EVERYTHING TO EVERYONE:
AMAZON’S RELENTLESS QUEST TO REINVENT
HOW PEOPLE PURCHASE EVERYTHING

NICHOLAS C.S. ARTMAN
SPRING 2017

A thesis
submitted in partial fulfillment
of the requirements
for a baccalaureate degree
in Supply Chain Management
with honors in Supply Chain Management

Reviewed and approved* by the following:

Robert A. Novack
Associate Professor of Supply Chain Management
Thesis Supervisor

John Spychalski
Professor Emeritus of Supply Chain Management
Honors Adviser

* Signatures are on file in the Schreyer Honors College.
Abstract

The objective of this thesis will be to examine Amazon's past supply chain strategies that have allowed them to set a new precedence in the e-commerce world, as well as explore Amazon's newest logistical initiatives as they continuously enhance their supply chain network's speed and cost efficiency.

The final analysis of this academic research is reached by exploring an in-depth look into the strategic supply chain initiatives of Amazon’s past, present, and proposed future. For example, this research examines what Amazon has used in recent years that have lead them to becoming the United States’ largest online retailer, and revolutionized e-commerce shopping through fast yet cost-effective processing and shipping methods. This analysis then proceeds to examine Amazon's current and upcoming network strategies, not only to gain a deeper understanding of them, but also to provide evidence and theory on how Amazon could potentially improve upon their existing and proposed methods.

This thesis creates a platform that students and professionals can reference to gain a deeper understanding of the evolution of Amazon's supply chain strategy since its creation in 1994. As the research will show, Amazon has been able to create a number of profitable business ventures within their store’s logistical operations, as well as outside the retail industry, that have helped fiscally support the company and significantly enhance Amazon customers’ shopping experience. These advancements have pushed the boundaries of e-commerce retail, disrupted traditional brick-and-mortar stores, and changed the way people purchase products forever.
# Table of Contents

List of Figures ............................................................................................................................ iii
Chapter 1 ........................................................................................................................................ 1
Chapter 2 ........................................................................................................................................ 6
Chapter 3 ........................................................................................................................................ 15
Chapter 4 ........................................................................................................................................ 25
Chapter 5 ........................................................................................................................................ 48
Bibliography .................................................................................................................................. 53
List of Figures

Figure 1. AWS Profit vs. Total Profit .............................................................................26
Figure 2. AWS Operational Profit Margins .......................................................................30
Figure 3. Prime Now Locations .........................................................................................36
Figure 4. United States Population Heat Map .......................................................................37
Figure 5. Drone Cost Sensitivity Chart ..............................................................................45
Chapter 1

Introduction

Approximately eleven years ago, I made my first online purchase. A pair of Nike Shox sneakers, a limited edition pair of shoes that weren’t available at any store or shopping mall near me. After getting my mother’s credit card, I anxiously navigated through the website, careful to double check to make sure I had ordered the right size, and typed the shipping and billing information in perfectly. A few hours later, I received an email confirming my order, and informing me that I can expect my package in ten to fourteen days. Two weeks of me anxiously waiting for my new pair of shoes followed, until finally one day a UPS truck delivered my brand new Nikes right to my front door. Needless to say, I was ecstatic, and as I tried my new pair of shoes on, I was astonished at how easy it was for me to be able to find exactly what I was looking for, and have it brought right to my doorstep. This delivery gave me the feeling that there was a whole new world at my fingertips, and little did I know, that this same feeling would reach millions of people across the world for years to come.

Fast-forward to July 2016. I am living in downtown Philadelphia, a twenty-one-year-old intern in need of some hair gel before the start of the upcoming workweek. Saturday morning before leaving for the beach for a weekend with friends, I pull out my iPhone, and place an order on Amazon for my favorite hair product within about one minute. Sunday evening I pull into my parking spot in front of my apartment, and walk to my front door to be greeted by a small brown box wrapped in “Amazon Prime” tape. The funny thing is, unlike eleven years ago, this delivery in no way felt out of the ordinary to me. Possibly even more notable about this transaction is that the product that I had purchased online wasn’t even an obsolete item not available to me in local
brick-and-mortar stores, but instead a product that I could have just as easily purchased by
driving ten minutes to a local drug store.

So how could online shopping and consumption have changed so much over an eleven-
year span? Well, there is no simple way to answer this question, with a number of exponential
improvements in online retail over the past decade, a number of companies have been able to
reach more consumers with their products and goods than ever before. Though it would be hard
to find a retailer without an online presence today, one online retailer has separated themselves
from the rest, Amazon.com.

Today, Amazon.com is the United States largest online retailer. With nearly six times the
annual e-commerce sales of its next biggest competitor, Wal-Mart, Amazon has become a simply
dominant force in the field of online retail today. In fact, Amazon’s online sales last year
accounted for approximately fifty percent of all sales for the United States’ top twenty-five e-
commerce retailers (Zaczkiewicz, 2016). So what’s different about Amazon? Well, almost
everything. This once online book store has created one of the world’s most fast-paced and
efficient supply chains, and like many front runners in emerging markets, they have done it in
truly innovative ways that has caught the interest and imaginations of academics and business
professionals everywhere.

It would be difficult to hold a conversation today with any executive in a company with
an online retail presence without mentioning or drawing a comparison to Amazon. That’s
because even if the executive’s enterprise isn’t concerned with competing against Amazon for
retail market share, chances are they might use Amazon as an infrastructure service through
Amazon Web Services (AWS), to create and host their website domain and e-commerce
platform.
For an example of how Amazon impacts so many of the world’s most coveted companies within the retail and consumables industry, refer back to my first online purchase, a pair of Nike shoes. Eleven years ago, Nike would retail their top selling products through brick & mortar retailers, and were also able to retail these same products, as well as some of their long-tail niche market goods, on their own website, or one of their retailers’ websites. In these days, retail was greatly more simplistic. Customers who wanted just a common pair of white Nike sneakers would travel over to their nearest store carrying Nike products, walk into the store, and walk out with a new pair of shoes. If you were someone like my ten-year-old self, looking for a less common pair of shoes not available in any of the local stores, you could go to Nike.com or any of the retailers who carried Nike shoes website, purchase the shoes, and wait a few weeks for them to arrive in the mail. In this online shopping world, shipping times and costs were practically the same across all the online retailers, and consumers would typically just buy from the site who was offering the best deal, whether it be a lower price, or a coupon such as ten percent off or free shipping.

Now fast-forward eleven years. The brick and mortar stores that sold the plain white Nike shoes still stands, but now the online retail world has multiplied in size, with thousands of online retailers offering consumers more products than ever before. Now imagine that out of these hundreds of websites that sell Nike products to consumers, one retailer guarantees that they can have those shoes to any of its members in the United States door within two days of their order, for free, with the cost of the product being the same or less than all the other retailers. For those consumers who live in some of the larger cities in the United States such as Los Angeles or New York, this same one retailer guarantees its members that same pair of shoes to their door in less than two hours, for free, with the cost of the product being the same or less than all the other
retailers. What has this one retailer done to the way Americans buy products? To say the very least, it has changed it forever, and this retailer is Amazon.

Unlike any other online retailer before, Amazon has created a supply chain and distribution network that has allowed for its products to be delivered at a cost, speed, and reliability that has made even the most basic of purchases for consumers more convenient to be made through Amazon online, then to be purchased at a local store on the way home from work. If you are a company like Nike manufacturing the goods being retailed by Amazon, how do you adapt to this change? Though you have your own website and distribution channels, your physical capabilities limit you from being able to deliver your products to your customers as fast, consistently, and at the same price as Amazon. Even though your e-commerce sales are likely growing, you see your own website losing market-share of the e-commerce industry.

So, what do the executives at Nike do? For the sake of this research, the answer to this question is somewhat irrelevant. What is relevant, however, is that manufacturers and retailers across the world are asking themselves this very sort of question in their board rooms today. With online sales estimated to reach $523 billion by 2020 in the United States, a fifty-six percent increase from 2015, online retail will be one of the biggest factors in the global economy moving forward (Lindner, 2016). As far as researching this industry, it is hard to find a better company than Amazon to evaluate. This is not only because of Amazon’s dominance in almost every aspect of the sector, both distribution and online capital, but also for the fact that Amazon was able to create a completely original business model that outperforms their closest competitor six-fold, in an industry filled with thousands of competitors.

The very purpose of this thesis is to not only understand how this once online bookstore could transform into a business phenomenon that has changed the way people across the United
States shop, but also to understand where they, and the rest of the e-commerce world are heading. This will be achieved through in-depth analysis of the creation of the Amazon distribution network, promotional offers, and business strategy, as well as analysis and conceptual predictions as to where Amazon’s current and future endeavors will take them. Whether you are a company manufacturing and retailing shoes, a young intern just trying to get some hair gel, or an executive at Amazon, this thesis will help provide insight on the past, present, and future of how people consume products.
Chapter 2

The Past

In May of 1994, Jeff Bezos, the current President and CEO of Amazon.com, sat in front of a computer in midtown Manhattan, exploring entrepreneurial opportunities for a Wall Street firm when he stumbled upon the fact that the Internet was growing at a rate of 2,300 percent (Ramo, 1999). After considering the endless possibilities of the Internet, Bezos began to brainstorm business models for online retail, and left his Wall Street firm to move to Seattle. Seeing the comparison to what would soon be Internet sales and mail-order services, Bezos began an in-depth study into the mail-order industry. What he found was that books were a great product to sell online, due to the ability to catalog a large variety of products online, and there were no established mail-order book catalogs. After a couple years of building a feasible business model, contracting suppliers, and receiving investment capital from friends and family, Bezos launched Amazon.com online in 1995 (Byers, 2007).

Much like the tech giants that came before him, Bezos began operations of his venture from his garage. “If you go back eighteen years, I was driving the packages to the post office myself, and we were very primitive” said Bezos when asked about the companies start up (Rose, 2013). These first book deliveries were made in 1995, and when asked by 60-Minutes’ Charlie Rose what the key to Amazon’s growth and success was, Bezos cited the company’s tireless operational improvements throughout the years. “The secret is we're on, like, our seventh generation of fulfillment centers. And we have gotten better every time. When I was driving the packages myself, one of my visualizations of success is that we might one day be big enough that we could afford a forklift.” (Rose, 2013). From the humble dreams of one day owning a forklift, to owning and operating 358 active facilities across the world, it is hard to not recognize
Amazon’s innovative distribution and operational methods as one of their key drivers for success (MWPVL International Inc., 2017).

**The Rise of Fulfillment**

As Amazon has grown to the e-commerce giant that they are today, the core of their operations has been their distribution centers, known as fulfillment centers. From rudimentary warehouse storage, to highly automated and technical centers that can send over a million packages a day, there have been large strides in innovation between the first and ninth generation of fulfillment centers. As mentioned prior, fulfillment centers today often serve a number of purposes, but to simplify and explain the different types of facilities within the Amazon distribution network, the basic functions of the facilities are described below.

To begin, small sortable fulfillment centers are used to house smaller items that can fit in a single box/shipment, can be placed on a conveyable tote, and have a dimension less than eighteen inches (MWPVL International Inc., 2017). An example of the type of item that could be stored in a small sortable fulfillment center would be books, DVDs, watches, etc. Large sortable fulfillment centers store larger items that can fit into a single box/shipment, can be placed on a conveyable tote, and have a dimension greater than eighteen inches. An example of the type of item that could be stored in a large sortable fulfillment center would be sports equipment such as a hockey stick, small furniture, etc. Non-sortable fulfillment centers store items that cannot be sorted into a box with other items, and cannot be placed onto a conveyor belt for automated sortation. Items placed in non-sortable fulfillment centers typically have unusual dimensions, or exceed the weight limitations of automated sortation devices.

Fulfillment centers can also help serve distribution purposes. For example, inbound cross dock (IXD) centers receive and consolidate items from Amazon’s vendors, and then distribute
the items to other fulfillment centers within the distribution network. Regional sortation centers are used to sort packages for geographical region by zip code, where the packages have originated from one or more fulfillment centers. From the regional sortation center, packages are sent to delivery stations or third party transportation services such as FedEx to get the package to the consumer. These delivery stations are mid-sized facilities owned by Amazon that represent the last leg of the delivery network. So in conclusion, the typical package ordered on Amazon would travel from the fulfillment center, to the regional sortation center, to the delivery station.

Though there have been great strides made over the past twenty years in the Amazon distribution network, it is important to notice that each slight improvement has helped Amazon increase their shipping speed and on-time delivery, allowing for Amazon to grow and add more items to its catalog. Just a few years after Amazon went live online as an e-commerce bookstore, the company went public on May 15, 1997 (Yglesias, 2014). Once Amazon went public, the company’s share price soared, and Bezos and his team got to work adding new items to Amazon’s online catalog in 1999 (Ramo, 1999). These new products included video games, DVD’s, toys, electronics, software, and home-improvement products.

Though these additions made in 1999 seem miniscule in comparison to Amazon’s current online catalog, they serve a symbolic purpose of sorts, as the beginning of Bezos’s dream, to sell everything to everybody. Bezos however did not stop at these new catalog additions in 1999, promising to double the offerings within the next year, and diversify more greatly within the e-commerce sector. This business diversification included Amazon Auctions and zShops, which were online flea markets for Amazon customers to buy goods from other customers (Ramo, 1999). Amazon also acquired minority stakes in other online retailers such as Drugstore.com, Pets.com, HomeGrocer.com, Gear.com, and Della.com.
Like many other tech companies, Amazon’s stock prices continued to climb at the turn of the millennium (Yglesias, 2014). However, Amazon stock dropped to a fraction of its previous value by 2001, as the market corrected from the 1990’s “tech-bubble”, and Amazon saw consistent quarterly losses as they continued to expand their distribution network and product catalog. These losses continued until the last quarter of 2002, when Amazon saw a modest profit. Amazon then went on to see annual profits in 2003 and 2004, helping drive the stock price up, and showing the world that Amazon could in fact have a profitable business model.

**Entering the Prime**

After surviving a devastating “tech-bubble” crash that had bankrupted a number of first generation e-commerce companies, and turning back to back annual profits in 2003 and 2004, Amazon would launch a service in 2005 that would be the beginning of the change in American consumerism. In February 2005, Amazon launched Amazon Prime, an express shipping membership program for approximately a million products within the Amazon product catalog (Amazon Prime, n.d.). Amazon believed that they were bringing three revolutionary things to market with Amazon Prime. First, Amazon was offering their customers two-day shipping at a time when consumers could expect to pay a premium to receive online items in 4-6 business days. Second, Amazon was guaranteeing this two-day shipping, making it a reliable way to shop. And third, it was an unlimited shipping service, allowing consumers to get free shipping on as many items as they so choose, for one flat annual rate.

When Amazon introduced this membership program in 2005, it had plenty of critics. From Wall Street investors who claimed that it would be an unprofitable business venture, to consumers and competitors questioning the reliability of consistent two-day shipping. However, Amazon decided to move forward with the program, citing positive results from former
membership programs offered to Amazon consumers such as the Free Super Saver Shipping. Amazon also claimed to have advanced operations analysis showing that with an increase in consumer purchasing and scale within Amazon’s distribution network, Amazon could become the first retailer to make fast and free shipping affordable (Amazon Prime, n.d.). Though there is no public information on exactly how much money Amazon Prime has cost the company in shipping, they have stated that in its first year alone, they lost many millions in shipping revenues to the Amazon Prime members.

Amazon Prime really raises two big questions. First, how is this possible? Second, why would Amazon do this? These questions are very complex in nature, but more than ten years after its unavailing, they can be answered in a fairly straight forward manner. First, Amazon had the vision for fast shipping before any of its competitors. CEO Jeff Bezos claimed that to disrupt brick-and-mortar retail, which was the already established shopping solution at the time, Amazon would need to turn online shopping from an occasional indulgence for luxury goods, to an everyday experience to acquire basic essentials (Mangalindan, 2015). In order to turn online shopping into this every-day experience however, consumers would have to be able to receive items in the same way they would if they walked into a store: fast, free, and with near certainty that the product would be available when needed. This vision seemed impractical to Amazon’s competition in the mid 2000s. Amazon, however, had built the distribution infrastructure to make this vision a reality. Through relentless capital investment across the country, and rigorous reform and improvement within the fulfillment centers to speed up and consolidate the processes needed to ship a package, Amazon has been able to make online shopping a practical solution to everyday purchases.
To answer why Amazon would do this however, you need to dig deeper to the core virtues of the company to understand why Amazon would take on the large economic risk that Amazon Prime presented. Since the beginning, Amazon has kept prices as low as possible in order to ensure customer loyalty, even at the expense of profits (Rose, 2013). Amazon and Jeff Bezos have also been known from the beginning for priding themselves in disrupting traditional ways. At the very core of Amazon Prime, the virtues of putting the customer first and being disruptive can be found. Amazon Prime was one of the first real disruptive forces to the tradition of brick-and-mortar retail on everyday essentials, and went to market as an affordable membership with a more convenient solution to the current status quo. This attracted millions of new consumers to Amazon, and despite what many critics anticipated, it became one of Amazon’s most profitable and successful ventures.

How Amazon Prime is a profitable venture is truly a case study within itself. A recent investigation done by Time Magazine showed that the average Amazon Prime member used $55 worth of shipping and $35 worth of additional Amazon resources such as digital content (Tuttle, 2013). Therefore, Amazon would be losing on average $11 annually per subscriber when collecting a $79 membership fee. However, when looking at the program as a whole, Prime members spend on average $1,224 per year with Amazon, in comparison to non-Prime members who spend on average $505 annually. After factoring in the shipping and additional costs, Amazon yields on average $78 more in profits annually from Prime members than they do shoppers who are not enlisted in the subscription. In fact, a study by Wired Magazine showed that Amazon could cut the subscription price for Prime by $50 and still see larger profits from Prime members then non-members (Wohlsen, 2013). What this shows is that the actual revenue from subscription fees is barely relevant to Amazon’s bottom line. What is relevant however is
that consumers buying a Prime membership in order to attain the two-day shipping shop significantly more at Amazon, and this increase in purchases makes Amazon Prime members more profitable.

In conclusion, Amazon Prime has been successful for a number of reasons. First and foremost, it has disrupted the established brick-and-mortar retail. Second, it has attained millions of new customers, as well as helped retain previous customers. In fact, Amazon boasts on their website that four out of five customers who subscribed to Prime in 2005, are still active subscribers today. Finally, because of the fast and reliable shipping, Prime members buy a significant amount of products on Amazon, increasing Amazon's economies of scale within its distribution network.

**Amazon Gadgets**

With an established online marketplace already in order, Amazon began developing technology to help complement their e-commerce storefront, as well as build an ecosystem of Amazon products. In November 2007, Amazon launched the Amazon Kindle, a first of its kind electronic portable reader (Kindle, n.d.). The Kindle was revolutionary in a few different ways. First, it looked and read like a real paperback book, allowing users to read the digital screen with ease, even in bright sunlight. Second, the Kindle offered anyone the ability to purchase and read nearly any book, in nearly any language, all within sixty seconds of purchasing the digital copy from Amazon. Within five and a half hours of the original Kindle launch, the product was completely sold out.

In typical Amazon fashion, as they began to develop and expand the Kindle and its massive digital content catalog, they did it in a fairly unconventional way. Amazon sold the Kindle hardware at a break-even price, with the hope of making profit through the online content
that consumers will buy to use the device (Clay, 2012). This strategy is very different from competitors such as Apple, who make profit on every iPhone and iPad. However, Amazon saw creating a cheaper medium for consumers to access the much more profitable online books, videos, and other publications as the better long term solution for their portable reader, and it worked. During an interview with BBC in 2012, Bezos explained the success Amazon had found with their Kindle business model “What we find is that when people buy a Kindle they read four times as much as they did before they bought the Kindle, but they don't stop buying paper books… Kindle owners read four times as much, but they continue to buy both types of books.” (Clay, 2012).

As Amazon continued to release more technology to complement their pre-existing ecosystem, they stuck to the “razor-and-blade” business model, selling the physical product at break-even price, in order to create a larger customer base that purchase the high profit margin electronic content that goes with the physical product. For example, this strategy was used for the Amazon Fire Tablet that was released in November 2011 (Fire Tablets, n.d.). Though it is difficult to know exactly how profitable this model is because Amazon releases very little about its sales or profits, there are a number of analysts who can make estimates on these matters. In 2013, Scott Devitt of Morgan Stanley did such an analysis on the Kindle business model, estimating that Amazon profited approximately $565 million on the model in 2012, or thirty-four percent of Amazon’s consolidated segment operating income (Yarrow, 2013).

Though the Kindle was a substantial success for Amazon, it, like Prime, represented the beginning of something much larger for Amazon. Much like how Prime was able to change the way people shopped online, the Kindle helped change Amazon as a whole. Unlike before, Amazon is now seen as much a tech firm like Google or Apple, as they are a retailer. This is
because beginning with the Kindle, Amazon began branching out into technological devices to create an eco-system of products for its customers. Much like how people would purchase an iPhone to work in synchronization with their iMac computer and play their music from the iTunes library, people could now purchase an Amazon portable reader or tablet to view books, movies, and magazines they purchased through Amazon online. As time progressed, Amazon would add even more technological products to further innovate and enhance the Amazon eco-system, which in return increases Amazon’s customer loyalty and switching costs.
Chapter 3

Current Innovations

In the past few years, Amazon has been in the news for countless new innovations and ventures. From new tech products, websites, transportation methods, fulfillment center innovations, multi-media streaming services, and much more, it would be nearly impossible to give an analysis on every single one of Amazon’s recent ventures. For this reason, this thesis will focus on four divisions within Amazon: additions to their product eco-system, Amazon Prime Now, innovations with order fulfillment and delivery, and Amazon Web Services. Though it will not completely cover all of Amazon’s current positions, this chapter will provide thorough analysis on many of Amazon’s current key economic drivers.

The Ecosystem Grows

As covered previously, one of Amazon’s first real attempts at building a product ecosystem to compliment is online storefront was the Kindle, which was a profitable success for the company. Since the Kindle’s launch in 2007, however, Amazon has not seen the same level of success on many of their product launches. Some notable failures include the Amazon Fire Phone and Amazon Local Register, which combined amounted to hundreds of millions dollars in loss for the company (Kim, 2016). However, these failures have not hindered the company, in fact they look at such shortcomings as a necessary evil, in order to create successful and innovative products in the future.

One of these new products is the Amazon Echo, a hands-free voice activated device, introduced in 2014, that can be asked for information, music, news, sports scores, and weather (Amazon Echo, n.d.). Though voice recognition software had been available in electronics for
years before the Echo was introduced, the Echo had the ability to connect directly to Amazon Web Services, streaming your voice commands directly to a large cloud server, creating faster, and significantly better results than the competitors. The Echo was also equipped with multiple microphones and speakers, allowing it to be voice activated, as well as heard, from anywhere within a room that the device is placed.

Though the Echo is an impressive gadget for listening to music, and getting news updates without ever picking up a device, the real genius in this product can be found in its synchronization with the Amazon marketplace. Previously, it was mentioned that Jeff Bezos believed that in order to disrupt brick-and-mortar retail, online purchases would have to be less of an occasional luxury, and more of an every-day common event. This idea becomes a reoccurring theme throughout many of the products Amazon has brought to the market in recent years. The Echo can easily be programmed through a laptop or smart-phone to recognize certain commands to order particular items. For example, if an Amazon customer were to say “Alexa, order toilet paper”, the Amazon Echo would place an order for your predetermined toilet paper stock-keeping unit (SKU), and it would be delivered to your door at your predetermined shipping time using Amazon “1-Click” technology. For Amazon Prime subscribers, this means that the toilet paper would be delivered for free within two-days, and for subscribers who live in select large metropolitan areas, they could receive the shipping in as little as two hours for free. This makes what appears to be a fun gadget, into potentially one of Amazon’s greatest salesmen.

This tool gives Amazon customers the potential to purchase and receive goods without ever leaving their home, and without ever opening a device. However, there is some point of concern with this product. With an easily activated microphone placed within people’s homes, there could be an understanding concern for safety. In November 2015, an Amazon Echo device
was in the national spotlight, for being a potential witness to a murder (Buhr, 2016). Though the Echo does not record audio continuously, police believe that audio stamps or text records between the Echo and Amazon servers could provide some form of evidence, since it was streaming music at the scene of the crime. To this point, Amazon has refused to release any customer information “without a valid and binding legal demand” (Buhr, 2016). Though this decision may seem aggravating for some law enforcement, Amazon’s refusal to turn over customer data should help Amazon’s Echo sales moving forward by proving to consumers that Amazon places their privacy above all matters, and that their data will not be used against them in the court of law.

Much like the Echo, another product was released in March 2015 that would make everyday purchases on Amazon even more convenient. This product was the Dash Button, a small button that could be placed anywhere within a home where commonly used household items could be stored, and could order these household goods anytime with just the click of a button (Dash Button, n.d.). The household products with available Dash Buttons include popular name brand laundry detergent, dog food, diapers, trash bags, coffee, and much more. Using the same “1-Click” technology available in the Echo, Amazon customers will have their order delivered in the fastest free shipping method available through Amazon Prime. Though this product seems simple, it once again shows Amazon furthering their ability to penetrate the established market, and into consumers’ everyday purchases.

**Prime NOW**

When the Amazon Prime membership was introduced in 2005, guaranteeing two-day delivery on thousands of items, it was revolutionary to online retail. Though Amazon’s ability to be a disruption in the online marketplace should come as no surprise given their competitive
advantages in distribution, there is evidence to show that Amazon has disrupted the retail sector as a whole. Though you may never find one specific definition for the “Amazon Effect”, it is the idea that the average consumer having access to a nearly-endless inventory catalog online that can be shipped quickly and reliably to them puts pressure not only on Amazon’s retail competitors, but also on the industry as a whole (Raines, 2016). The “Amazon Effect” is a topic that will be covered in greater detail later in this analysis, however it is important to identify before covering one of this chapter’s most significant topics, Amazon Prime Now.

As the previous chapter has shown, Amazon was able to cause a disruption in retail with their free two-day shipping by giving people a reliable, convenient, and low-price way to shop online. However, in December 2014, Amazon launched Prime Now, an additional service available to Prime members in select major cities and metropolitan areas, which allows for free two-hour delivery, or $7.99 one-hour delivery, on tens of thousands of items (Prime Now, n.d.). This innovation allowed for everything from paper towels to big-screen televisions to be delivered to a customer’s door, within a couple of hours with just one click. Though this business venture received criticism from others wondering how Amazon could possibly earn profit on small revenue items such as toilet paper when delivering it to the consumer in less than two hours, today it has expanded to twenty-eight cities in the United States as well as London in United Kingdom. There is little question that Amazon must struggle to turn a profit delivering a bottle of shampoo in Manhattan in a couple of hours, however with further analysis it is evident that this service could truly be one of Amazon’s greatest tools in their quest to “sell everything, to everybody”.

The logical next step in analyzing Amazon Prime Now is to look at how this service is even possible. First, Amazon located small storage facilities near or in the locations where
Amazon Prime Now is offered. These are referred to within Amazon as “Prime Now Hubs”, and the company currently has forty-two of them active throughout the United States (MWPVL International Inc., 2017). Prime Now Hubs are small footprint distribution buildings typically positioned close to the center of the area where Amazon Prime is available. These hubs are stocked with high velocity products such as bestselling books, allowing for a limited number of SKUs to be stored. Though these hubs carry significantly less inventory and SKUs than the average Amazon Fulfillment center, the hub’s smaller floor plan and structure allow for faster picking and processing times. Offering a limited number of SKUs through a virtual interface, and availability to the consumer in less than a couple of hours, these Prime Now Hubs are essentially retail stores for Amazon, giving Prime members a realistic alternative to going to the local store.

Equally as innovative as the Prime Now Hubs, is the way in which Amazon delivers their Prime Now orders to customers. Amazon created the delivery system “Amazon Flex”, a delivery system much like Uber, where Amazon employs drivers who choose their own hours, and deliver packages from Amazon Prime Now Hubs to Prime Now customers (Rosenblum, 2015). Though Amazon also uses some other delivery options such as UPS and other third party transportation companies, Amazon Flex delivers the largest number of Prime Now deliveries. Amazon directly hires their Flex drivers, and advertises online that they pay these employees $18 to $25 an hour (Frequently Asked Questions, n.d.). On top of the hourly wage, Amazon recommends that Amazon Prime Customers tip the Flex drivers a given amount at checkout, typically around five dollars (Rosenblum, 2015).

According to a current Amazon Flex Driver, Harry Campbell, for a ten-hour workday he makes $180 from hourly wage, and approximately forty dollars in tips, all before tax (Campbell,
2016). Though there is no estimate as to how many boxes an independent Amazon Flex Driver may deliver in a day, there is data on the number of deliveries drivers make per day working for third party transportation companies. These third party contractors’ employees undergo the same daily processes of Amazon Flex Drivers, with the only difference being that the employees work under contract of the third party provider, not Amazon. According to Natalie Kitroeff of the Los Angeles Times, third party logistics drivers deliver about 260 boxes per ten-hour workday, to approximately 200 different addresses (Kitroeff 1, 2016).

From looking at the hourly wages of Amazon Flex Drivers, and the number of deliveries made by third party logistics companies whose employees are contracted to work as Amazon Flex Drivers, we can begin to analyze approximately how cost effective this form of delivery is. If the average Flex Driver is collecting eighteen dollars an hour wage, a safe assumption can be made that Amazon is paying approximately twenty-five dollars an hour, per employee. Therefore, a ten-hour day for one employee would cost Amazon $250 per day, to deliver an average of 260 packages. This would mean that Amazon is paying approximately ninety-six cents in transportation fees for getting packages from Prime Now Hubs to the consumer. This is a significantly lower cost than what Amazon would pay for a typical Amazon Prime two-day delivery through large delivery service companies such as FedEx or UPS. According to David Vernon of Bernstein Research, Amazon likely pays USPS around two dollars per package, while paying UPS and FedEx around four dollars per package (Leonard, 2015). Therefore, Amazon is delivering their packages to customers through Amazon Prime Now at a fraction of the transportation cost to consumers, in comparison to shipping alternatives such as FedEx and UPS.

Amazon Web Services
Though Amazon has always been one of the most dominant forces on the Internet since the company’s beginnings in the late 1990’s, in 2006 Amazon would begin to expand their online empire through something other than retail. Amazon Web Service (AWS) is a cloud services platform that offers customers computing power, database storage, and other content delivery (Amazon Web Services, n.d.). This service that was at first created by Amazon to help with their own technological infrastructure, quickly showed its capabilities that could be revolutionary to a number of companies. Less than 10 years after AWS was introduced to the market, some of the largest and most innovative companies in the world use Amazon to store and compute data. From the CIA, The New York Times, and Major League Baseball, to direct Amazon competitors in content streaming such as Netflix and Spotify, AWS has a diverse and profitable clientele.

To begin to understand Amazon Web Services, it is important to understand what AWS is physically. AWS is made up of a number of Amazon Data Centers, which are filled with powerful servers capable of storing and analyzing large amounts of data. Once Amazon began investing into their own sophisticated computing infrastructure to track the massive online traffic that their online retail store brings, they realized that they could continue to expand their infrastructure to store data and host websites for hundreds of thousands of companies and government agencies across the world (Rose, 2013). Though AWS’s immense computing power in itself is impressive, it’s the service’s ability to be scaled to any customer’s specific needs that have made it the dominant cloud-computing infrastructure in the world today (Miller, 2015). With the ability to measure and scale exactly how much storage and computing power each customer is using within the infrastructure, AWS is able to only charge their patrons on how
much of their service they use. What this means is that literally no one individual or company is
too big or too small to use AWS, creating a nearly infinite number of potential customers.

Once there is a brief understanding of the AWS infrastructure, it is important to
understand the services, and how it is profitable. Amazon Web Services, as a whole, gives
anyone access to online computing power and space. How Amazon’s clientele chooses to use
the online space that they lease from Amazon is practically endless. Once the customer chooses
which virtual server they prefer, they are able to host their domain, create databases, collect and
analyze data, and much more (Web Hosting, n.d.). Though the capability to purchase large
amounts of computing power has been around for years, the difference is that Amazon owns and
manages the hardware, while the customer is only paying for the service. This means that
companies don’t have to make a large upfront capital investment to access the computing power
necessary to run their business, but still receive the speed and bandwidth they need within their
enterprise.

Another important service trait that makes Amazon Web Services unique is its
compatibility and easiness to use. One major downside to using third-party computer software is
that in order to make the software fit a company’s needs, either the company must change to
meet the software’s processes and code, or the company pays the third-party to customize their
software to fit the company’s processes and code. Regardless of the IT alternative the company
may choose, there will always be a number of incongruences that need to be worked out after
implementation, workers will need to learn new processes, and the company will need to make
large investments in time and capital to make this all happen. Amazon however is different from
these other IT solutions because of the numbers of different virtual servers available, large
number of programming applications, and its flexibility with programming language (Web
Hosting, n.d.). What this allows is for the IT department of any company big or small, to likely be able to create their technological innovations using the programming and coding skills that they have already learned. Once these companies begin setting up something like a database on AWS, they are not only able to easily customize their own online infrastructure, but also able to scale it up or down as they need. Amazon also allows for high levels of encryption within their servers, creating a digital infrastructure safe enough for government agencies such as the CIA to store sensitive data within a virtual cloud.

What this infrastructure and service creates is an offering with nearly immeasurable possibilities and potential customers, and also a sizable profit. In fact, Amazon Web Services has been profitable every quarter since the beginning of 2014 (Rosoff, 2016). Though a further analysis of AWS’s financials will come in the following chapter, it is important to see the relevance of how AWS plays into Amazon as a whole. Similar to when Amazon introduced the Kindle, Amazon found great success in AWS by creating a profitable product that complimented Amazon e-commerce. Though the Kindle provided a medium between themselves and the customer to sell Amazon digital content, AWS created a platform that allows Amazon’s infrastructure to grow at the expense of their competition.

Today, Amazon adds to their digital infrastructure as much computing power as the entire company possessed ten years ago, every single day (Myer, 2015). Obviously this level of capital expansion is caused by Amazon working to meet the demand of their AWS customers. However, it is important to note that as the digital infrastructure of AWS improves, so does the digital infrastructure of Amazon as a whole. This means faster and better search results on the Amazon store, faster downloads to Amazon products, more advanced data storage and analysis techniques, and much more. While these technological improvements come at a large cost to
most companies, Amazon is able to do so from the revenue generated from the e-commerce retailers, digital content streamers, and websites who Amazon competes with. From this the re-occurring theme of Amazon’s successes ultimately complementing the Amazon storefront is not only evident, but also the creation of one of the world’s largest and most advanced product ecosystem.
Chapter 4

Future Endeavors

Now that a basic understanding of Amazon’s past and present initiatives has been formed, this chapter will speculate how on Amazon will move forward in the years to come. Though it is nearly impossible to predict the projects and ideas that Amazon is currently working on behind closed doors, it is possible to analyze and predict the future of their current innovations. For this reason, this chapter will be focusing on four specific topics; the future of Amazon Web Services, Amazon’s distribution network facilities, Amazon’s logistics and transportation services, and autonomous delivery methods.

The Future of Web Services

As stated previously, Amazon Web Services is one of the company’s greatest ventures to date. Not only is it a profitable service, but it also builds Amazon’s digital infrastructure at the expense of Amazon’s competition. Though there is no denying AWS’s success, it is important to understand just how profitable this service and the industry as a whole has become, and how AWS will likely be a financial stronghold for Amazon moving forward.

First, this research will examine the current financials surrounding AWS. Since Amazon went public with AWS’s financials in 2015, the web-based service has been profitable every single quarter. Though the consistent returns from this venture are impressive, the service’s growth in financial importance to the company has been immense in just a short period of time. As the chart below (Figure 1) shows, AWS has been consistently generating more operating profit, and becoming a larger percentage of Amazon’s profit as a whole since the first quarter of 2014 (Rosoff, 2016).
Figure 1. AWS Profit vs. Total Profit

Though AWS’s increasing percentage of total operating profit is impressive, it is only a small piece of the service’s success. In a market that has grown twenty-seven percent in revenue across the world in 2016, AWS has grown a substantial fifty-eight percent in revenue (Trefis Team, 2016). In this ever-growing market, Amazon has not only out-performed the sector, but also holds a commanding thirty-one percent market-share. This is a larger market-share than Amazon’s next three biggest competitors combined, Microsoft, IBM, and Google, who only hold twenty-two percent of the market collectively. Amazon has held this commanding lead since 2006, and as the dominant player within the industry, Amazon has been able to create efficiencies within their AWS operations while their competitors focused on building their technological infrastructure.

As covered through these metrics, as well as points stated in the prior chapter, AWS is a successful and profitable venture for Amazon. However, like most innovations within Amazon,
the genius of the service is much more in-depth than numbers on a financial statement. AWS allows Amazon two things: the ability to build, manage, and innovate one of the world’s most advanced technological infrastructures at the expense of their competition, and provides the company a steady stream of monetary capital that can be used to invest in other initiatives or offset losses from other divisions.

First, this thesis will examine the power of the AWS infrastructure. In 2016, Amazon is estimated to sell 7.2 billion items, with estimates predicting that Amazon could sell as many as 12.6 billion items by the year 2020 (Leonard, 2016). On top of this, Amazon also has more than sixty-three million active Amazon Prime Members, and 214 active distribution facilities with more than twenty new facilities currently under construction (MWPVL International Inc., 2017). The digital infrastructure needed just to store the data that Amazon currently generates is enormous. However, as the projections show, the amount of data is likely to grow rapidly in the years to come, meaning that the servers and databases must not only be capable of finding today’s solutions, but must also be flexible enough to scale-up to meet the challenges of tomorrow as well.

This sort of growth, and the necessary capital investments needed to support such a large and complex organization, would be a major challenge for most corporations. However, AWS is not only a platform that can meet the technological demands of both today and tomorrow, but can also do so at best in class standards. Though the service can be used as a data storage system, it is also a powerful data analytics and functional tool that provides Amazon with nearly endless computing power. This is why Amazon not only can operate their e-commerce store, but also can collect and analyze millions of individual variables attached to every Amazon customer and purchase. These pieces of data that are stored and used by Amazon include customer
shipping and billing information, what products customers have searched or viewed and when, products reviews, seller information and ratings, and much more. All of this data is not only stored, but also analyzed using advanced algorithms which in return create a personalized recommendation system for each customer, an anticipatory shipping model, and supply chain and pricing optimization (Wills, 2016). Without AWS, Amazon would not likely have many of the core technological competencies as a company that they enjoy today.

AWS not only helps Amazon with storing and analyzing data throughout their network, but also help strengthen products within their eco-system. As mentioned in the prior chapter, the Amazon Echo is a voice-activated product that runs off of the AWS system. As a consumer speaks to the system, it connects through a local Wi-Fi network to an AWS database, and from there is able to perform the task it was commanded. Though this may seem like basic technology that any iPhone user could find within their phone, that is simply not the case. The difference is that with the capabilities and easy to use interface of AWS, nearly anyone can create voice-commands or “skills” for their Amazon Echo through AWS (Hern, 2017). In fact, some analysts have referred to the Echo as “Amazon’s operating system”, because it is a product that uses software to give users access to the hardware capabilities of AWS.

There are currently seven thousand skills available for the Amazon Echo, and as the number of Amazon Echo owners rise, it is likely that the number of Echo skills within AWS will rise as well. As more helpful skills become available to the Echo, there will likely be more consumers that will purchase the product, and by default a lower number of the competitors’ technologies will be used. While the capabilities of the AWS pairing with the Echo gives the company a competitive advantage with the product, it also works as Amazon’s number one salesman, with Amazon’s products and services being just a sentence away from their customers.
This is just one more example of how Amazon’s digital infrastructure is able to create a platform that can help all aspects of the business.

Next, it is evident that the revenue streams created by AWS provide financial stability for Amazon as they incur large expenses for new ventures within the company. Currently, Amazon Web Services is valued at $121.8 billion, which is approximately 34.9 percent of the company’s total valuation (Trefis Team, 2016). At approximately a third of Amazon’s total valuation, AWS revenues have increased sixty-four percent in the past fiscal year, and account for fifty-six percent of Amazon’s total operating income (Wingfield, 2016). What is interesting about these financial statistics is that AWS amounts for about nine percent of total revenue for Amazon in the same fiscal year. So in other words, the service that creates less than ten percent of revenue, accounts for fifty-six of operating income, and about thirty-five percent of the company’s valuation. Though these statistics may seem odd at first, what they reveal is the efficiency of the service.

In 2016, AWS saw a 25.1 percent operating margin, while Amazon as a whole averaged a minuscule 2.9 percent operating margin within North America and a -2.7 percent operating margin within Europe (Trefis Team, 2016). This is how AWS is able to account for such a large share of operating income and profit, while only accounting for nine percent of total revenue. The chart below (Figure 2), also helps to provide further insight into AWS’s operating margins and income (Trefis Team, 2016).
While the rest of Amazon continues to expand its operations with new ventures within both retail and consumer electronics, AWS remains a high-profit margin service within a growing industry, whose healthy profits provide the company with monetary capital to mitigate the expenses of new innovations. One of Amazon’s most controversial business strategies is their willingness to take large fiscal losses on shipping in order to guarantee the fastest delivery times to consumers. In 2016, Amazon saw a net loss of $7.2 billion in shipping packages (Bishop 1, 2017). This number reflects the difference between what Amazon charges its customers for shipping, and what the company pays to get those products to the customer. In the year 2016 however, AWS also saw net revenues reach $12.2 billion, with $3.1 billion in operating income (Condon, 2017). Though the profit from AWS could not cover these shipping expenses, with such high rates of growth in both revenue and operating income, and new and innovative transportation methods hopefully reducing Amazon’s shipping losses moving
forward, a logical assumption can be made that over time the profits from AWS may be able to surpass Amazon’s losses in shipping.

There is no denying the success of Amazon’s venture into web services. From creating a better network for its store and consumer electronics, to generating profits that help Amazon invest in its newest ventures, AWS is a cornerstone in Amazon today. Moving forward, it is easy to conclude that Amazon will see increases in revenue and operating income from the web service as it continues to be an absolutely dominant player and market-share leader in a vastly growing industry. As AWS continues to grow, Amazon will also be able to reap the benefits of an advanced technological infrastructure, which include better information system technologies and increased supply chain efficiency. In conclusion, Amazon Web Services will be one of Amazon’s most influential and powerful functions moving forward.

The Future of the Amazon Distribution Network Facilities

As mentioned prior, Amazon’s story could not be told without their distribution network. From building a nationwide network capable of delivering thousands of items to customers across the United States in the early 2000’s, to making reliable and free two-day shipping available to Prime Members, to even making two-hour delivery possible for customers within select metropolitan areas, no company has been able to push the envelope in speed and reliability in e-commerce distribution like Amazon. Though these great strides made in the past have given Amazon a competitive advantage within the retail sector, it is also important to look at where this innovative company is headed in the future. For this reason, this analysis will cover new and upcoming innovations within Amazon’s fulfillment centers, and the expansion of Amazon Prime Now Hubs.
Though the majority of Amazon’s fulfillment centers’ (FC) technological specifications have gone undocumented for many years, there has been some coverage of Amazon’s FC technology recently. In 2010, Amazon was building fulfillment centers that they considered to be their seventh generation. These fulfillment centers on average held around one million items that could vary in shape and size, with everything from diapers to flat-screen televisions (Robinson, 2016). Though items were manually picked at these facilities, workers within the facility did so with the help of a fleet of hundreds of powered industrial trucks (PIT), which is the name Amazon had given to their forklifts and other small motorized trolleys that assist workers with carrying inventory. These facilities were also equipped with advanced conveyor belt systems that allowed for thousands of packages to be quickly sorted and sent to the correct destination to be shipped. Though this may not seem different from most distribution centers during this time, Amazon was capable of picking their products at high rates of speed and precision, and had the capability to easily scale their workforce and processes up or down during holiday peak seasons.

In November 2014, Amazon unveiled their eighth generation of fulfillment centers. The newest generations of fulfillment or distribution centers do not typically make headlines, however Amazon did just that when it unveiled its fulfillment center in 2014. Unlike prior generations, the eighth-generation FC had a number of new technological innovations, which revolved around the automated capabilities of the Kiva robots (Bishop 2, 2014).

The Kiva robots are an automated fleet of robots that carry stacks of inventory to the picker. Instead of the traditional picking method where an Amazon employee would need to walk up and down aisles to pick their inventory, the Kiva system brings the inventory that needs picked to the worker, keeping the person stationary and the inventory moving. In the few years
Amazon has deployed this technology, they have seen large improvements in warehouse efficiency where this technology is used. According to a note published by Deutsche Bank in 2016, Kiva robots have been able to cut average cycle times from sixty minutes to roughly fifteen minutes, have cut operating expenses by approximately twenty percent, and helped inventory space grow fifty percent due to smarter use of space and narrower isles (Kim 1, 2016).

Though Amazon has seen great success with the Kiva system to date, only thirteen of Amazon’s ninety-five fulfillment and redistribution centers currently use this technology. However, multiple reports point toward Amazon using the Kiva robots more frequently, and in more facilities moving forward (Kim 1, 2016). This is not only because of the gains in efficiency for Amazon, but also for the gains in competitive advantage.

Since acquiring the Boston-based company Kiva in 2012, Amazon has declined to make the Kiva System available to others (SCDigest Editorial Staff, 2015). This gives Amazon an advantage over the competition when it comes to innovation in distribution technologies; similar to their advantages in the web services industry. By owning the best in class service, they have the choice of who they allow to use their technology. This is powerful because it puts Amazon in a position where they can find large profit margins selling this technology to competitors, but they ultimately have the choice as to when the competition is allowed to attain the technology. It is also similar to the web services, because Amazon has the choice as to which web services and features are available to their competition, and at what price point. For these reasons, it is evident that the Kiva systems will be deployed in more facilities within the Amazon distribution network moving forward, and they will provide Amazon with a competitive advantage over other e-commerce and traditional retailers.
Though it is very difficult to speculate what a company with high levels of secrecy such as Amazon will do in the future, with some innovations it is only logical to predict that Amazon will continue to expand upon in the future. One of these innovations is the Amazon Prime Now Hubs. As mentioned prior, Amazon Prime Now Hubs are small pockets of inventory placed within metropolitan areas, which are the distribution centers that serve Amazon Prime Now customers, and allows for one hour or two hour shipping. Like many other innovations within Amazon, the Prime Now Hubs signify more than just new and responsive e-commerce practices, but instead something that will transform the way people purchase goods in the future.

In typical Amazon fashion, Prime Now Hubs are going “against the grain” of typical practices within their industry. While many companies today are consolidating their warehouses to fewer but larger facilities to decreases costs, Amazon is rolling out a number of smaller facilities within their distribution network. These new smaller facilities certainly add to Amazon’s overhead costs, however it allows them to be more responsive in areas where they see large volumes of purchases. Though this practice is not typical within retail, the United States Army performed a similar practice during Operation Desert Storm (Center of Military History, 2010). Instead of holding all of the supplies within a small number of large military base warehouses scattered across the Persian Gulf, the U.S. Army placed a large number of small pockets of inventory throughout militant zones, which would allow for quick inventory deployment to potential battlefronts. Though there is a large difference between sending ammunition to the front lines of battle and sending a pair of headphones to a teenager in Manhattan, the supply chain principle is the same. By adding more facilities to a distribution network, you are positioning more inventories closer to the customer, which in return means shorter delivery times.
The idea of putting the inventory closer to the customer is simple, but to the world of e-commerce retail it is a true game changer. Jeff Bezos’s one goal is to sell everything to everyone, and even with reliable two-day shipping, this would be impossible. In a world full of uncertainties, consumers simply need goods available to them nearly instantly, and an Amazon Prime Now Hub does just that. In a traditional brick-and-mortar retail store a consumer must go to the store, enter it, find the goods that they are looking for, and then return home. With Amazon Prime Now, the storefront is on any of the many electronics that can access Amazon online or through an application. This cuts the typical process in which consumers purchase goods from a brick-and-mortar retailer in half, because all the customer has to do is tell their phone, laptop, or Amazon Echo what they want, and it arrives at their door in less than two hours. This is not only immensely convenient, but also saves the consumer time and energy.

Though Amazon Prime Now seems like an interesting e-commerce innovation, it is truly Amazon’s version of brick-and-mortar retail, where instead of the customer interacting with them through a physical storefront, they are doing it from their devices in a virtual storefront. There will always be demand for long-tail items only available online because physical stores do not have enough shelf space to carry everything. However, in order to actually disrupt convenience stores and brick-and-mortar retailers, the “available now” convenience of everyday purchases is necessary. This is why Amazon Prime Now is so powerful; it is the first online retail offering that provides a true alternative to going to a local store. Everything from milk, to toilet paper, to even electronics can be in consumers’ hands in less than an hour.

As Amazon looks to continue their quest to sell everything to everyone, it is only logical that they will continue to expand their Amazon Prime Now services to more cities. Below is a
map (Figure 3) of the cities that currently have Amazon Prime Now service available, and house a one or more Prime Now Hubs that supports the service (Rubin, 2015).

Since this visual was created, Amazon has also added the capability to Cincinnati, Columbus, Orlando, Tampa, Raleigh, Virginia Beach, and Washington DC (Prime Now, n.d.). By comparing this map to a heat map of U.S. population by density (Figure 4), a logical analysis can be performed to predict where Amazon will build a Prime Now Hub in the future (Kanewisher, 2015).
By comparing Figure 3 and Figure 4 above, it is clear that many of the densely populated metropolitan areas in the United States already have the Prime Now service. However, there are still some very large metropolitan areas that the service is not available, and will likely be markets that Prime Now will expand into in years to come. These cities include Boston, Philadelphia, Pittsburgh, Cleveland, Detroit, Denver, Charlotte, Jacksonville, New Orleans, and Oklahoma City. By expanding to these ten cities, more than 6.8 million potential customers would have access to Amazon Prime Now services that currently do not (Ballotpedia.com, n.d.). Though these are some of the largest metropolitan areas that do not currently have the service, it is important to note that setting up Amazon Prime Now may not currently be possible in some of these areas. This is because the information necessary to make an educated analysis on
Amazon’s ability to move the service into these locations is not public. Some of these reasons that Amazon may not be able to expand to certain cities include zoning restrictions, pressure from local labor unions, taxation, and availability of labor. Since this information is not public, it is only speculation as to where Amazon should move to based on population statistics.

Regardless of the Prime Now Hubs next locations, these fairly new distribution centers will likely become more efficient in the future. With smaller floor plans, and high velocity SKUs, advancements in warehousing technology such as the Kiva robots will have a large impact not only on the facilities, but also on the services overall capabilities. If Amazon were to create a Kiva Robot system for the Prime Now Hubs that delivers the same results as the systems in the fulfillment centers, Prime Now not only will be able to carry fifty percent more products, but also will see increases in efficiency, delivery speeds, and on time deliveries. With a fifty percent increase in available SKUs, Prime Now would be able to offer 15,000 SKUs on average. This would be significantly fewer items offered than a supermarket, which carries on average 39,500 SKUs (Food Marketing Institute, n.d.). However, Amazon would still be able to carry the most popular items within each area, and offer them to consumers with a much more convenient shopping experience and at competitive prices.

In the quest to sell everything to everyone, Amazon Prime Now will need to expand to more cities across the United States, as well as improve upon the Amazon Prime Now Hubs’ processes and capabilities. By offering a number of best-selling SKUs at competitive prices through a convenient and fast shopping alternative, Amazon Prime Now could possibly be the greatest disruption to brick-and-mortar retail in modern history. With new innovations and locations, Amazon Prime Now Hubs could provide Amazon a strong competitive advantage in the retail industry moving forward.
The Future of Amazon Logistics and Transportation Services

Amazon’s ability to offer fast and reliable shipping to consumers is a cornerstone within their business model. After being the first e-commerce retailer to one-hour delivery in select locations, Amazon has established one of the fastest and most advanced distribution networks in the world, but it has come at a steep price. After showing a net loss of $7.2 billion in shipping in 2016, Amazon will need to focus on reducing shipping costs while maintaining speed and reliability in order to make Amazon retail both profitable and sustainable moving forward (Bishop 1, 2017).

Though it can be expected that Amazon will continue to expand on current cost saving innovations such as Amazon Flex in the future, there is speculation on Amazon’s recent investments in transportation capital to supplement their preexisting delivery network. In 2016, Amazon began leasing forty Boeing 767 cargo airplanes, purchased 4000 truck trailers, and obtained a freight forwarding license in China that enables them to sell space on container ships traveling between Asia and the U.S. (Leonard, 2016). These investments immediately grabbed the attention of a number of professionals across many industries. When questioned about the investments, Jeff Bezos told reporters that these purchases were made to supplement capacity of the U.S. Postal Service, UPS, and FedEx (Leonard, 2016). However, some analysts believe that if Amazon were to build upon their last-mile delivery capabilities, they could pose a serious threat to the three companies currently delivering Amazon products.

It is not likely to see Amazon running FedEx or UPS out of business anytime soon. If Amazon were to go all-in on the venture at once and attempted to run these companies out of business, all it would take is for one of the three major transportation companies they use to pull their services, and Amazon would not be able to fill a large sum of their orders. This is because
Amazon already uses these three providers at near maximum capacity. If one were to pullout, the other two would not have the capacity to take the additional orders, and Amazon would not be able to develop their delivery network fast enough to deliver the potential of billions of packages by themselves.

However, many comparisons can be drawn between Amazon Web Services and the company’s newest venture into logistics and transportation. Both of these initiatives started out to help aid Amazon with growing demands they had within the company. In the case of AWS, once the infrastructure was set in place Amazon was able to sell their services, which in return paid for the upkeep and continuous innovations for the service. John Rossman, a former Amazon executive, believes that Amazon will open up their transportation and logistics supply chain for others to use in years to come (Leonard, 2016). Rossman said that he doubts that these transportation services will be available within the next five years, however he believes Amazon almost certainly will have the infrastructure ready for the use of others within the next ten to fifteen years.

All signs currently point toward Amazon transportation services becoming the next AWS. However there are some who are skeptical of Amazon’s ability to create a transportation and logistics infrastructure that would be available for other companies to use. For example, Eugene Kim, an enterprise tech reporter for Business Insider, believes that these recent investments in transportation capital will help Amazon expand their delivery capabilities, however they will never be able to rival UPS or FedEx for a few reasons (Kim 2, 2016). First, he believes that Amazon will not be able to match the density and reach of UPS or FedEx. Though this may be true currently, it is by no means far-fetched to believe that the fifth-most valuable company in the world would be capable of building the infrastructure capable of
matching the density and reach of FedEx or UPS. This assumption can simply be made off of Amazon’s sheer size. UPS and FedEx’s combined market capitalization is only thirty-five percent of Amazon’s, and their total yearly revenues in 2016 combine to only equal eighty percent of Amazon’s in the same year (MarketWatch, n.d.). Much like Amazon showed in the web services industry, if they want to enter the market, their sheer size and power from multiple sources of income will likely allow them to bully their way into the industry. Kim also claims that Amazon would not be able to convince FedEx and UPS customers to switch over to their delivery service, because those customers would not want to give their business to their biggest competitor in retail. Though this is sound logic, Amazon has proved through AWS that competitors are willing to give Amazon their business, as long they are providing superior services and better pricing.

Though this is all merely speculation as to what Amazon’s true intents are with their most recent investments within transportation alternatives, it is a fact that they got the attention of the transportation and logistics industry. This venture places all of Amazon’s transportation suppliers in a position where they realize that they must work with Amazon and be sure to provide the capacity that it wants, or face the potential risk of facing off with one of the world’s biggest companies as a direct competitor in your industry. A study conducted by Citigroup showed that if Amazon were to build a transportation and logistics infrastructure that could rival UPS and FedEx, they could save on average $1.1 billion per year in shipping costs (Condliffe, 2017). Though this may seem like a large incentive, if you take into account the possibility of the transportation services being set up similar to AWS in the future, where Amazon would be able to maintain and improve upon their own transportation capabilities and infrastructure at the
expense of their competition, there is little doubt that Amazon will not attempt to rival FedEx and UPS in the future.

**Autonomous Deliveries**

While Amazon may one day challenge the world’s major logistics and transportation companies, they will likely do so with the aid of automated delivery vehicles. Whether it is through air, or on the road, self-driving vehicles are one of the most heavily researched innovations today. A number of companies including FedEx, Uber, and Google are all companies currently investing in these technologies, and Amazon is no different. Regardless of the transportation mode, autonomous shipping will provide companies with fast, low cost shipping alternatives in the near future.

To begin, autonomous driving trucks are one of these transportation alternatives that will be hitting the market in years to come. Currently, seventy percent of all goods shipped across the U.S. are shipped over the road by truck (Alba, 2016). Though the demand for products being shipped over the road continues to increase every year, the number of capable truck drivers is decreasing, creating a large driver deficit. For this reason, many companies are naturally turning to autonomous driving vehicles to overcome the current driver deficit and growing demand. The driverless technology for tractor-trailers today still requires that a driver be in the cab of the tractor to operate the vehicle off of and on to the interstate system as well as providing maneuvers such as backing up. However, these drivers of autonomous vehicles will likely require less training and certification then the average tractor trailer driver today, meaning that their salaries are expected to be lower, and there will likely be a larger body of qualified workers available moving forward.
In January 2017, Amazon received one of their first patents on self-driving vehicles (Ohnsman, 2017). The patent was for a system with the capability of controlling lane direction and guidance for self-driving vehicles on both roads and reversible lanes. Though Amazon has not commented on their intentions with the patent, it at the very least has signaled to the industry that they are working on the technology internally. Other companies however have been much more verbal of their interest in autonomous driving vehicles. FedEx, a supplier and potential competitor of Amazon, has spoken with a number of different media outlets about their visions for autonomous driving vehicles in the future. Uber has also made headlines with their interest in the innovation. After they purchased trucking start-up Otto in August 2016, the company made the first autonomous trucking delivery in Colorado in November 2016, delivering 50,000 cans of Budweiser over 120 miles (Davies, 2016).

Regardless of Amazon’s current stance on the technology in the public eye, it is a safe to make the assumption that if the technology becomes readily available in the next few years, a company as innovative as Amazon will adapt the innovation into their operations. Not only will this technology help Amazon combat the decreasing workforce of truck drivers, but will also provide large cost savings. According to Josh Switkes of Peloton, a software company that links interactions between multiple semi-trailer trucks, autonomous technologies reduce fuel expenses by seven percent and create even larger savings through reductions in driver labor costs (Kitroeff 2, 2016). When a company is spending billions of dollars per year on shipping, savings of this size can easily surpass tens or even hundreds of millions of dollars per year. With Amazon currently growing their logistics and transportation capabilities, this cost saving innovation will likely be implemented as soon as the technology is readily available for deployment.
The other automated transportation innovation that may be taking to the skies in years to come is one that Amazon has been much more vocal about within the media, drone delivery. In December of 2013, Jeff Bezos introduced to the world a secret project that Amazon had been working on, Amazon Prime Air. This project was a futuristic delivery system that planned to safely get packages into Amazon customers’ hands in less than thirty minutes using innovative drone technology. At first, this technology seemed like science fiction, and many analysts questioned if such a delivery system was even feasible. However, more than three years later Jeff Bezos still stands behind the drone delivery vision, and the first Amazon Prime Air packages have been delivered in rural parts of the United Kingdom (Wells & Stevens, 2016).

Even though the technology for drones has improved, and the first deliveries have been made using the technology in the United Kingdom, the FAA has barely changed their position with the unmanned aircraft delivery since its introduction in 2013. The problem is that the FAA refuses to lift legislation that prohibits unmanned aircraft to leave the sight of the operator, which renders Amazon’s vision of autonomous drone delivery impossible (Mogg, 2016). However, the FAA passed legislation in August of 2016 that will allow some drones to fly outside of an operator’s line of sight for some agricultural purposes if it is within a drone air traffic control system. Though this is not significant for Amazon’s purposes, it does show that the FAA is slowly beginning to open up to the idea of professional uses of autonomous drone technology.

Despite the FAA’s stern position on a drone delivery service, Amazon has continued to push the technology both internally and through the media. In 2016, Amazon was awarded a number of patents regarding an “airborne fulfillment center”, drone charging stations connected to lampposts, and software that allows drones to plan routes and communicate amongst each
other (Kharpal, 2016). Without diving too deep into the details of these patents, it is evident that Amazon continues to pursue drone delivery technology, regardless of the actions of the FAA.

Though the time and money Amazon has invested in this venture may seem precarious, the cost savings potential of the innovation is likely worth the risk. The company reportedly plans to charge Amazon Prime members one-dollar for the thirty-minute delivery service. According to a study done by Ark Invest, a one-dollar business model would be profitable for Amazon if operations were scaled to 400 million packages or more a year (Keeney, 2015). Ark Invest’s research estimates that delivering a five-pound package within a ten-mile radius by drone will cost on average eighty-eight cents per delivery, considering energy, technology, and labor costs. The chart below (Figure 5), gives a more in depth breakdown of the costs to ship a package via drones, and the potential costs per shipment with economies of scale (Keeney, 2015).

![Figure 5. Drone Cost Sensitivity Chart](image)
The consulting firm also estimates that after the initial expenses of research and development for the project, the costs to build a drone infrastructure would be fairly low. This innovation would be low in cost because many of the distribution centers within Amazon’s network have space capable of running the operation, and the drones capable of making deliveries only cost $1000-$3000 per unit on average.

Though only approximately twenty-five percent of all packages delivered to customers are currently less than five pounds and within ten miles on an Amazon facility, this innovation has the potential to be Amazon’s first profitable shipping service (Keeney, 2015). With a company that spends so much money on shipping, the ability to cover the last-mile transportation of its products on a quarter of its orders could help Amazon profit margins soar. Also, with the largest operating expense of drones being human operators, this venture would likely only get more profitable as the FAA lifted more restrictions, and the package deliveries became more automated.

Besides the fact that this innovation could be a cost effective solution to Amazon building on their shipping and logistics capabilities, it also would likely be a large disruption to brick-and-mortar retail. A drone delivery system would allow for thousands of products to be less than thirty minutes away for a number of customers. At the one dollar shipping price point, this not only would be a more convenient way for many people to buy a number of goods, but also would be faster and cheaper than taking the time to drive a gasoline powered vehicle to a local store. With this innovation, and an Amazon Prime membership, purchasing goods from a catalog of thousands of products could be as easy as telling an Amazon Echo what you want, and having that product delivered to your door in less than thirty minutes.
Overall, the future of Amazon Web Services, distribution network facilities, logistics and transportation services, and autonomous delivery methods will all likely provide a number of competitive advantages for Amazon moving forward. The abilities of AWS not only helps power Amazon’s extensive technological capabilities, but also creates a profitable business model that helps sustain itself, as well as generate a steady source of income. The facilities within Amazon’s distribution network are likely to see greater levels of automation in years to come, which will help drive lower costs and higher efficiencies. Amazon logistics and transportation services are likely to create an infrastructure that not only decreases shipping costs, but also is open to other companies in order to create a service and business model similar to that of AWS. Finally, autonomous transportation methods are set to be the delivery methods of the future, and will increase delivery speed while also reducing costs. In conclusion, these future innovations will help Amazon retain their e-commerce dominance, and further disrupt brick-and-mortar retail.
Chapter 5

Conclusion

Since going online in 1995, Amazon has grown from a humble online bookstore operating out of Jeff Bezos’s garage, to being the fifth-most valuable company in the world (Leonard, 2016). In 1999, Bezos won the “Man of the Year” award from Time Magazine. When questioned about his success, he turned his attention to the Internet and said, “The Internet holds the promise to improve lives and empower people. I feel very lucky to be involved in this time of rapid and amazing change.” (Ramo, 1999). Though Bezos saw the Internet’s great potential eighteen years ago, the magnitude in which the Internet has changed people’s lives across the world was likely unimaginable at that time. As the Internet’s first large retailer, it is only fitting that just a little over twenty years from when Amazon’s founder saw the way this new innovation was changing the world, that Amazon would be changing the way people purchase products forever.

At Amazon’s core, three things have made them great; innovation, supply chain and logistics operations, and vision. When Jeff Bezos set out to start Amazon, he was a trailblazer of sorts. With brick-and-mortar stores and mail-order catalogs already being established within the retail industry, becoming a large online retailer was not only innovative, but also something no one had ever done before. In the little over twenty years that Amazon has been online, the company has never lost their fearless desire to innovate. From building a massive distribution network in a time when Wall Street and investors were heavily scrutinizing the dot-com industry, to revolutionizing the way people purchase and read books, to guaranteeing free and reliable two-day shipping in a time when the standard was one to two week delivery, Amazon has earned its place as one of the most innovative companies of the twenty-first century. Though not every
venture has been a success, the company has never shied away from criticism of their failures, and has certainly never stopped working to develop the next innovation that will change the world.

The next one of Amazon’s true core competencies is its supply chain and logistics capabilities. In a time when the standard online order took one to two weeks to be received through standard shipping, Amazon announced that they would be guaranteeing free two-day delivery to its Amazon Prime members. This was not only a defining innovation within e-commerce retail, but also would a true testament of Amazon’s logistical capabilities. While other companies have worked for years to be able to provide this same delivery time and price point as Amazon to their customers, Amazon has not stopped improving. Today, the company has arguably the world’s biggest and most advanced data and information infrastructures in the world. This advanced computing power and data collection system combined with new innovations within their distribution network such as the Amazon Prime Now Hubs have created a shopping experience for customers that rivals the price and convenience of shopping in a physical store. Though all of this has come at a steep fiscal cost to Amazon, their supply chain and logistics capabilities have been able to revolutionize and disrupt the age-old task of going to a market to buy goods.

Finally, if there is one thing that this analysis and research should show, it is Amazon’s nearly impeccable ability to create a vision and follow it. Jeff Bezos once said in an interview, that Amazon’s goal was to “sell everything, to everyone” (Rose, 2013). Though this goal may seem ridiculous, it gives insight to the culture and vision of the company. Amazon has been the target of ridicule since its beginnings. However no matter the opinions of Wall Street, or journalists, or even academics, it has simply seemed like Amazon does what it wants. When
Wall Street and many investors criticized Amazon and the dot-com industry during the early 2000’s, Amazon responded by building one the countries largest and most advanced distribution networks. In the mid 2000’s when a number of journalists and investors claimed that guaranteed two-day shipping was an unprofitable and unsustainable business venture, Amazon continued the offering anyway, and created one of the world’s most successful membership programs by doing so. When Amazon continued to spend billions on shipping costs and new innovations in the late 2000’s, many criticized the company on their lack of profitability, to which Amazon replied by building what would become the world’s most powerful and profitable data infrastructure and web service of its kind.

Selling everything to everyone is an impossible feat, but it is the vision that lies at the heart of Amazon, and appears to be the company’s driving force. All of Amazon’s technological and operational innovations can all be linked back to this very goal. For example, in order to sell everything to everyone, Amazon needed to be able to provide a retail service that was as reliable, convenient, and as cheap as going to a local store. Though Amazon nearly achieved this through guaranteed two-day shipping, it is difficult to question that consumers within select metropolitan areas do not have a more convenient shopping alternative than going to a physical store with Amazon Prime Now.

In order to sell everything to everyone online it is imperative to have a leading edge data infrastructure capable of managing the company’s vast operations and online catalog. Amazon has been able to create such a digital infrastructure through the servers and hardware of Amazon Web Services. This service not only supplied Amazon with the necessary digital capabilities, but also created a platform open to the public that allowed for the infrastructure to be profitable, as well as have the maintenance and further capital investments for the venture paid by the service’s
customers. As Amazon transportation and logistics services continues to build, it is likely that these services will mimic AWS, in that they will enhance Amazon’s capabilities, while creating an open platform for others to use, which in return will pay for the maintenance and investments of Amazon’s transportation network. Even the electronic products Amazon has created such as the Kindle or Echo clearly create a platform, which enhances their customers’ shopping experience by creating faster and more convenient ways to shop the Amazon store.

These examples show one thing, that regardless of the Amazon venture, the end product for Amazon is always a more powerful and disruptive e-commerce store that continuously gets one step closer to selling everything to everyone. In the process of striving to achieve this goal, Amazon has also differentiated themselves from their competition. Unlike any other major retailer before it, Amazon has a strong presence not only in retail, but also in the web service, technology, and transportation industries. This has allowed Amazon to have many sources of income, and reach market capitalization size twice that of its closest competitors. Amazon has also differentiated themselves by building an entire eco-system around their store. While traditional retailers focused on lowering costs, Amazon looked for ways to make shopping on Amazon a habitual part of peoples’ daily lives. These efforts created innovations such as the Amazon Dash Buttons and Echo, which have helped make buying goods from Amazon an effortless routine for millions of its customers.

Once in a generation a company comes along and redefines the way people live their lives every day. In the 1800’s Carnegie Steel forever changed the structures in which people worked and lived, in the early 1900’s Ford changed the way people commuted, and in the 1980’s Microsoft and Apple introduced to the world a personal computer. Today, Amazon continues to change the way people shop for and purchase goods. Whether it be toilet paper or televisions,
Amazon customers are just a brief spoken sentence or a swipe on their cell phones away from having nearly anything they need delivered to them in less than two days, or even within a couple of hours. Regardless of Amazon’s fiscal numbers on paper, their innovations and continuous efforts to push the boundaries of online retail have changed the world forever. There is no telling what technologies or services lie ahead for Amazon, but the fact that consumers may receive their Nike sneakers from a drone in the near future, is a true testament of Amazon’s ability to change the world.
Bibliography


https://www.amazon.com/p/feature/8fgjn84xjx6h7ka?ref_=aa_bx_20&pf_rd_r=XECF54PD5C6G3V64BV5M&pf_rd_p=97083ec7-8d59-4088-be3f-0bb8f6bd7903


Academic Vita

Current Address: 134 E Foster Ave. Apt. 206
State College, PA 16801

Nicholas Artman
Email: nca5073@psu.edu
Mobile: (412) 335-7435

Permanent Address: 401 Laing Road
Lower Burrell, PA 15068

Education

The Pennsylvania State University
Schreyer Honors College
- Pursuing a Bachelor of Science Degree in Supply Chain Management, and Information Systems Management minor.
- Conducted independent thesis research on Amazon.com to analyze and portray the e-commerce industry's ability to disrupt previously established brick-and-mortar retailers.

Experience

The Boeing Company
Business Support Services Intern
June 2016 – August 2016
- Elected by peers to lead and manage group presentation for executive level management
- Created an original and effective database tool using Microsoft Office programs to help retrieve vital information across multiple departments and reports
- Consulted with teammates to innovate current analytical tasks that help drive leadership decision making
- Responsible for analyzing, verifying, loading, and tracking foreign and domestic service orders across multiple vertical lift aircraft platforms
- Analyzed and interpreted a vast range of financial and operational reports to identify and generate root-cause corrective actions for a number of target metrics
- Exposure to a large array of international business matters including direct commercial sales, foreign and domestic government contractual agreements, and foreign political agendas

Mondelēz International
Customer Service & Logistics Co-Op
Wilkes-Barre, PA
January 2016 – June 2016
- Responsible for the inventory levels and planning of nine distribution branches
- Recognized for innovative replenishment tactics that lead to substantial increases in regional inventory fill rates, as well as team leading individual performance
- Created a macro powered Excel data analysis template that allowed for easy evaluation of shipping alternatives for item deployments across multiple countries
- Worked within a team to deliberate and implement enhanced training techniques to improve communication skills for new hires within replenishment department

Westmoreland Mechanical Testing & Research, Inc.
Supply Chain Management Intern
Youngstown, PA
May 2015 – August 2015
- Organized, recorded, and managed excess inventory valued at approximately $750,000
- Completed a project which helped generate approximately $7,500 in monthly revenue
- Constructed and implemented an original inventory system creating a safer work environment within a warehouse

Leadership

Sapphire Leadership Program
Member
University Park, PA
Fall 2013 – Current
- Selected into leadership development program representing top 5% academically in Smeal College of Business
- Participate in leadership building activities, provide community service, and attend seminars to improve professional development skills

Mary Queen of Apostles SCG Outing
Co-Founder/Marketing Manager
Lower Burrell, PA
June 2014 – Current
- Created and organized large scale annual golf outing with 72 participants in order to raise money for Mary Queen of Apostles School Community Group
- Raised approximately $10,000 in first event, with expected growth in years to come

Zeta Psi Fraternity
Scholarship Chair/New Member Educator
University Park, PA
Fall 2013 – Current
- Organize and implement professional development activities and tutoring services for an 80 student organization
- Responsible for academics, philanthropic activities, and safety of 19 young men who seek entrance into the Zeta Psi Fraternity. Includes teaching brotherhood information, organizing philanthropy events, and peer mentoring

Skills
- Microsoft Access and Excel (Including Pivot Tables, Mail Merge, Macros, SQL & VBA coding, etc.)
- Rapid Miner software and various data-mining techniques (Including text mining, data cleaning, etc.)
- SQL and R programming languages
- SAP and Oracle software