ENHANCED DESIGN AND INNOVATION STRATEGIES FOR AMAZON'S ONE-DAY DELIVERY IN THE UNITED STATES

A Term Project Report

Presented

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1. ABSTRACT

In order to continue to secure its position as one of the most reputable and trusted companies in the United States, Amazon is seeking to evolve its relationship with customer expectations by growing its Amazon Prime shipping service to one day and same day shipping. The logistical implications of such a change are challenging and complex. This term project will attempt to highlight and answer some of the challenges to overcome to make one day shipping financially feasible and attainable including hiring strategy, warehouse locations, and utilizing technology.

2. INTRODUCTION

If you have ever purchased goods online, one of the first companies that most consider is Amazon. You can purchase almost anything online at low prices with fast shipping. Amazon's annual net sales in 2017 totaled 177.9 billion, up 40 billion in sales from just a year prior [1]. Total sales have increased 150 billion since 2008 [1]. Statistically, half of all online shoppers will search for their desired product on Amazon [1].

Amazon's key to growing success has been Amazon Prime. Amazon Prime is a subscription service that gives subscribers many Amazon perks. The highlights include free 2-day shipping on purchases, Amazon Prime video, discounts at Whole Foods and exclusive deals among others. Amazon Prime captures 64% of households in subscriptions [2]. In their pursuit of continued customer excellence, Amazon is seeking to provide its customers with shipping times less than the 2-day Prime standard. Two-day shipping was established back in 2005, leaving customers in 2019 desiring more. Amazon's next logistical goal - offering one day and same day shipping service to its products and continue to maintain its low prices.

The product description is at a click of a mouse, a customer can have an item delivered to their home in one day or less. The process scope is inclusive from the moment an order is placed to when the item is received. This process includes steps such as warehouse organization and automation, product sorting, truck placement, and logistical efficiency to route and deliver the item. This term project will aim to capture the advantages and challenges of one day and same day shipping. The project team will determine the best strategy to fulfill shipping time constraints, meet customer expectations, and keep costs similar to the current 2-day shipping logistics.

3. OBJECTIVES

● Amazon is adding seasonal, full-time drivers to supplement delivery during the holidays and through-out the year. The drivers will add to the fleet of traditional carriers, smaller-scale delivery partners and independent contractors, delivering Amazon packages. The 'Amazon Flex' delivery system was established to design a Strategy for fulfilling the one-day delivery service on days of high demand and in the long run as well [4].

- In order to streamline the whole supply-chain and logistics operation and to take major control of its own transportation system Amazon has invested millions of dollars in its 'Prime Air' initiative.
- Another aspect of Amazon's Prime Air project is investing and developing new forms of shipping methods like autonomous delivery drone for streamlining the shipping process and to prioritize the deliveries based on the 1-day delivery service to meet the demand and to meet the customer expectation.
- Increasing the number of Amazon's Fulfilment centers across various locations in different geographical locations contributing to the reduction in the overall logistics cost while increasing the reliability of product availability for instant shipping.
- Optimizing the product handling systems within the warehouses for faster dispatch and delivery.
- Increasing and optimizing 3rd party sales to customers for faster delivery time.

4. PREVIOUS WORK / LITERATURE REVIEW

Amazon is already capable of offering same-day and one-day delivery to 72% of the total U.S. population. The vast delivery network is a result of significant investments over the past four years. Amazon said on its latest earnings report that it's making one-day delivery the default for Prime members. A closer look at Amazon's delivery network illustrates why the company is now ready to make one-day shipping the default for its Prime members. Amazon is capable of providing the same day or next day delivery to more than 95% of the households in 16 of the wealthiest and most populated states and Washington, D.C. The vast delivery network is the result of significant investments over the past four years, a period during which Amazon built out fulfilment centers across the country, nearly tripling its U.S. logistics network across the entire country. Amazon has roughly double the amount of distribution space Home Depot currently owns [5].

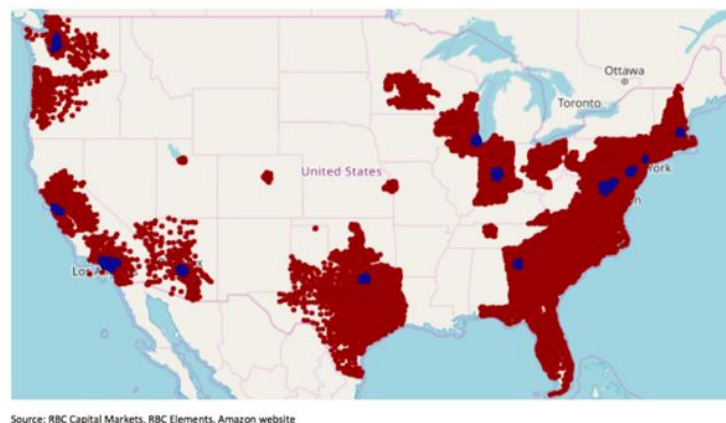Source: RBC Capital Markets, RBC Elements, Amazon website

Figure 1 - Distribution of the Areas across US covered by Amazon's One-day delivery
Source: RBC Capital Markets, RBC Elements, Amazon website

This means the company has a huge head start in fulfilling its plan laid out in its latest earnings report. This is in the aims of shortening the current two-day free shipping plan by one day for Prime members, who pay $119 a year for fast delivery as well as services like unlimited music, access to the video catalogue, and other exclusive deals [5]. Such is a competitive offering in the online realm.

Amazon's 1-day Prime shipping is raising consumer expectations and increasing the cost to compete in e-commerce. Although, the store-level distribution is still the fastest way for a consumer to acquire a product, Amazon's continued rollout of same-day and next-day delivery capabilities continues to reduce that historical competitive barrier and represents a growing risk to retailers who are too often fighting for the 2-day delivery wars. Amazon is trying to follow the strategy that "the faster you ship; the more people buy" [5]. Amazon can attract more customers by shipping products faster than the competition, thus keeping up for its brand name for delivering packages on time.

One of the biggest reasons people shop at a physical store is because of the immediate need to get a product. By shortening delivery time to one day, Amazon changes that equation. The first-quarter earnings show that the company is already starting to see "good order trends" after rolling out one-day default shipping to certain areas [6]. Amazon should focus on continuing this trend along with continuous improvement opportunities to meet up its goals on time.

Most retailers are just now starting to offer two-day shipping and will be forced to spend more on improving their logistics infrastructure to try and keep pace with Amazon. Even at Amazon, the change won't come cheap. The company is planning to spend $800 million during this quarter alone to expand one-day shipping. Still there are 15 U.S. states that don't have access to Amazon's same-day or next-day delivery, so the company will have to spend more heavily to reach those areas [5]. There is clear much progress to be made by Amazon in order to meet customer needs quicker.

The table below depicts the percentage of states that Amazon can fulfil one-day delivery.

Exhibit 10: Percentage of households covered by same-day or 1-day Amazon delivery, 2018

Connecticut	100.0%	Oregon	86.8%
Delaware	100.0%	Minnesota	74.0%
District of Columbia	100.0%	Wisconsin	72.3%
Florida	100.0%	Illinois	72.0%
New Jersey	100.0%	Nevada	71.3%
Georgia	100.0%	Washington	70.6%
North Carolina	100.0%	New York	66.9%
South Carolina	100.0%	Ohio	66.3%
Indiana	99.9%	Oklahoma	45.2%
Rhode Island	99.9%	Colorado	40.4%
Virginia	99.9%	Utah	35.0%
New Hampshire	99.9%	Kansas	31.3%
Massachusetts	99.6%	Kentucky	25.6%
Maryland	98.2%	Tennessee	21.8%
Arizona	95.7%	West Virginia	13.7%
Texas	95.3%	Missouri	10.3%
California	94.6%	Iowa	3.1%
Pennsylvania	88.9%	Michigan	2.2%

Source: RBC Capital Markets, RBC Elements, Amazon website, Census Bureau

Figure 2 - Percentage of households covered by 1-day delivery
Source: RBC Capital Markets, RBC Elements, Amazon website

Another benefit is improvements in warehouse efficiency. Since products are shipped faster, more inventory will move in and out of Amazon's fulfilment centers more quickly.

4.1 Current Approaches & Practices

Amazon Air - As Amazon has continued to expand its last-mile delivery services, it's also focusing on growing air cargo services, Amazon Air, to reduce its reliance on third-party carriers such as UPS, FedEx, and the United States Postal Service. FedEx recently declined to renew their shipping contract with Amazon. According to a Morgan Stanley report in December 2018, Amazon could save between $1 to $2 billion in 2019 as a result of handling more of its own air deliveries [6].

The existing shipping infrastructure owned by Amazon already includes ocean shipping licenses from China to the U.S, a recently launched shipping trucking brokerage platform, and last-mile gig delivery operations such as Amazon Flex services, Amazon Fresh, Prime Now, Shipping with Amazon, and food delivery services primarily conducted by independent contractors [6].

XPO Logistics, one of the largest logistics companies in the United States, estimated a revenue loss of $600 million in the coming year as Amazon is insourcing the majority of its business with the company [6].

Figure 3 - Amazon Air
Source: Amazon website, Gizmodo website

5. METHODOLOGY/TECHNICAL DISCUSSION

Amazon has taken continuous efforts towards utilizing and improving many aspects of the supply chain areas that they are involved in. The area now of same day delivery, especially during seasons of high demand like Christmas, is still a challenge for Amazon. Various technical factors contribute to such, but many steps are being taken towards addressing it. Some of these include: Amazon using its electric vehicle fleet to deliver goods, becoming less reliant on third party delivery companies in the shipment of products, and implementing more AI and drones both on the delivery and warehousing side to cut down on delivery time and labor cost to make it more cost efficient [7]. Each of

these approaches, among others, have the potential to have great impact on one-day delivery.

Black Friday, the day after Thanksgiving that has become a tradition for consumer deals, put Amazon's shipping logistics to the test. Last holiday season the company announced it shipped over one billion items to its prime customers [8]. During the holiday season, Amazon hires over 120,000 part time workers across its logistics and warehouse network [8]. Interestingly, its investments in technology and automation drove that number down to 100,000 in 2018 [8]. The strategic placement of fulfillment centers has driven down shipping times and automation makes this occur even more naturally.

Wise investment into the selected avenues will bring about a positive impact in the realm of making same day delivery a realizable option in more locations. Being that it would not be rational to locate some services in locations where there is not high demand, it presents a challenge in regards to providing optimal delivery to all of the general public. Since this is the case, capital will be utilized to formulate sound strategies to delivering items to harder to reach locations. Resources will be used towards developing more efficient ways to reach more urbanized or easy to reach individuals as well.

6. RESULTS

6.1 Using Amazon Flex For 1-Day Delivery & On The Days Of High Demand

Amazon appears to have come up with a solution rather elegant in its simplicity but staggering in its implications: Anybody who wants to can be a delivery person, by just BYOV (bring your own vehicle). That's the basic premise behind the Amazon Flex program, where the company pays independent drivers (like Uber drivers, except they're carrying packages, not people) to use their own cars to pick up packages at local warehouses and deliver them to customers' houses [4]. According to Amazon the last mile of delivery is the most expensive and time-consuming part of fulfilment for them and their logistics partners, comprising 53% of the overall cost of shipment. Amazon's Flex program takes the onus off of companies, instead connecting customers directly with local couriers to expedite deliveries and cut down on costs [9]. Currently, Amazon Flex is available in most large and medium U.S. cities. Here are just a few of the cities where Amazon Flex is available: Seattle, New York, Los Angeles, Chicago, Indianapolis, Washington D.C., Denver, Miami, Nashville, Atlanta, San Francisco [10]. The next big step for Amazon will be to implement this delivery program throughout other states and major cities in U.S.

Lastly the 'Flex' program is just, Amazon getting warmed up. In order to make its supply-chain and logistics operations more efficient, the online giant's latest foray into logistics is called 'Delivery Service Partners', which basically is a funding operation that aims to help individuals launch and run their own logistics companies to deliver Amazon packages. The company claims that owners can earn as much as $300,000 in annual profit (which, presumably, means after taxes and expenses) operating a fleet of up to 40 delivery vehicles. If the idea catches on, Amazon expects to see hundreds of small business owners employing tens of thousands of delivery drivers nationwide. And to get the idea up and running, Amazon has pledged $1 million to fund start-up costs ($10,000

in reimbursement costs per person) for qualified military veterans who want to start their own delivery businesses [4].

Figure 4 - Amazon Flex
Source: Amazon website

6.2 Amazon Prime Air

Prime Air is closely related to Amazon's long-distance delivery. After any order leaves, the fulfilment center, the order needs to reach across U.S or to other parts of the world to another warehouse of Amazons. In order to do so, Amazon is cutting cost and increasing its reliability of its shipping by using its fleet of airplanes. In order to make it a success Amazon has been building an air-network for years now coupled with its other air-logistics partners as well. Amazon has also invested a massive $1.5 billion in building and developing an air-hub in northern Kentucky in May 2019 with a capacity for some 100 planes, as part of the company's commitment to ensure fast, free shipping for customers [11].

6.3 Amazon Air (Autonomous Drone Delivery System)

Amazon Prime Air is basically a future delivery system from Amazon designed to safely get packages to customers in 30 minutes or less using unmanned aerial vehicles, also called drones. Prime Air has great potential to enhance the services Amazon already provide to millions of customers by providing rapid parcel delivery that will also increase the overall safety and efficiency of the transportation system [12].

For Amazon, safety is a top priority. Amazon's vehicles will be built with multiple redundancies, as well as sophisticated "sense and avoid" technology. Additionally, through their testing, they will gather data to continue improving the safety and reliability of their systems and operations [10]. Safety and security are top priorities for Amazon as they look to incorporate small drones into the airspace. They are working with regulators and industry to design an air traffic management system that will recognize who is flying what drone, where they are flying, and whether they are adhering to operating requirements to ensure a lean, safe and efficiently operating shipping pipeline [12].

For the matter of fact Amazon will deploy its autonomous drone-delivery system, where they have the regulatory support needed to safely realize their vision of aerial unmanned shipping. They are excited about this technology and strive to one day use it to deliver packages to customers around the world in 30 minutes or less [12]. This is very useful in large cities where rooftop skyscraper delivery is convenient and effective by avoiding traffic congestion.

Figure 4 - Amazon Air
Source: Amazon website

6.4 <u>Setting Up New Fulfilment Centers</u>

The objective of achieving the same day delivery or the one-day delivery can be achieved by increasing and setting up of numerous Amazon Fulfilment centers in various locations according to the geographical locations. The main objective of these centers will be to decrease the lead times to deliver the products once the orders are placed, in addition to decreasing the transportation costs and increasing product availability and reliability. This can be achieved by following the below practices.

- Assemble the right team to focus on the objective of one day delivery service.
- Define the goals to achieve targets one day shipping and delivery.
- Focus entirely on Amazon's logistic service using Electric vehicles contributing to a cleaner environment instead of partnering with other 3PL carriers, resulting in the reduction of shipping costs while enhancing the Amazons package tracking technology to reduce losses from the packages lost by third party carriers.
- Automate the fulfilment centers as much as possible so that it can cut down on the labor cost along with faster processing times.
- Drone delivery service can be an advanced delivery service which can help to shorten the lead time and thus achieving the one-day delivery objective.

The above strategies can help Amazon to achieve the following results:

- Increase conversions
- Increase average order value
- Expand market or target audience
- Decrease costs
- Improve operational efficiency

Figure 5: Amazon's Fulfilment Center

Source: Amazon website

6.5 Optimizing Amazon's Product Handling System In Warehouses

For optimizing the product handling system within the warehouse for faster dispatch and delivery, Amazon uses an automated inventory management system powered by barcodes and barcode scanners, called 'chaotic storage'. This method, wherein items are placed seemingly at random on any available shelf space, appears to fly in the face of everything we expect from Amazon, a monster online retailer that ships billions of items every year [13]. Chaotic storage isn't as simple as leaving products strewn around the warehouse and searching blindly when it's time to send them out. It all starts with a quality inventory management system, powered by automated software. This software is a collection of business applications that track product sales, the purchases of raw materials and other processes along the supply chain [13]. For inventory management software the five main areas are: managing inventory, saving space, maximizing labor, satisfying customers and reducing wear and tear. All these areas are based on the premise of a more organized warehouse, but the word 'organized' can mean many things. Anytime a product has a barcode label (and its corresponding shelf space, bin or other storage area has one as well), it can be organized. That's where chaotic storage comes in. Barcodes, both traditional, linear barcodes and more complex 2D barcodes, are translated into alphanumeric codes by a barcode scanner [13].

On the other side of this chaotic system lies the disadvantages it possesses which restricts the same day delivery, for instance goods that require specific conditions for storage (for example, refrigerated goods) or bulky goods for which special shelving is necessary cannot use this inventory management system. To tackle this problem storage installations that are organized through a combination of two or more multiple location management can be used which produces the following result of higher rotation products being in a fixed zone (usually close to the loading docks) and the rest being assigned freely or randomly. If there are any errors in the barcode placement either on the product or the shelving unit itself, it can cause a tremendous delay in the handling system and

ultimately in the final dispatch for delivery. So, Amazon must focus on more automation process and technology and try to eliminate the use of manual labor wherever they can. Also, in order to assist the automated drone delivery system, special storage units can be constructed wherein the drone itself can travel-in grab the unit from the shelves and do the last mile delivery task.

Figure 6- Amazon's Chaotic Storage,
Source: systemid.com

6.6 Third Party Sales Optimization

Allowing 3rd party entities to conduct sales on Amazon is an avenue that connects buyers to sellers all around the world. Such provides a large boost to the growth of companies involved. Although this is the case, the current operation of 3rd party sales to customers on Amazon can be improved for faster delivery times. The rate of third-party sells has increased steadily over the years. In fact, at the end of 2018, the percentage of 3rd party sellers on Amazon reached 53%. This is a high value, especially with it increasing 13% over a five-year period from 2013 [14]. This is great news for both Amazon and the 3rd party seller. Amazon gains revenue through commissions along with other seller service fees and reinvest it to improve their service. Such is good for sellers because more and more entities are operating with Amazon and adopting a direct-to-customer business and shipping strategy. Operating in this manner gives sellers more control over their business, but it hinders their ability to provide desired levels of customer service, gain customer feedback, along with provide end-to-end quality control due to the rapidly changing marketplace [15]. These are some hurdles that Amazon is working towards trying to resolve.

Although that is the case, 3rd party companies choosing to operate through Amazon has its major advantages. One of those is just the name and presence that Amazon has, especially in the shipping and logistics realm. Since Amazon handle the shipping requirements and shipping related customer service needs for companies, it takes a lot of hassles away from the 3rd party seller. Amazon's efficient logistics and shipping system cuts down on the amount of resources and time needed by sellers to handle their own shipping [15]. Such cuts down on hassle as well as shipping time, leading

to happier sellers as well as customers. Amazon offers two separate ways to do business to sellers. They are operating as first-party, wholesale type of seller, or as a third-party, direct-to-customer seller [15]. These two methods have their benefits and drawbacks as expected. With a lot of companies moving towards selling directly to customers and cutting out the middleman, efficient and fast shipping is a high priority. Due to this, the shift to more direct-to-customer sellers is occurring. These current offerings and developments are making the same day or one day delivery more realizable in many locations for Amazon.

7. CONCLUSION

The aim of this project is to provide the one-day delivery across the U.S. using Amazon's new delivery strategies and innovations instead of relying on third party logistics partners. Such actions would eventually reduce both the labor costs and delivery time. The objective of reaching most of the states with one day delivery service is a clear objective that can be obtained through the implementation of the proposed strategies.

Amazon's corporate mission statement is very telling to the direction the company will continue to head. "We strive to offer our customers the lowest possible prices, the best available selection, and the utmost convenience." [16] By using these new delivery strategies and innovations, Amazon will continue driving towards the future providing value to their customers and the bottom line.

7.1 Future Scope Of The Project

- Amazon can adopt full automation from the moment a package enters a distribution center, to the point that it is sorted and then delivered by drones to the customer.
- Amazon can focus on using electric vehicles for all its delivery services and incorporating solar panels for energy, thus contributing to a cleaner environment and more efficient processes.
- Amazon can increase its physical presence in the U.S by increasing its number of stores (Amazon Go), thereby making it convenient for the fulfilment centers to ship products conveniently to the customers.
- Amazon can utilize distributed generation renewables such as wind, solar, and battery technology for a cleaner company footprint that is not reliant on fossil fuels.

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