

## Foot prints of Big data and Analytics at Amazon.com

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**ABSTRACT:** Amazon.com, Inc.(AMZN) is a multi-national tech-giant who are into e-commerce. Their success lies in good product assortment and extraordinary customer service. Amazon.com began its journey in the year 1994 as an online book store and today they have a diversified product line ranging from video sales, streaming, software, electronics to apparel, furniture, food, toys and so on. At present they are the biggest e-commerce players and providers of cloud services. Big data and analytics are the driving forces behind a variety of businesses and online market is not an exception. For an online retailer like Amazon, Big data has played a pivotal role in making what they are today. Amazon heavily relies on predictive analytics to ensure customer satisfaction and build brand loyalty on their massively acquired market share. The present paper discusses about the data-driven customer centric approach of Amazon taking into consideration the big data and predictive analytics, which is woven deep in their system. Big data and Analytics are not just a part but rather part and parcel of their business prototype at Amazon. Making personalized recommendations, recommending books on Kindle, ordering by just a click, pre-emptive shipping prototypes and price optimization are the results of incorporating analytics powered by Big data. The paper concludes by giving a road-map to online retailers to gain a competitive edge by relying on Big Data and predictive analytics in an e-commerce market scenario.

**Key Words:** e-commerce, Predictive Analytics, Big Data, data-driven, customer centric.

### Introduction

The name Amazon.com has been a luminary since last two decades. In the year 1995 Jeff Bezos founded Amazon.com with a vision to build a virtual shopping place for book lovers and today it sells more than 606 million products. Amazon product lines include numerous media (books, DVDs, music CDs, videotapes, and software), apparel, baby products, consumer electronics, beauty products, gourmet food, groceries, health, personal-care items and the list goes on. Amazon.com offers their services towards four types of customers namely- consumers, sellers, enterprises and content creators as stated in Annual report 2013. The business strategy of Amazon.com is always met with a skepticism and it was predicted that they would be a loser and the company profits till 2001 justified the critics but Amazon proved them wrong by rapidly expanding in other areas. Amazon's client-centric approach focuses on improving the customer experience and its internal operations by leveraging on big data. Through this Amazon crafts and captures value in a righteous cycle that involves increasing number of customers and transactions. So that Amazon can spawn more data that feeds into further improvements and thereby increasing the customer base. Amazon.com launched item-based collaborative filtering in 1998, enabling recommendations at a previously unseen scale for millions of customers and a catalog of millions of items.

Basically, Amazon amasses widespread facts on user's activity on the website which starts right from tracking their journey of exploring and discovering products to finally delivering or returning the product. The entire process is netted by the site and Amazon heavily relies and uses this data to run tests and refine the performance of site which in turn benefits customers and sellers on the platform. Since Amazon is customer-centric it actively adapts the site with the best algorithm so that the most relevant products and sellers surface. The vendors manage their operations and optimize the display content and advertising in accordance to the metrics and data provided by Amazon thus drawing more customers and sellers to the site. Amazon collects a subscription fee through Prime (from customers) and a transaction percentage and advertising revenue (from sellers) thus adding to its revenue basket.

### Review of Literature

(Hof, 2006) says Amazon.com has not just nurtured but has even lead the new retail format and has become the market leader in online retailing. In 1999, books were the second largest retail segment next to computers sold over the Internet (BCG, 2000). (Forrester, 2001) says the sales of books online grew tremendously from 1995 to 2000. Nowadays when a customer visits Amazon.com site based on their

preferences and selection criteria they are given "Personal Recommendations" (Chiagouris & Wansley, 2000). (Jakinson and sain) comments that through web site Amazon automates the process of creating value for the customer. Online firms that that uses big data and analytics into their businesses experience 5-6% more productivity in comparison to their competitors (McAfee and Brynjolfsson, 2012). (Columbus, 2014) on a recent study on BSA software Alliance in the USA has concluded that incorporating Big data and analytics in the value chain will increase the growth rate by 10%. This is much more evident as per (Kiron et al., 2014) who says 91% of the 1000 companies are investing on Big data and analytics. Further to add to these (Jao, 2013) says big data and analytics helps firms to make informed decisions based on critical insights further he says that in e-commerce context big data helps the firms to track the customer's activity on the website and analytics will suggest effective ways to convert them into potential customers rather than continuing as repeat buyers. (Miller, 2013) believes that big data and analytics guides e-commerce firms to use data effectively for a better conversion rate and improved decision making process. (Devaraj et al., 2002; Williamson, 1981) as per transaction cost theory in e-commerce says that big data and Analytics enhances buyer-seller interaction and improves managerial transaction cost efficiency. (Barney, 1991) on their resource-based view argued that Big data and Analytics is a distinctive competence of the high-performance business process to support business needs (Davenport and Harris, 2007a). Owing to the popularity of e-commerce Big Data and Analytics is the focus of academic and industry investigation (Fosso Wamba et al., 2015). (Loebbecke and Picot, 2015) considers big data as the "next big thing in innovation". (Gobble, 2013) says big data and analytics are the fourth paradigm of science". (Strawn, 2012) says it's the next frontier for innovation, competition, and productivity", (Ann Keller et al., 2012) considers Big data and analytics as a revolution in science and technology.

### **History of Amazon**

July 5, 1995 *Amazon online book store is born*

May 15, 1997, *goes public*

June 11, 1998 *expands into music*

September 28, 1999 *acquires "one-click" patent and launches third party seller market place*

December 10, 1999 *takes a hit after dot.com bubble burst*

November 7, 2002 *ventures into clothing and apparels*

June 10, 2003 *launches web hosting business*

August 19, 2004 *enters China*

February 5, 2005 *prime unveiled*

November 19, 2007 *Kindle goes on sale (after acquiring Goodreads)*

January 31, 2008 *acquires audio book company Audible*

July 22, 2009, *acquires shoe shopping site Zappos*

March 12, 2012 *acquires robotic company Kiva Systems*

July 18, 2014 *unveils its first smart phone*

November 2, 2015 *opens its first physical book store*

November 10, 2015 *echo is available in market*

June 16, 2017 *acquires Whole Foods*

September 4, 2018 *reaches a \$1 trillion market cap*

November 2, 2018 *Virginia to become Amazon's second head quarters*

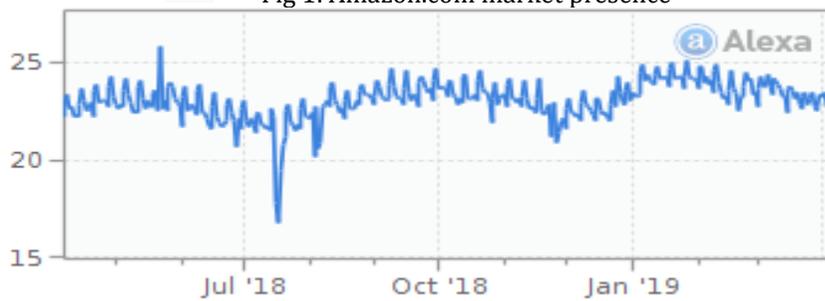
(source: The Everything Store by Brad Stone, CNN Business, February 2019)



Country	Percent of Visitors	Rank in Country
United States	66.9%	4
China	3.9%	50
India	3.4%	29
Japan	3.4%	19
Canada	1.8%	16

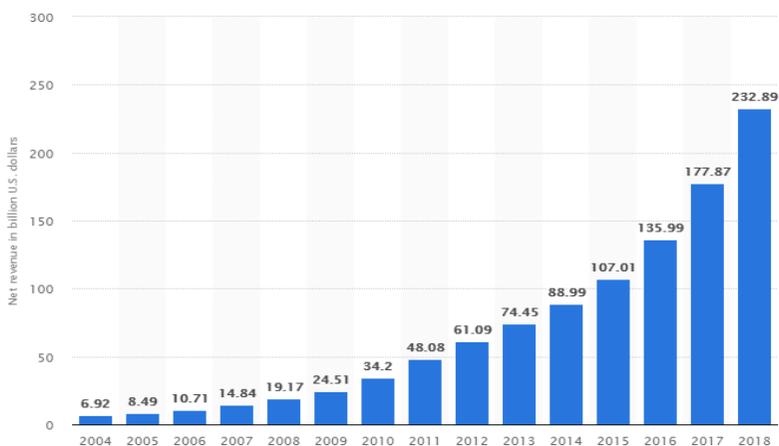
Source: Alexa, visited on 8-4-2019

Fig 1: Amazon.com market presence



Source: Alexa

Fig 2: Visitors from search engine



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Fig 3: Revenue of Amazon.com

### Objectives

1. To understand the customer-centric and data-driven approach for value creation at Amazon.com.
2. To appreciate the applications of big data and analytics at Amazon.com.

### Big Data and Predictive Analytics at Amazon

Predictive analytics describe the use of statistics and modeling to determine future performance based on current and historical data. Predictive analytics look at patterns in data to determine if those patterns are likely to emerge again, which allows businesses and investors to adjust where they use their resources in order to take advantage of possible future events. (Source: Investopedia). There are several types of predictive analytics methods available. Predictive models look at past data to determine the likelihood of certain future outcomes, while descriptive models look at past data to determine how a group may respond to a set of variables.

Amazon.com in the early years into their e-commerce venture realized the potential of big data for an e-commerce platform. They are not just an online merchant anymore. If any e-commerce platform has been a proving ground for what [big data](#) can do, it's Amazon. Amazon is utilizing big data and analytics to the fullest and reaping the benefits out of it. This is a company that isn't just an online merchant but a mammoth that pioneered and specialized in connecting customer data with that of business objectives. Jeff Bezos, Amazon's founder, realized early that Amazon could be about more than just selling products.

Amazon makes use of Big Data that it has gathered from customers while they browse for building and tweaking its recommendation engine. The rule they follow is pretty simple the more they know you, the better they can predict about your buying. Based on which it can rationalize the process of coaxing its customer to buy. Amazon makes sure that each and every customer activity on their web is recorded and they even keep track of the items you have taken a glance at. Their predictive algorithm can predict the income level of its user based on the location, reviews and feedbacks customers leave on their website. The big data heap is used to build up a "360-degree view" of you as an individual customer and make recommendations accordingly. It also gathers data such as time spent on certain page and navigation time for making better recommendations. In this way a holistic view of your customers is obtained which acts as a foundation for Big Data-driven marketing and improved customer service.

#### Application of Big Data and Analytics at Amazon.com

The following are the key areas where Big data and predictive analytics are applied at Amazon.com (Source: Investopedia, 2018)

**Custom-made Recommendation:** Amazon uses the technique of collaborative filtering engine (CFE) which analyzes the items bought earlier, items in the shopping cart and wish list, items that are searched the most, the items reviewed and rated by the customer together and uses predictive analytics to recommend additional products that other buyers bought and suggest this to its user. By this, Amazon uses the power of suggestion to improve customers shopping experience and encouraging users to make an impulsive buying decision and spend more money. This method generates 35% of the company's sales annually.

**Book Recommendations from Kindle Highlighting:** After acquiring good reads and integrating the social networking functions with Kindle, Amazon.com started sending additional e-book recommendations to its users based on the words highlighted and shared with other Kindle users thereby encouraging and promoting user's to buy its product.

**One-Click Ordering:** One-click ordering is a patented feature of Amazon that helped customers to place the order in just one click. It promises to deliver quickly so that the customers don't switch to other brands. This is enabled once the customer places the order and mentions the shipping address and payment method. Usually the customer can cancel the order within thirty minutes of placing the order else the product is inevitably charged and shipped. (Amazon 1999 Annual report) says customer who have earlier activated this functionality can order items by just one click without fulfilling the order form.

**Anticipatory Shipping Model:** This is another patented model from Amazon.com that completely relies on big data and predictive analytics to forecast the products that are likely to be bought so that the items are made delivery-ready by sending it to the local distribution centers making it ready for shipping as and when the orders are placed. This reduces the delivery time and overall expense thereby increasing the sales and profit margins.

**Supply Chain Optimization:** Amazon.com primarily uses graph theory for reducing shipping expenses. Graph theory helps in deciding the best delivery schedule, best route and a better product classification aided by big data and analytics which helps Amazon in tracking their inventory, tie-up with their distributor for managing and tracking inventory. Big data plays a pivotal role in helping Amazon to select their ware houses which are closer to the distribution centers and to the customers to minimize shipping expenses. Tie-ups with manufacturers on managing and tracking inventory.

**Price Optimization:** Pricing on Amazon is dynamic and is backed by big data and analytics. The prices are changed and managed by Big data. Amazon attracts its customers by giving them competitive prices. The predictive analytics algorithm prices the products based on customer's activity on website, product availability, expected margin of profit, competitors pricing etc. and accordingly gives discounts considerable discount on best-selling products and makes more profits on selling scarce products

## Findings

The paper is an attempt to understand the catalyst role played by big data and analytics at Amazon.com. Through secondary data it is evident that the e-commerce landscape is changing day by day and most of the companies are resorting to big data and analytics to reap its benefits. Amazon.com is one such e-commerce giant who has leveraged on Big data and Analytics to take their business to the next level. The paper elucidates on how Amazon at the initial stages of their business resorted to using predictive analytics and big data for informed decision making. They achieved this by recording customer activities on the web and based on which the algorithms improved the recommendation system. Despite it being predicted to be a biggest failure in 2001 after the dot com burst Amazon managed to survive. In 2006 after acquiring Goodreads and venturing into AWS there was no turning back and rest is history. The mountain heap data provides a holistic profile about the customer which helps them plan their strategies well in advance and serve their customers better. Moreover, the paper touches on the application aspect of big data and analytics in the form of personal recommendations, book recommendations, anticipatory shipping, dynamic pricing, one-click ordering and supply chain optimization, which acts as a catalyst in transforming their business. The study also reveals that being dynamic and different from your competitors is the key for being successful.

## Conclusions

To conclude, the paper throws light on how big firms in general and Amazon.com in particular sensitize the marketing environment and adapt themselves to keep their business live and serve their customers better. It justifies the quote "Change is the only permanent thing". While other businesses adopted big data and predictive analytics and have witnessed outstanding results, e-commerce giant like Amazon was not an exception. They were one among the early adopters of big data and analytics for an e-commerce platform and advanced their business by relying on it. Big data and analytics has not just taken their business forward but has demarcated them from their competitors and have helped them in retaining and acquiring more market share and witnessing better revenues. To conclude big data and analytics has impacted the Amazon.com's business positively and this sets a road map for the other e-tailers who are already using and to those who are all set to incorporate big data and analytics as part of their can learn from the Amazon's success mantra and reap the benefits of it.

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