amazon

Operations Audit

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Background

- Founded on July 5th, 1994 in Bellevue, WA by Jeff Bezos
  - Initially an online marketplace for books
  - In 1998, added more product categories: toys, electronics, tools
  - By 1999, Amazon shipped 20 million items to 150 countries around the globe
- **Amazon in 2022:**
  - Focuses on e-commerce, cloud computing, digital streaming, and artificial intelligence
  - Guided by four principles: customer obsession rather than competitor focus, passion for invention, commitment to operational excellence, and long-term thinking.

Amazon Headquarters 2022

Background

- **Background of E-commerce industry:**
  - 1960-1982
    - EDI created to replace traditional mailing and faxing of documents and allow a digital transfer of data from one computer to the other
    - Michael Aldrich coined the invention "teleshopping" as the precursor of modern online shopping
  - 1982-1990
    - B2B online shopping became lucrative
  - 1990s
    - Major advancements in commercial use of internet
    - Amazon became first ecommerce site, many other companies followed
  - Today
    - Retail e-commerce sales amount to approximately 5.2 trillion USD worldwide

- **Buyers of E-commerce:**
  - **Consumers:**
    - US 2021: Ages of 24-35 were largest group of digital buyers, accounting for over 20% of ecommerce sales
    - Second largest group: 35-44 accounting for 17.2% of US digital buyers
  - **Businesses**
    - US 2020: B2B ecommerce sales reached 6.7 trillion USD
- **Competitors of Amazon:**
  - Ebay
  - Alibaba Group (B2B)
  - Walmart
  - Rakuten (cash-back-program)
  - Otto group (German ecommerce)
  - JingDong (Chinese ecommerce)

AMAZON LOCATIONS

At a glance:

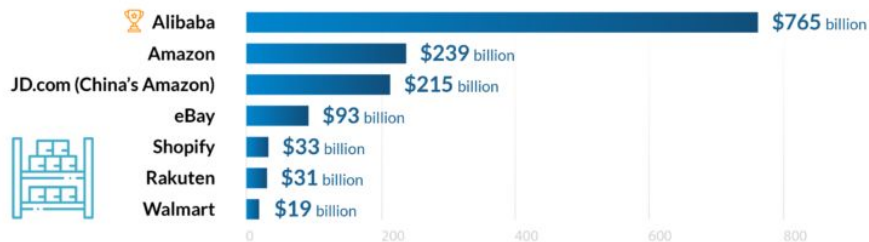## 1 Amazon totally dominates US ecommerce

Source: Visual Capitalist

US ecommerce market share:

- 49.1% Amazon
- 6.6% eBay
- 3.9% Apple
- 3.7% Walmart
- 1.5% Home Depot
- 1.3% Best Buy
- 1.2% Costco

2 Alibaba still dwarfs Amazon in terms of global sales

Source: Motley Fool

Global gross merchandise volume:

- Alibaba: $765 billion
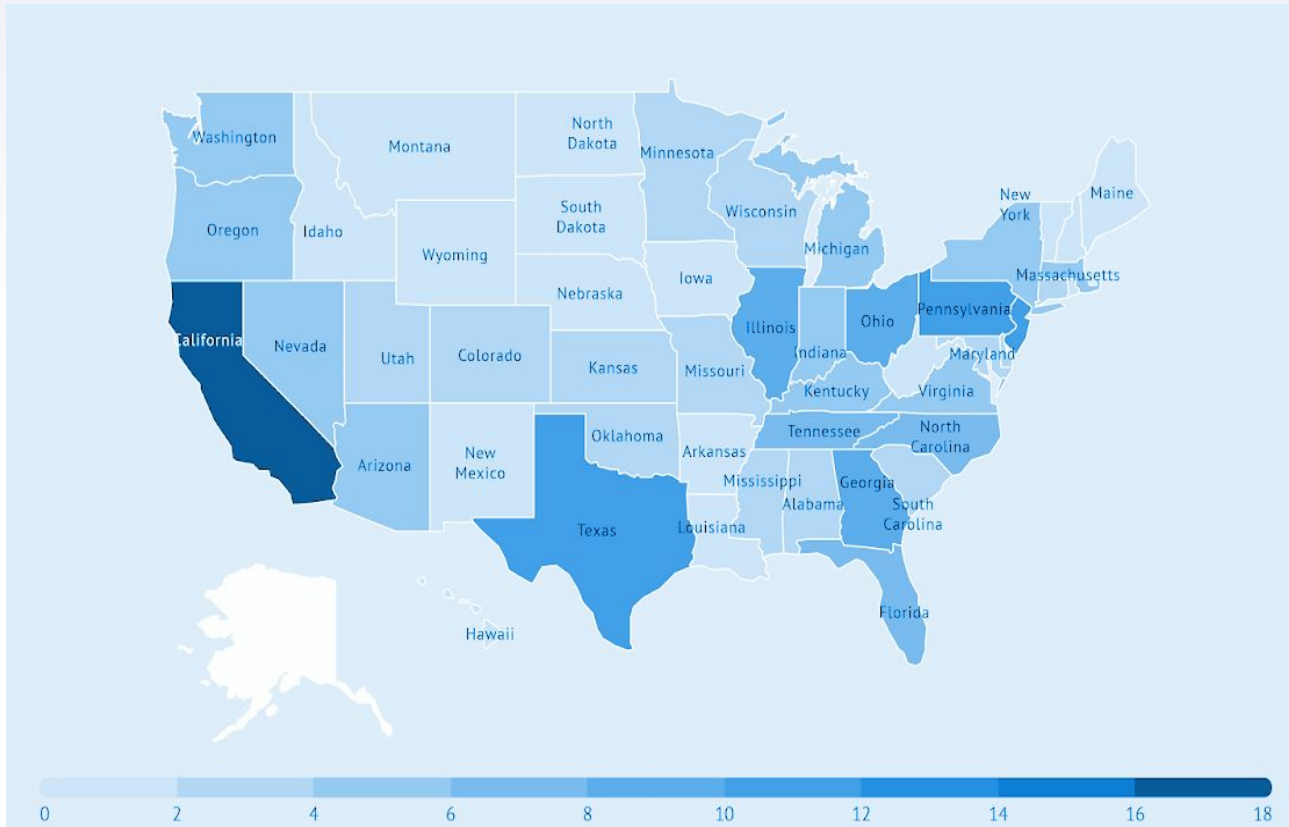- Amazon: $239 billion
- JD.com (China's Amazon): $215 billion
- eBay: $93 billion
- Shopify: $33 billion
- Rakuten: $31 billion
- Walmart: $19 billion

3 The most frequently bought products on Amazon

Source: Feedvisor 2019

- 44% electronics
- 43% clothing, shoes and jewelry
- 39% home and kitchen
- 36% beauty and personal care
- 33% books
- 28% cell phones and accessories
- 25% movie and TV
- 20% pet supplies
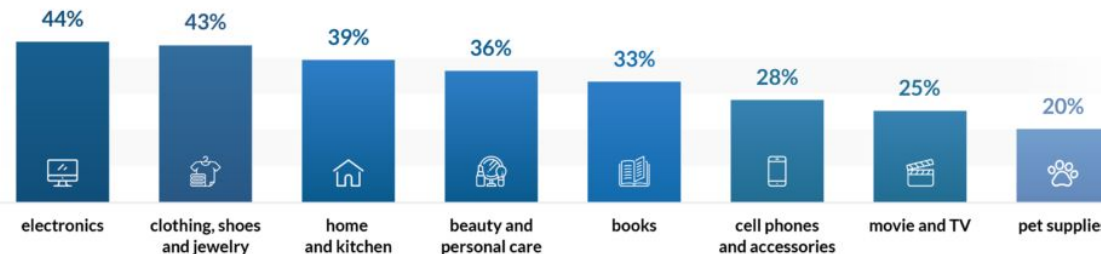
Operations and Supply Chain Management

Process:

1. Receiving Products
2. Storing of Items
3. Picking Orders
4. Quality Assurance
5. Packing Orders

Operations and Supply Chain Management

Fulfilment Center and an Amazon Delivery Fleet are two key elements of Amazon's supply chain.

Fulfilment Centers

- In order to fulfill and logistics these orders, Amazon needs to have a fulfillment network that can accommodate 112 million Prime members and two-day shipping.
- There are currently more than 150 million square feet of fulfillment operating space at Amazon's fulfillment centers globally. There are 21 fulfillment centers in California alone, and 14 in Texas. Near major metropolitan areas, Amazon has an estimated 500 warehouses. **Since the COVID-19 pandemic sparked a boom in ecommerce, Amazon has seen record growth.**

Amazon Delivery Fleet

- Amazon's delivery fleet is just as important as its inventory storage capacity and fulfillment capabilities. As a way to keep up with customer demand, Amazon works with several shipping and delivery partners.
- Starting from the fulfillment centers to the sort centers, Amazon's trucks transport about 2,000 boxes. After receiving the packages, Amazon distributes them based on their location and delivery speed requirements. In order to transport these packages, the company chooses the most efficient mode of transportation. About 30 or more containers can be carried by airplanes from more than 20 airports around the United States. The company uses trucks, vans, bikes, and even robots when it comes to moving goods on the ground. Drones are now being considered by Amazon as a means of delivering items to nearby fulfillment centers.

Operations and Supply Chain Management
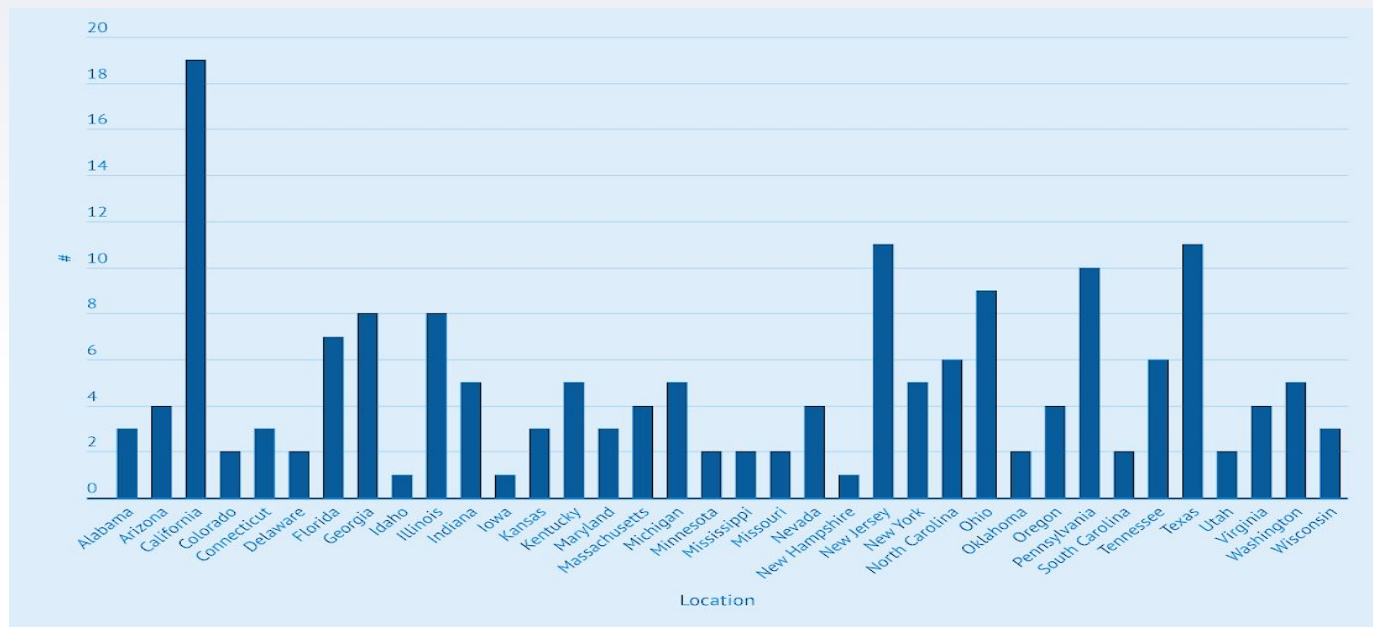
Advantages:

- Very effective way
- Amazon is so effective they have received the consumers trust

Disadvantages:

▸ There is a lot of steps to complete which means a lot can go wrong
▸ It can take a longer time

Recommendation: To explore supply chains that decrease the steps from ordering to delivery like drones.

Strategy

- **Competitive Dimensions:**
  - Price, delivery speed and reliability, convenience, adaptability
    - "People always want low prices, selection, and fast delivery"- Jeff Bezos
- **Exceeding customer expectations has remained at the core of the Amazon business strategy**
  - Regularly entering into new niches and segments
  - Uncompromised focus towards customer service
  - Focusing on Amazon leadership values (16 company principles)
    - Working for Amazon is highly challenging, employees expected to take on heavy workloads
- **COVID-19**: Amazon only accepted household staples (medical supplies and "other-high demand products" to ensure that customers were satisfied, led to some confusion with sellers as to what is "high demand"

Strategy

- **Amazon continues to hire more people every year**
  - 1.3 million people globally, 950,000 employees in the U.S. (1 in every 169 people of the population)
- Expansion slows for Amazon as of 2022
  - **COVID-19** pushed Amazon to add millions of square feet in warehouse space and hire tens of thousands of employees for the surge in e-commerce (2020-2021)
    - Higher costs and declining e-commerce revenue led to $3.8 bil loss in 3rd quarter of 2022, pulled back on expansion plans
      - Now focusing on improving productivity and cost efficiencies in fulfillment network
- **Amazon's productivity expectations high for employees**
  - Deeply automated tracking system for each individual associate's productivity
    - Bottom 5% of workers placed on training plan
  - Productivity levels estimated higher than industry benchmark, increasing over past few years

Strategy

- **Layout of a typical fulfillment center** —>
- **Capital Intensive Business:**
  - Huge quantities of capital poured in
  - Owns warehouses, trucks, offices, computers and computer software
    - Last twelve months capital expenditure ~ $66 billion
- **Strategy for change is continuous improvement**
  - Lean Management
    - Systems and processes based on Lean principles to achieve optimal customer experience
    - Data-driven culture

Advantages:	Disadvantages:
▶ Better customer service	▶ Unhappy, overworked employees
▶ High productivity	▶ Slow adjustment to change (COVID-19)

Recommendation: Consider the needs of factors other than just customers (employees, circumstantial changes, work culture rather than strictly data)

Sustainability

- **Supply Chain commitments**
  - Identify industries, countries and issues with the greatest opportunities
    - Identify and address risks, have a positive impact on workers
  - Work closely with suppliers around the world
  - Consistently identify partnerships and programs to help suppliers invest in worker well-being and safe workplaces
- **Environmental Impact:**
  - Claims to be on a path to power operations with 100% renewable energy by 2025
    - Recently rated with an "F grade" for failing to self-disclose carbon emissions publicly

Advantages:
- Forms of renewable energy in operations that benefit environment
- Workers benefit from partnerships

Disadvantages:
- No true understanding or claim of the environmental impact

Recommendation: Accurately measure carbon emissions to understand environmental impact

Forecasting

- Time-series forecasting is done by Machine Learning at Amazon
- The information is accurate as it is based on past, and current data. The date is entered and an analysis is created based on that data
- **COVID-19:** Amazon used their forecasting model based off of ML to forecast the spread of COVID-19 and won a best-paper award

Advantages:
- ▸ Using past data is very useful and you can identify trends

Disadvantages:
- ▸ Technology is great, but there is always room for error
- ▸ Circumstances are constantly changing because of COVID, so forecasting won't always be accurate as things change

Recommendation: Use another method of forecasting and compare the two for accuracy.

Project Management

- **Project 1: Renewable Energy Projects Globally**
  - Sept. 2022: Bringing new wind and solar projects online to power offices, fulfillment centers, data centers, and stores that serve millions of customers"
  - On a path to reach 100% renewable energy across entire business by 2025
    - <u>Time</u>: 5 years sooner than original target, 2030
    - <u>Quality:</u> Energy projects in action have reduced carbon emissions (ex; India)
    - <u>Budget:</u> There have been no reports of Amazon exceeding budget for this project
- **Project 2: Amazon's Second Headquarters in Arlington, Virginia**
  - Late 2019: Amazon planned to build second HQ, expected finish time 2023
  - **COVID-19 had no impact on project; operations at the site continued throughout pandemic**
    - <u>Time:</u> Expected to finish in 2023, consistent with plans
    - <u>Quality:</u> Hired skilled craft workers and project managers
    - <u>Budget:</u> No reports of Amazon exceeding budget for this project

Advantages:	Disadvantages:
- Consistently finish projects on time, of quality, and within budget - Hire proper professionals and project managers	- Still forced employees to work during COVID-19 and times of uncertainty - Led to worker dissatisfaction

Recommendation: Consider how continuing projects during COVID-19 might affect customer relationship

Quality

Amazon uses key performance indicators to measure their customers' satisfaction

> The company expects to maintain a high level of quality to sustain their brand reputation

+

Controllable input metrics→ tools used to measure the activities and operations within Amazon (i.e., number of sales or interactions by each customer)

Bar Raiser process→ hiring process implemented by Amazon to hire the most qualified employees

> Ensures the employees contribute to Amazon's values and work ethic & fit their leadership principles .

Amazon uses the DMAIC process from Six Sigma (Define, Measure, Analyze, Improve, and Control) and presents this through "Weekly Business Reviews (WBRs)

Amazon's implementation of DMAIC (Quality)

Define: Amazon identifies the most accurate and appropriate controllable input metrics through a trial and error process

Measure: Amazon requires its metric owners to remove bias and thoroughly audit their metrics to determine the effectiveness on their business operations

Analyze: Amazon implements the "5 whys" to explore the causes of any problems they experience with the metrics. They do this to develop a comprehensive understanding of of the "underlying drivers behind the metrics" (Link).

Improve: After going through the three previous steps, Amazon has developed a thorough foundation of the quality of their metrics and can use that to make any improvements that will help them attain their goals and objectives.

Control: In this stage, Amazon enters the steady-state control phase where they work to ensure all the metrics and operations are functioning smoothly

Advantages & Disadvantages of Amazon's Quality Metrics

Advantages:

▸ Saves costs from errors

▸ Protects brand reputation

▸ Ensures customer satisfaction

▸ Ensures better product quality

Disadvantages:

▸ Employee burnout

▸ Incomplete metric audits which lead to inaccurate performance indicators

  ▹ Allows competitors to gain an advantage with Amazon's customers

Recommendation:

Ensure employees are supported and respected
- This will lead to higher productivity rates
- Maintain appropriate work expectations and offer promotions as incentives to keep a low turnover rate
- Implement more machine-learning models which focuses more on customer feedback and use that towards measuring business performance

Impact of Covid-19 on Quality

- Amazon's sales increased substantially throughout the Coronavirus pandemic
  - Became the default retailer by 2020 because of their convenience and low prices
- Hired over 125,000 new employees to keep up with the orders and maintain customer satisfaction
- It was difficult to measure company performance with past key indicators because of the new challenges that were associated with the pandemic
- Jeff Bezos and other senior leadership individuals met often to tackle the issues that rose throughout the pandemic (i.e., inventory management, quality control, and customer service).

Amazon's Class Action Lawsuits & Recalls

- $1 billion class action lawsuit in the United Kingdom over an alleged antitrust breach
  - Law firm Hausfeld claimed that Amazon breached competition law to promote their own products through "a secret and self-favouring algorithm" (Link).
  - Amazon responded to this claim and announced this was "without merit" (Link)
  - The suit was expected to be filed with the Competition Appeal Tribunal in London by the end of October 2022
- Amazon recently recalled "Basic Desk Chairs" due to fall and injury hazards on October 27, 2022
  - Customers that purchased this product is subject to a full refund
  - The company recalled this product due to 13 reports of customer complaints

Capacity

- Amazon operates more than 175 fulfillment centers worldwide
  - The entire number of Amazon warehouses in the United States, both current and confirmed, is over 319 million square feet.
- Due to the several divisions catering to individual demands, Amazon warehouses have a wide range of schedules.
  - Some establishments operate on two shifts, one in the morning and one in the evening.
  - Depending on the region, these shifts might run anywhere from four to twelve hours.
  - Shift lengths range from eight to six hours; nevertheless, some sites adhere to a five-day workweek while operations are open 24 hours a day, seven days a week.

Capacity

- There was no official capacity utilization rate on record for amazon but on it's Best practice guide, Amazon advised to establish the scaling objective to 60-80% usage. This allows the application to better handle bursts of increased demand while more capacity is being supplied.
- Amazon has reduced its operational expansion plans for this year and 2023 "to better correspond with projected consumer demand," according to CFO Brian Olsavsky during the e-commerce giant's second-quarter earnings call on Thursday.
- In contrast, Amazon is constantly increasing its promotional efforts;
- The primary strategy of Amazon is to differentiate itself by providing products and services that fulfill the demands of its consumer groups. Customer-centricity, innovation, organizational agility, and optimisation are the four pillars of Amazon's growth strategy.
- **Due to the COVID-19 pandemic**, Amazon has experienced record growth and has had to hire 427,300 new employees in the last 10 months.

Advantages:

- **Amazon is constantly expanding and improving its capacity**
- **They adjust plans based off of projections, save costs**

Disadvantages:

- **A lot of people and facilities are involved**
- **Increase in costs and expenses**

Recommendation: Amazon should continue to grow their networks (i.e., employee workforce) to increase capacity to meet changing needs and demands in the e-commerce field

Waiting Line

- Compared to other e-commerce websites, Amazon has very short wait times from the moment their customers order their products, to when they receive them.
  - Amazon is known for how fast their deliver products to their customers as they deliver on weekends, and do next day and same day deliveries, which most companies do not do.

- Amazon does have a mobile app, and is mostly known for their e-commerce. However, Amazon has opened various Amazon Fresh grocery stores, Amazon Lockers, and book stores across the country.

- To reduce frustrated customers about long waits, Amazon introduce Amazon Prime, which customers can subscribe to for faster deliveries, and easier returns.
  - With Prime, customers can receive their products in anywhere from a few hours, to a few days. In addition, returns are made easy as customers can go to any Whole Foods, Amazon Fresh, Kohls, and UPS stores to easily and conveniently return their products quickly, thus saving time.

- **During COVID,** Amazon's wait times increased drastically: Amazon Fresh wait was over a month when it was supposed to be same-day delivery

Advantages:

- Extremely fast service which is creating a very loyal customer base
- Safe and convenient for all of their customers and offers many products

Disadvantages:

- When there is a wait, customers become very angry and do not want to always do their business with Amazon based on one bad experience because of fast-delivery promotion

Recommendation: Stay consistent with wait times, and make sure all packages are delivered swiftly to keep a loyal customer base

MRP and IT Systems

- **ERP: Amazon uses SAP** software suite, up-to-date and allows for high functionality across various departments
  - finance, purchasing and receiving, inventory control, HR, order management…
- SAP software allows Amazon to manage complex business processes by accessing real-time insights about the business
- **Use of IS/IT: Amazon extensively uses IS/IT to grow business**
  - **AI:** Analyzes customer data and predicts what customers are likely to buy, then uses recommendation engine to convert sales
    - Amazon search increases the change of a sale by 558%
  - **COVID-19: Amazon used AI and ML to anticipate when customers place orders based on their buying patterns to improve supply chain management**
- **Website and Mobile Apps:** extremely customer-friendly, easy to maneuver, adapts to

Advantages:	Disadvantages:
▸ Technological use has led to competitive advantages ▸ Cloud computing allows for easier access throughout company	▸ Factory technology has began to eliminate human jobs (could hurt reputation) ▸ Some consumers feel that Amazon's use of AI is invasive

Recommendation: Inform customers that their data is being monitored, more transparency

ERP Systems (Continued)

- **AWS engages in cloud migration**
  - The firm saves 20% in infrastructure costs
  - Experiences 66% increase in administrator productivity
  - 29% increase in staff and employee innovation
  - 45% decrease in security-related issues
- **Amazon utilizes artificial intelligence to ensure efficiency within their internal and external business operations**
  - The implementation of AI helps boost customer satisfaction by making personalized recommendations (i.e., display products that are associated with their previous purchases), improve safety and security measures, and increase customer engagement through automated services (i.e., chatbot)
- **AWS utilizes data mining to analyze, process, and manage large amounts of data**
  - Amazon is able to identify different patterns and trends through data mining
  - They are able to attract and retain their customers by better understanding their specific needs and demands through different media and technologies

Inventory Management

- Amazon uses several inventory management strategies to maximize efficiency within their business operations
- Lean Inventory Management
  - Maintain a minimum amount of inventory to cover demand
    - Reduces unnecessary inventory and costs of holding
    - Utilizes artificial intelligence solutions, blockchain and cloud-based technology to refine supply chain management
- Vendor Managed Inventory
  - An operations model that tells vendors & suppliers when it's time to restock their inventory to fulfill orders
- Digitizing Warehouse & 3PL
  - Third party logistics helps Amazon manage their supply chain and stock (saves money, time, and warehouse space)
  - Amazon implements ERP software to help manage their inventory as it connects different warehouses and facilities into a "unified supply chain" (Link).

Inventory Management (continued)

- Amazon creates seller reports and makes them available to third-party sellers to outline past sales performance, sell-through rates, and inventory health
  - Helps sellers forecast future inventory for Amazon
- Jungle Scout developed a software that automates the inventory forecasting processes: Inventory Manager
  - By overestimating demand of products, sellers experience an increase in costs (i.e., storage fees, damage, insurance, and labor and facility expenses)

Advantages:

- Reduces unnecessary costs for third-party sellers and Amazon

Disadvantages:

- Amazon could lose their competitive advantage if they don't have sufficient inventory

Recommendation: Implement ERP & MRP systems to accurately forecast the need for inventory

Inventory Management (Stock outs & LayOffs)

- Disparities between product counts (includes technical issues, human error, and loss of products due to damage/theft), inaccurate forecasting and reporting, and poor cash flow management are all reasons Amazon experiences stock outs
  - The pandemic has caused companies to experience more frequent disruptions in the global supply chain
- Amazon released a statement announcing their plan to lay off approximately 10,000 employees
  - Considered the largest job cut in Amazon's history
  - This is due to the altering economy and changing business models across the globe
  - **The pandemic** also contributed to this decision because Amazon's growth rate has slowed down substantially compared to the previous two decades
  - Their decisions to overinvest and expand in terms of employment and inventory aren't aligned with the shopping habits of the market and the constantly changing economy

Summary Matrix

Area	Brief Description	+	o	-	Change
1. Operations and SCM	Known for an efficient process and fast delivery	X			Explore quicker delivery (drones)
2. Strategy	Customer oriented	X			Consider needs of employees too
3. Forecasting	Future Success	X			More Data = More Accuracy
4. Project Management	Effectively manages projects	X			Adjust for special circumstances (COVID-19)
5. Quality	Use of key performance indicators	X			Implement more machine-learning models to track business performance
6. Capacity	Continuously growing and expanding	X			Continue increasing capacity
7. Waiting Line	Delivering products to customers		X		Keep services quick and efficient, even during special circumstance to maintain brand promises
8 .MRP and IT Systems	Leader in technological use	X			Inform customers that they are being tracked and monitored
9. Inventory Management	Uses lean inventory, vendor managed inventory, digitizing warehouse, and 3PL		X		Use ERP & MRP systems to accurately predict inventory levels