsourced to firms such as FedEx Supply Chain and Optoro Inc.

The retailing boom in the United States, which started in the 1950s, had left the country "overstored"— with too much retail capacity in relation to demand—and consumer traffic in malls had been declining steadily since 2014.[19] The *Wall Street Journal* noted that the United States had more than five times the gross leasable retail space per capita than the United Kingdom and that, in 2018, U.S. retailers were on track to close more than 8,600 locations, which would eclipse the number of store closures during the 2008 recession.[20]

AMAZON.COM

In 1994, Jeff Bezos quit his job as vice-president of D.E. Shaw, a Wall Street investment management firm, and moved to Seattle, Washington, to start Cadabra, Inc., which he later re-named Amazon.com (Amazon). He started to sell books online because books were low-price items with a large variety of categories.

Amazon went public in May 1997, raising $54 million on the Nasdaq stock exchange.[21] Its online retail store grew in the years after the dotcom boom ended, a period during which there were few, if any, serious competitors. Starting in 2000, Amazon allowed third parties to sell on its site. It also acquired other online booksellers, such as Bookpages Ltd. in the United Kingdom and Telebook Inc. in Germany, and rebranded them as Amazon sites.

Amazon moved beyond books in an attempt to broaden the appeal of its online store, buying online retailers specializing in various niche markets. A few of these included drugstore.com, Diapers.com, Audible.com, and Zappos.com.

To attract more users, Amazon started offering a service called Amazon Prime for a flat fee of $75 per year in 2005. Prime offered members free two-day shipping on eligible items, access to Prime Video and Prime Music, and free online books.[22] In about 5,000 cities and towns, Prime offered customers free same-day and one-day delivery for more than one million items. In selected areas, Prime offered two-hour deliveries on tens of thousands of items through its Prime Now hubs.[23] As of April 2018, there were over 100 million Prime members, who spent an average of about $1,300 a year on Amazon's website, significantly more than

the $700 spent by non-members. In April 2018, Amazon announced that it was increasing the annual price of its Prime membership by 20 per cent, to $119, citing rising costs and expanded services, such as an expanded library of streaming music and videos.[24] In 2017, Amazon had generated about $9.72 billion in revenues from subscription services, which included fees from Prime members.[25]

Amazon also branched out beyond online retail, starting Amazon Web Services (AWS)—a data services firm that originally provided information on Internet traffic patterns—in 2006. In 2018, AWS provided more than 90 cloud-computing services, including networking, storage, analytics, mobile, and tools for machine learning, artificial intelligence, and the Internet of Things. Its most popular services included Amazon Elastic Compute Cloud and Amazon Simple Storage Service.[26]

Amazon also started testing physical store concepts such as AmazonFresh grocery stores in 2007 and bookstores in 2015. It made a more significant commitment to brick-and-mortar retail when it purchased Whole Foods for $13.7 billion on June 16, 2017, signalling that it had serious intentions of capturing a greater share of the $800-billion-per-year U.S. grocery market. Although online sales accounted for an estimated 3 per cent of the U.S. grocery market in 2017, this segment was expected to increase dramatically in the next five years. Amazon's total grocery sales in 2017 were an estimated $2 billion.[27] When the Whole Foods deal was announced, Amazon's market capitalization jumped by $15.6 billion.[28]

Amazon had succeeded because, according to Amazon's chief technology officer, Werner Vogels, it had relied on several key building blocks and the "flywheel effect"—the concept that core technology pieces, once assembled, could drive other positive effects and innovations—to maintain its technological edge over rivals (see Exhibit 3). As Vogels commented during BoxWorks, a tech show, "We may be a retailer, but we are a tech company at heart. When Jeff started Amazon, he didn't start it to open [a] book shop. He was fascinated by the Internet. We are missionaries. It's why we do innovation, to make life better for our customers."[29] This innovation was illustrated in the development of important Amazon products and services over the years (see Exhibit 4).

THE DEVELOPMENT OF AMAZON'S SUPPLY CHAIN

Amazon's distribution network started with the building in 1994 of two warehouses, which Amazon called fulfillment centres, in Seattle and Delaware. The Seattle fulfillment centre was 8,640 square metres (93,000 square feet) and resembled other retailers' fulfillment centres with manual receiving, warehousing, picking, packaging, and shipping operations. Boxes were packed, taped, and weighed, and then they were shipped by either U.S. Postal Service (USPS) or UPS, arriving at the customer's location within one to seven days.[30] The Delaware fulfillment centre was larger—18,766 square metres (202,000 square feet). In 1999, the company opened five more fulfillment centres as well as its first European fulfillment centres—two in Germany (Regensburg and Bad Hersfeld) and one in Marston Gate, United Kingdom. Six years passed before Amazon opened more fulfillment centres, in 2005.

In 2006, Amazon created FBA, a service that managed the fulfillment process for its third-party sellers. Third-party sellers could manage their own inventory and ship directly to Amazon customers (for which they would be reimbursed the standard shipping and packaging fees), or they could outsource inventory storage, picking, shipping, customer service, and returns to Amazon through FBA (see Exhibit 5).

In 2013, it was reported that Amazon had launched an umbrella project, code named "Dragon Boat," to expand its fulfillment capabilities. This initiative aimed to create a global delivery network to facilitate the movement of goods from China and India to Amazon DCs in the United States and the United Kingdom.[31]

The volume of Amazon orders overwhelmed UPS and other carriers during the 2013 Christmas holiday season. Late deliveries of customer orders reportedly cost Amazon millions of dollars in refunds and motivated management to embark on plans to build its own last-mile delivery network.[32]

In 2016, Amazon created a venture named "Global Supply Chain by Amazon" that featured Amazon as a global logistics provider, targeting all services, including trucking, freight forwarding, and customer delivery. According to Amazon, it would be a "revolutionary system that will automate the entire international supply chain and eliminate much of the legacy waste associated with document handling and freight booking."[33] This initiative would see Amazon purchase space, in bulk, on airplanes, trucks, and ships, allowing it to bypass brokers and thereby reduce logistics costs. Amazon added that sellers would no longer book with DHL, UPS, or FedEx, but would book directly with Amazon. The ease and transparency of this disintermediation would be revolutionary, and sellers would flock to FBA, given the competitive pricing.[34]

Whole Foods sourced products from local, regional, and national producers. It had three seafood processing and distribution facilities, a specialty coffee and tea procurement and roasting operation, and 11 regional DCs that focused primarily on distributing perishables to stores across the United States, Canada, and the United Kingdom. In addition, Whole Foods had three regional commissary kitchens and four bake-house facilities, all of which distributed products to its stores. Other products were typically procured through a combination of specialty wholesalers and direct distributors. United Natural Foods Incorporated (UNFI) was the company's largest third-party supplier, accounting for approximately 32 per cent of its total purchases in 2016.[35]

To make Whole Foods more attractive to customers, Amazon reduced prices in 2017 on a selection of best-selling grocery staples.[36] With an estimated 62 per cent of Whole Foods customers—about eight million people—maintaining Amazon Prime memberships, there were cross-selling opportunities as well. Amazon had plans to sell electronic goods at Whole Foods and offer special in-store discounts to its Prime members.[37]

Amazon also planned to use Whole Foods' 400-plus stores as pickup locations for groceries and to handle returns.[38] The chain's stores and supply chain provided Amazon with access to the refrigerated distribution system its existing network lacked, which it could use to supply home delivery of groceries. Meanwhile, the Whole Foods supply chain would benefit from being part of Amazon, with its greater purchasing power and opportunities to achieve cost efficiencies.[39] In February 2018, Amazon announced it would start delivering Whole Foods groceries via its Prime Now hubs in four markets. Amazon's supply chain had evolved over time (see Exhibit 6), and Prime Now was Amazon's fastest delivery option, with one- and two-hour delivery service.[40]

AMAZON'S SUPPLY CHAIN IN 2018

Traditional retailers purchased goods from manufacturers in bulk and took receipt, in full container loads, at their DCs. In contrast, Amazon's strategy was to control the shipment of goods across the entire supply chain, including procurement, shipment to DCs, and final customer delivery. As of November 2017, Amazon had 573 million products for sale on its website in what seemed like an unlimited number of categories and subcategories.[41] The category on Amazon.com with the most sales in 2017—more than $8 billion—was the company's consumer electronics division, which included Fire tablets, laptops, headphones, and other computer components. Home and kitchen, publishing (including books), and sports and outdoors were other top-grossing categories.[42]

Amazon had first-party, second-party, and third-party sellers. A first-party seller was a manufacturer that sold product directly to Amazon. The online labelling for these items stated, "Ships from and sold by Amazon.com." For these products, Amazon was the merchant of record (MOR) and the legal owner of the inventory prior to delivery. Second-party sellers were resellers that bought from brands or manufacturers and then sold the product to Amazon. Amazon was the MOR for second-party products. Lastly, third-party sellers relied on Amazon's marketplace to sell directly to customers. These third-party sellers were the MOR for their products.

Amazon's buyers purchased and priced goods for sale on the Amazon site, placing orders to replenish inventory. Third-party sellers could quickly and conveniently list products for sale in 20 low-risk categories, such as stationery, books, clothing, cell phones, beauty, baby products, and fashion jewellery. Product categories that required approval included collectible coins, fine jewellery, automotive and power sports products, sports collectibles, and watches.[43] For other categories, including packaged food, sellers were required to apply for verification and approval to ensure they met applicable government standards.

Amazon had more than two million third-party sellers worldwide, including more than one million small businesses in the United States.[44] In 2017, for the first time, more than half of the units sold on Amazon's site were from third-party sellers.[45] Third-party sellers accounted for 26 per cent of Amazon's order volume in units in 2007. Ten years later, third-party seller volume represented approximately 51 per cent of the total units shipped, while revenue from third-party seller services[46] was $32 billion.[47]

PROCUREMENT

Amazon purchased products for resale on its site, acting as the MOR. Its buyers purchased goods for resale, pulling product from manufacturers' warehouses on a weekly basis. Each Monday, Amazon's buyers would send, electronically, a list of purchase orders for items that manufacturers would then ship to one of the company's 122 fulfillment centres. Suppliers, second-party sellers, and third-party sellers would log into Vendor Central, Amazon's ordering application, and download the orders as Excel or PDF files. Amazon typically offered suppliers the option of receiving orders in multiples of up to six units. Thus, if a particular fulfillment centre needed only one unit, Amazon would wait until it could trigger a six-unit order before issuing the purchase order.

Suppliers could enter shipping details on Vendor Central, follow up with tracking numbers, and submit invoices. Amazon typically offered payment terms in the 90- to 120-day range. The features of Vendor Central contrasted starkly with the ordering systems of most brick-and-mortar retailers, who continued to rely on a system of emailed or faxed purchase orders and manual invoice processing. One exception was Walmart, with its Retail Link system.

WAREHOUSING AND DELIVERY

Amazon's distribution network consisted of a network of sortation centres, fulfillment centres, Prime Hubs, outbound sortation centres, and delivery stations. In April 2018, it had 122 fulfillment centres and 207 other DCs in the United States. These other facilities and services included eight inbound sortation centres; 122 fulfillment centres; 39 outbound sortation centres; 33 fresh food DCs, including Whole Foods DCs; 53 Prime Now hubs; and 71 Amazon Flex services delivery stations (see Exhibit 7).

The typical flow for goods through Amazon's distribution system was as follows: Product from overseas arrived at one of Amazon's inbound sortation centres before being sent to a fulfillment centre. Domestic

suppliers often shipped goods directly to fulfillment centres. From the fulfillment centres, product followed one of three channels. First, it could be shipped to FedEx or UPS, who handled customer delivery. A second option was for it to be sent as part of a truckload of packages to an outbound sortation centre, where packages would be sorted and loaded together with other packages destined for a similar ZIP code; these shipments would go to the USPS, and letter carriers would deliver them to customers. A third option was for shipments to go from outbound sortation centres to an Amazon delivery station or hub, where local couriers or Amazon Flex drivers would deliver the packages to customers.[48]

In October 2017, Amazon introduced Amazon Key, a smart lock system. One feature of this system was the ability to allow Amazon couriers access to customers' homes to place packages inside.[49]

Fulfillment Centres

Amazon's fulfillment centres were warehouses where product was stored, picked, and shipped. Individual fulfillment centres focused on specific types of product, such as small sortable, large sortable, large non-sortable, specialty apparel and footwear, specialty small parts, and returns. Small sortable fulfillment centres handled items smaller than a typical box in length, which could be placed in totes and ferried around on conveyor belts. These items included books, small electronics, and watches. Large sortable fulfillment centres looked after products that were too large to fit in typical 18-inch boxes and that could not be sorted easily.[50] For example, the Arizona PHX3 facility was dedicated to apparel and footwear; the California LGB4 facility was for large items such as sports equipment, patio furniture, and pet food; Indiana IND5 was for large non-sortable items and for hazardous materials (hazmat) merchandise; and Illinois MDW4 was for apparel, shoes, watches, and jewellery.[51]

In an effort to control logistics costs, Amazon invested heavily in warehouse automation. It acquired Kiva Systems in 2012 and later re-named it Amazon Robotics. This division designed and installed warehouse automation systems exclusively for Amazon. Amazon Robotics automated fulfillment centres with the latest technology, such as autonomous robots and associated systems, control software, and devices that incorporated innovative tools such as computer vision, depth sensing, and object recognition.[52]

Fresh Food Distribution Centres

Amazon had a separate set of DCs for fresh food and cold storage grocery. These facilities had refrigeration and infrastructure to handle perishable soft foods. Amazon had retained the Whole Foods DCs to focus on serving physical stores and to augment Amazon's online perishables orders.[53]

Prime Now Hubs

Through its Prime subscription service, Amazon offered special items for rapid shipment to Prime members in select markets. Prime Now Hubs were smaller buildings—about 1,765–4,645 square metres (19,000–50,000 square feet)—located in or near urban centres. They warehoused a small subset of the fastest-moving items that were available to Prime subscribers—about 15,000 stock-keeping units. Delivery for these items was made as little as 60 minutes after customers placed their online orders.[54]

Outbound Sortation Centres

Goods ready for shipment from fulfillment centres were also sent to outbound sortation centres (OSCs). Unlike in a traditional order-fulfillment process, where packaged orders went straight to the shipper for sorting and shipping, Amazon OSCs received, sorted, and packaged orders before delivering them to the shippers. Amazon coined the term "sortation centre" in 2014 when it opened its first such centre in Kent, Washington.[55] According to Amazon, "Our sortation centers are at the intersection of our passion between our transportation and logistics networks and help us provide our Prime members with their orders in two days or less."[56]

Outbound sortation centres allowed Amazon to have greater control over the outbound transportation of packages. By identifying opportunities to rely on low-cost carriers, such as the USPS, local couriers, and independent Amazon Flex drivers, OSCs aimed to divert volume away from UPS and FedEx. In 2017, 3 per cent of FedEx's revenues came from Amazon, compared to 7 per cent at UPS.[57]

Amazon Flex

Amazon Flex was a program that started in February 2016. Similar to Uber, but for package delivery, it enabled contract drivers to make $18 to $25 dollars per hour delivering Amazon packages within select metropolitan areas. The first four cities to use Amazon Flex were Seattle, Las Vegas, Phoenix, and Dallas. Drivers signed up through a mobile application (app), similar to that provided by Uber. Amazon was looking to save costs by using Flex drivers instead of dedicated local couriers, which could charge 35 per cent of the total shipping cost to deliver goods in the last mile.[58]

Delivery Stations

Instead of being directed to OSCs, product from fulfillment centres could go to delivery stations. Amazon's delivery station network (DSN) facilities were similar to OSCs, but with key differentiating features. First, they were smaller—5,574–9,290 square metres (60,000–100,000 square feet)—and they were nested within larger metropolitan centres. Second, DSNs focused on last-mile and rapid outbound shipments within a tightly confined urban region. Third, DSNs relied heavily on contractors, such as independent Amazon Flex drivers, to deliver packages.[59]

Transportation

Amazon started building its truck fleet in 2015 to take increased control over shipments to and between its fulfillment centres and sortation centres.[60] In July 2017, Amazon was also leasing 40 cargo planes as part of its logistics network.[61] In January 2017, Amazon relied on its freight forwarding arm, set up in Beijing in October 2016, to arrange the transportation of goods from China to North America.[62]

Amazon shipping costs included the costs of sortation and delivery centres and transportation costs; these were $4 billion in 2011, $5.1 billion in 2012, $6.6 billion in 2013, $8.7 billion in 2014, $11.5 billion in 2015, $16.2 billion in 2016, and $21.7 billion in 2017.[63] Total fulfillment expenses included shipping costs (see Exhibit 8). Management expected that shipping costs would increase as more consumers became Prime members and accepted two-day shipping offers. To offset these shipping costs, the company was working to optimize delivery operations by investing in new technologies and negotiating better prices with suppliers as volumes increased.

Physical Store Network

As of January 2018, Amazon's brick-and-mortar store network consisted primarily of 465 North American and seven international Whole Foods stores. Other locations included 12 bookstores in the United States and an experimental Amazon Go grocery store in Seattle. Amazon opened its first bookstore in November 2015 at Seattle's University Village shopping centre, and it had 11 other locations across the United States. It planned to open more bookstores in Walnut Creek, California; Austin, Texas; and Washington, D.C. In the third quarter of 2017, Amazon began reporting sales from its physical stores, with sales reaching $1.3 billion in the quarter.[64]

BUILDING A GLOBAL LOGISTICS GIANT

In 2018, Amazon was both a retailer of merchandise and digital content and an operator of a chain of grocery stores and a chain of bookstores, and it had more than 300 million customers around the world. It contributed about 4 per cent of total U.S. retail sales, and its market share of the e-commerce segment was estimated to be approximately 43 per cent. By comparison, its two closest competitors, eBay and Walmart, had 7.4 per cent and 4.3 per cent of the U.S. e-commerce market, respectively.[65] In addition, Amazon had video-streaming and music-streaming services and offered cloud-computing platform services. Amazon was continually exploring new products, services, and markets. Meanwhile, it was using new technologies and logistics models to exploit opportunities to reduce supply chain costs and improve customer service.

Despite Amazon's rapid growth, the company faced challenges in its supply chain. In 2017, Amazon shipped over five billion items worldwide through its Prime program alone.[66] However, based on the difference between what Amazon charged customers and third-party sellers for shipping and the actual costs the firm incurred to deliver those packages, Amazon lost $7.2 billion on shipping in 2016: it had outbound shipping costs of $16.167 billion and revenues from shipping of $8.976 billion.[67]

The company's shipping volume was set to grow as it continued to build its business-to-business (B2B) marketplace, Amazon Business. Launched in 2015, Amazon Business was a B2B marketplace that had more than $1 billion in sales in its first year of operations. By July 2017, it had one million business users and had expanded to Germany and Britain.[68] Along with other business segments (see Exhibit 9), Amazon's B2B marketplace continued to grow.

Amazon had a fleet of long-haul truck trailers to ship by ground, and it was experimenting with delivery drones and had a fleet of Boeing 767-300s for its Prime Air logistics service. It had established a freight forwarding company to manage marine shipments. It was using big data to pre-position packages in the delivery chain in anticipation of customer orders, and it had established a last-mile delivery network in some markets. It was encroaching on FedEx and UPS in an effort to control the entire delivery chain. As a result, Amazon's capital investment in its distribution network had accelerated to $13.2 billion in 2017, up from $5.2 billion in 2016.[69]

In February 2018, the *Wall Street Journal* reported that Amazon was looking to enter the business-to-consumer shipping market. This new service, called Shipping with Amazon, would deliver packages from merchants' warehouses to customers' homes.[70] While the initial trial was limited to Los Angeles, couriers such as FedEx and UPS saw their shares fall by 4 per cent on the announcement.[71]

While one certainty was that Amazon's business model would continue to evolve, a key challenge facing Bezos was determining how Amazon's supply chain should change to support the company's strategic objectives.

EXHIBIT 1: KEY FINANCIAL INFORMATION FOR AMAZON, WALMART, AND TARGET*
(IN US$ MILLIONS)

Amazon (Fiscal year end Dec 31)	2014	2015	2016	2017
Net sales	88,988	107,006	135,987	177,866
Product sales	70,080	79,268	94,665	118,573
Service sales	18,908	27,738	41,322	59,293
Cost of sales	62,752	71,651	88,265	111,934
Operating income				
Product sales	(280)	726	1,078	(225)
AWS	478	1,507	3,108	4,331
Fulfilment expenses	10,766	13,410	17,619	25,249
Net income (loss)	(241)	596	2,371	3,033
Total shareholders' equity	10,741	13,384	19,285	27,709
Accounts receivable, net	5,612	6,423	8,339	13,164
Accounts payable	16,459	20,397	25,309	34,616
Inventories	8,299	10,243	11,461	16,047
Total assets	54,505	65,444	83,402	131,310

Walmart (Fiscal year end Jan 31)	2015	2016	2017	2018
Net sales	482,229	478,614	481,317	495,761
Cost of sales	365,086	360,984	361,256	373,396
Operating income	27,147	24,105	22,764	20,437
Net income (loss)	16,363	14,694	13,643	9,862
Total shareholders' equity	85,937	83,611	80,535	80,822
Accounts receivable, net	6,778	5,624	5,835	5,614
Accounts payable	38,410	38,487	41,433	46,092
Inventories	45,141	44,469	43,046	43,783
Total assets	203,706	199,581	198,825	204,522

Target (Fiscal year end February 3)	2015	2016	2017	2018
Net sales	72,618	73,785	69,495	71,879
Cost of sales	51,278	51,997	48,872	51,125
Operating income	4,535	5,530	4,969	4,312
Net income (loss)	2,449	3,321	2,669	2,928
Total shareholders' equity	13,997	12,957	10,953	11,709
Accounts receivable, net	493	379	385	416
Accounts payable	7,759	7,418	7,252	8,677
Inventories	8,790	8,601	8,309	8,657
Total assets	41,404	40,262	37,431	38,999

Note: *Amazon's fiscal year end was December 31. Walmart's and Target's fiscal year end was approximately 30 days later, but in the following calendar year. For example, Walmart's fiscal year end was January 31, 2018, and Amazon's 2017 fiscal year end was December 31, 2017, AWS = Amazon Web Services.
Source: Amazon.com Inc., Walmart Inc., and Target Corporation, "Key Financial Information, 2014–2018," Mergent, accessed April 16, 2018.

EXHIBIT 2: AMAZON OPERATING INCOME BY BUSINESS SEGMENT
(IN US$ MILLIONS)

Amazon (Fiscal year end Dec 31)	2014	2015	2016	2017
Net sales:				
North America	50,834	63,708	79,785	106,110
International	33,510	35,418	43,983	54,297
AWS	4,644	7,880	12,219	17,459
Total Net Sales	88,988	107,006	135,987	177,866
Operating income:				
North America	360	1,425	2,361	2,837
International	(640)	(699)	(1,283)	(3,062)
AWS	478	1,507	3,108	4,331
Total Operating Income	198	2,233	4,186	4,106

Note: AWS = Amazon Web Services
Source: Amazon.com Inc. *2017 Annual Report*, 37, April 18, 2018, accessed June 15, 2018, http://phx.corporate-ir.net/phoenix.zhtml?c=97664&p=irol-reportsannual.

EXHIBIT 3: AMAZON'S AND WALMART'S PRODUCTIVITY MODELS*
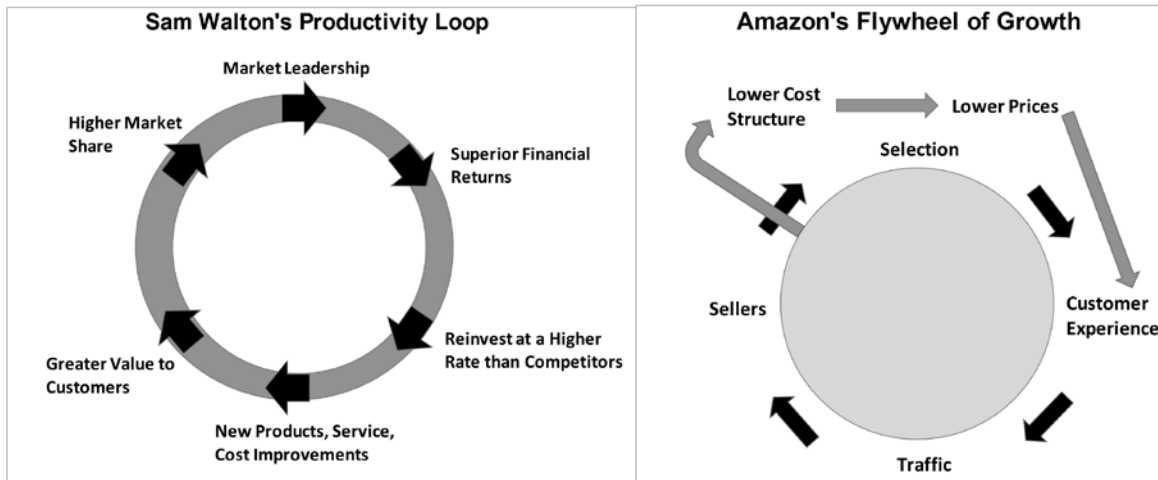
Note: *A flywheel was a mechanical device specifically designed to efficiently store rotational energy. Flywheels resisted changes in rotational speed by their moment of inertia. The term "flywheel effect" came from Jim Collins's book, *Good to Great*, and was used by Bezos to describe the firm's business model; Jim Collins, "The Flywheel Effect," excerpted from *Good to Great*, Jim Collins, accessed June 15, 2018, www.jimcollins.com/article_topics/articles/the-flywheel-effect.html; https://www.entrepreneurs-journey.com/24146/flywheel-virtuous-cycle/.
Source: Adapted by the case authors from Robert Sabath and Richard Sherman, "Want to Innovate Your Supply Chain? Break the Rules," Supply Chain 247, April 21, 2013, accessed June 15, 2018, www.supplychain247.com/article/want_to_innovate_your_supply_chain_break_the_rules/HP.

EXHIBIT 4: AMAZON—PRODUCTS AND SERVICES

Product/Service/Event	Description	Date
Amazon's incorporation	Start of website operations in July 1995	1994
Amazon's initial public offering		1997
Amazon Prime	Membership services: free shipping on selected Amazon items; access to Amazon Prime video and other benefits	2005
Amazon Web Services	Cloud-computing services	2006
Video	Internet video-on-demand service, offering films for rent and purchase, and Prime Video—a selection of Amazon Studios' content and licensed video	2006
AmazonFresh	Limited-selection grocery stores delivering groceries to customers	2007
Kindle	E-readers	2007
Kindle Store	Online store selling e-books	2007
Amazon Music	Music streaming service with millions of songs	2007
Amazon Digital Game Store	Digital video game distribution service	2009
AmazonWireless	Service offering cell phone plans and services from providers such as AT&T and Verizon	2009
Amazon Studios	Original content development, including TV series and films	2010
App store	Online store selling apps	2011
Amazon Drive	Cloud storage application	2011
Fire tablets	Tablet computers	2011
Fire TV	Digital media player	2014
Echo	Cloud-based voice assistant Alexa	2014
Amazon Business	Business-to-business supplies marketplace	2015
Amazon Books	Physical bookstores in California, Illinois, Massachusetts, New Jersey, New York, Oregon, and Washington State	2015
Whole Foods Market	Grocery stores focused on natural foods	2017
Amazon Go	Partially-automated grocery store: first location in Seattle, Washington, opened to the public	2018
Shipping with Amazon	Delivery service for businesses shipping to consumers	2018

Source: Created by the case authors based on content from Amazon.com Inc., accessed June 15, 2018 https://www.amazon.com/

EXHIBIT 5: FULFILLMENT BY AMAZON FEES (IN US$)

Fulfillment and Monthly Storage Fees		
Fulfillment Fees/per unit	Standard Size	Oversize
Includes picking and packing your orders, shipping and handling, customer service, and product returns	Small (1 lb. or less): $2.41 Large (1 lb. or less): $3.19 Large (1 lb. to 2 lb.): $4.71 Large (over 2 lb.): $4.71 + $0.38/lb. above first 2 lb.	Small: $8.13 + $0.38/lb. above first 2 lb. Large: $9.44 + $0.38/lb. above first 2 lb. Large: $73.18 + $0.79/lb. above first 90 lb. Special oversized: $137.32 + $0.91/lb. above first 90 lb.
	Add $0.40/unit for clothing items	
Monthly Inventory Storage/per cubic foot	Standard Size	Oversize
Charged for all units stored in an Amazon fulfillment centre based on calendar month and your daily average volume	January–September: $0.64 per cubic foot	January–September: $0.48 per cubic foot
	October–December: $2.40 per cubic foot	October–December: $2.40 per cubic foot

Note: lb. = pound
Source: "Fees and Rate Structure," Amazon Services, accessed May 2, 2018, https://services.amazon.com/fulfillment-by-amazon/pricing.htm/ref=asus_fba_snav_p.

EXHIBIT 6: AMAZON.COM—SUPPLY CHAIN EVOLUTION

- 1995 – E-commerce sales start.
- 1995 – Distribution centres (DCs) created; DCs allow for bulk product to be received, warehoused, sorted, picked, and shipped, individually, to customers.
- 1997 – Amazon starts to rely on external warehouses to supplement its DCs.
- 2000 – Amazon creates a marketplace for third-party sellers.
- 2006 – Fulfillment by Amazon begins, allowing third-party sellers to have Amazon fulfill orders for customers.
- 2007 – Amazon payments: Amazon launches a payment service to rival PayPal's offer, allowing third-party sellers to set up electronic payment services on their sites.
- 2007 – Amazon develops and launches proprietary electronic products.
- 2012 – Amazon acquires Kiva Systems, a designer and installer of warehouse automation systems, and re-brands it as Amazon Robotics.
- 2013 – Amazon initiates Operation Dragon Boat to coordinate the shipment of product from factories to its distribution centres.
- 2013 – Amazon launches a Black Friday Deal store.
- 2014 – Amazon consolidates inbound shipments and distributes to its own DCs.
- 2015 – Amazon begins building its own air and truck fleet.
- 2015 – Amazon launches Amazon Business.
- 2015 – Amazon launches Prime Now local store delivery.
- 2016 – Amazon launches Prime Air, a venture to test delivering packages by drone.
- 2016 – Amazon launches its own freight forwarding service, to be used internally.
- 2017 – Amazon launches sortation centres to sort merchandise before it is sent to DCs.
- 2017 – Amazon acquires Whole Foods Market.
- 2018 – Amazon Go, a self-checkout grocery store concept, opens in Seattle.
- 2018 – Grocery delivery from Whole Foods Market.

Source: Created by the case authors based on content from Zvi Schreiber, "Amazon Logistics Services - The Future of Logistics?," Supply Chain 247, February 2, 2016, accessed June 15, 2018, https://www.supplychain247.com/article/amazon_logistics_services_the_future_of_logistics; "Amazon: The Making of a Giant," *Wall Street Journal*, accessed June 15, 2018, www.wsj.com/graphics/amazon-the-making-of-a-giant/.

EXHIBIT 7: AMAZON.COM—U.S. AND GLOBAL FACILITIES AS OF APRIL 2018

USA	Currently Active	Future Facilities	Active Square Feet	Future Square Feet
Fulfillment Centres, Supplemental Centres, Return Centres	122	32	93,260,721	26,824,968
Pantry/Fresh Foods Centres	21	1	3,845,456	140,000
Whole Foods Retail Grocery Distribution Centres	12	0	1,043,850	-
Prime Now Hubs	53	0	1,880,541	-
Inbound Sortation Centres	8	1	4,683,164	615,440
Outbound Sortation Centres	39	2	11,326,292	556,136
Delivery Stations	70	4	5,989,162	274,725
Other	3	0	112,665	-
Airport Hubs	0	1	-	3,350,000
Subtotal USA	328	41	122,141,851	31,761,269
Rest of the World	380	14	67,802,023	6,383,160
Total Amazon	708	55	189,943,874	38,144,429

Source: Excerpted from MWPVL International, "Amazon Global Fulfillment Center Network," MWPVL International, accessed May 2, 2018, www.mwpvl.com/html/amazon_com.html.

EXHIBIT 8: AMAZON FULFILLMENT EXPENSES (IN US$ MILLIONS)

Year	Product Sales	Cost of Sales	Fulfillment Expenses
2011	42,000	37,288	4,576
2012	51,733	45,971	6,419
2013	60,903	54,181	8,585
2014	70,080	62,752	10,766
2015	79,268	71,651	13,410
2016	94,665	88,265	17,619
2017	118,573	111,934	25,249

Source: Amazon.com Inc., *Annual Report on Form 10-K for the Fiscal Year Ended December 31, 2017*, February 2, 2018, accessed May 3, 2018, https://www.sec.gov/Archives/edgar/data/1018724/000101872418000005/amzn-20171231x10k.htm.

EXHIBIT 9: AMAZON GLOBAL REVENUES BY SEGMENT (IN US$ MILLIONS)

	2014	2015	2016	2017
Online	68.51	76.86	91.43	108.35
Physical stores				5.80
Retail third-party seller services	11.75	16.09	22.99	31.88
Subscription services	2.76	4.47	6.39	9.72
Amazon Web Services	4.64	7.88	12.22	17.46
Other	1.32	1.71	2.95	4.65
Total	88.98	107.01	135.98	177.86

Notes:
1. Online: Includes product sales and digital media content.
2. Physical stores: Includes product sales where our customers physically select items in a store.
3. Retail third-party seller services: Includes commissions, related fulfillment and shipping fees, and other third-party seller services.
4. Subscription services: Includes annual and monthly fees associated with Amazon Prime membership, as well as audiobook, e-book, digital video, digital music, and other non-Amazon Web Services subscription services.
5. Other: Includes sales not otherwise included above, such as certain advertising services and co-branded credit card agreements.
Source: Created by the case authors based on data from "Global Net Revenue of Amazon.Com from 2014 to 2017, By Segment (in Billion U.S. Dollars)," Statista, February 2018, accessed May 3, 2018, https://www.statista.com/statistics/672747/amazons-consolidated-net-revenue-by-segment/.

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