

# Artificial Intelligence, Investing in the Future

---

- What is it?
- How Do You Play?
- Who are the Winners?
- Who are the Losers?

KYLE CINNAMOND

KYCINNAMOND@GMAIL.COM

PRINCETON CAPITAL

MANAGEMENT LLC

# Executive Summary

## **The Breakdown**

*The exploration of AI investment is structured into four core sections.*

"What is it," provides an insight into AI's nature and capabilities.



"How "do you Play" section outlines various strategies for effective engagement in AI investment endeavors.



"Who are the Winners" portion conducts an in-depth analysis of eight exemplary companies deemed conducive to AI investment.



"Who are the Losers," delves into sectors grappling with AI-related challenges and suggests plausible preventive measures.

## **The Takeaways**

*Artificial Intelligence is here to stay and being able to invest the right way will serve well for years to come.*

Mega/Large Cap companies are going to be the best investments in the beginning years of AI growth

Risk/Reward of AI investments are still high, making sure to invest in healthy and reliable companies is paramount

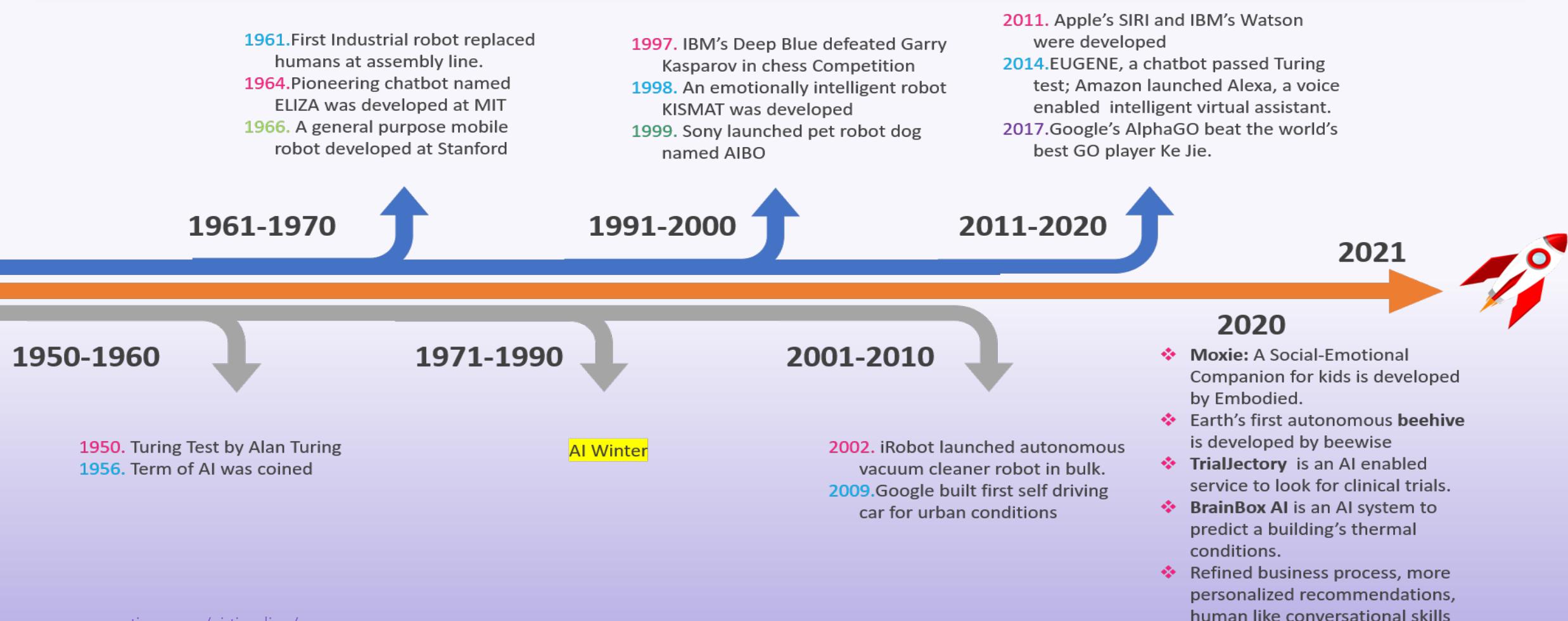
*Every Industry is going to be impacted but some more than others*

Chip Manufacturing, Data Storage & Solutions, Security, and Technology are going to be impacted the most

Owning companies in each of these industries will allow you to reap the benefits of Artificial Intelligence from every angle

# What is it?

## Artificial Intelligence Timeline



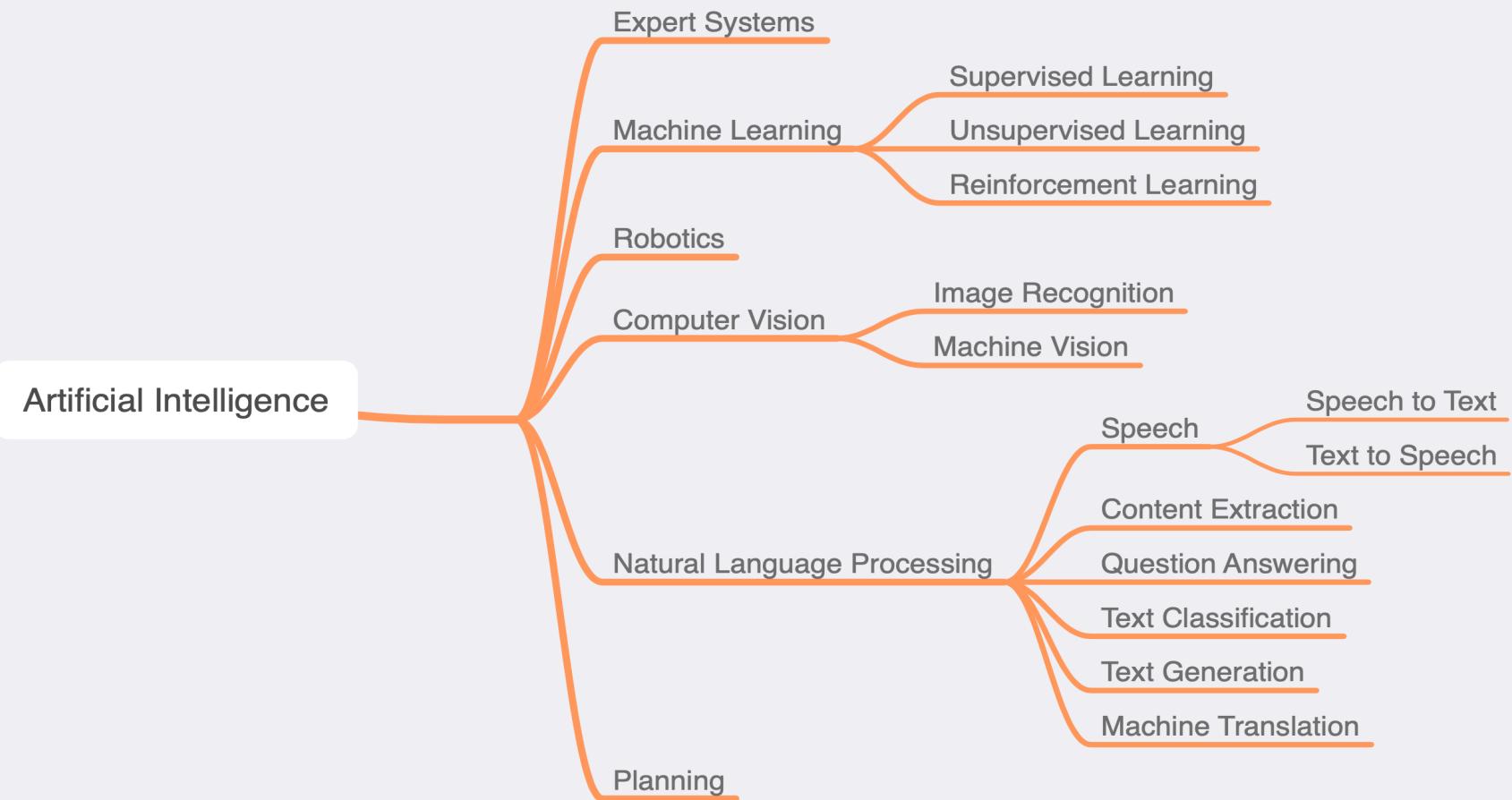
# What is it?

## The AI Ecosystem

An interdisciplinary field combining computer science, math, statistics, etc.

One of the fastest growing industries, expected to see annual growth of around **37.3%** from 2023-2030 according to [Forbes.com](https://www.forbes.com)

The spotlight of attention now is primarily on Machine Learning, Natural Language Processing, Hardware, and Data.

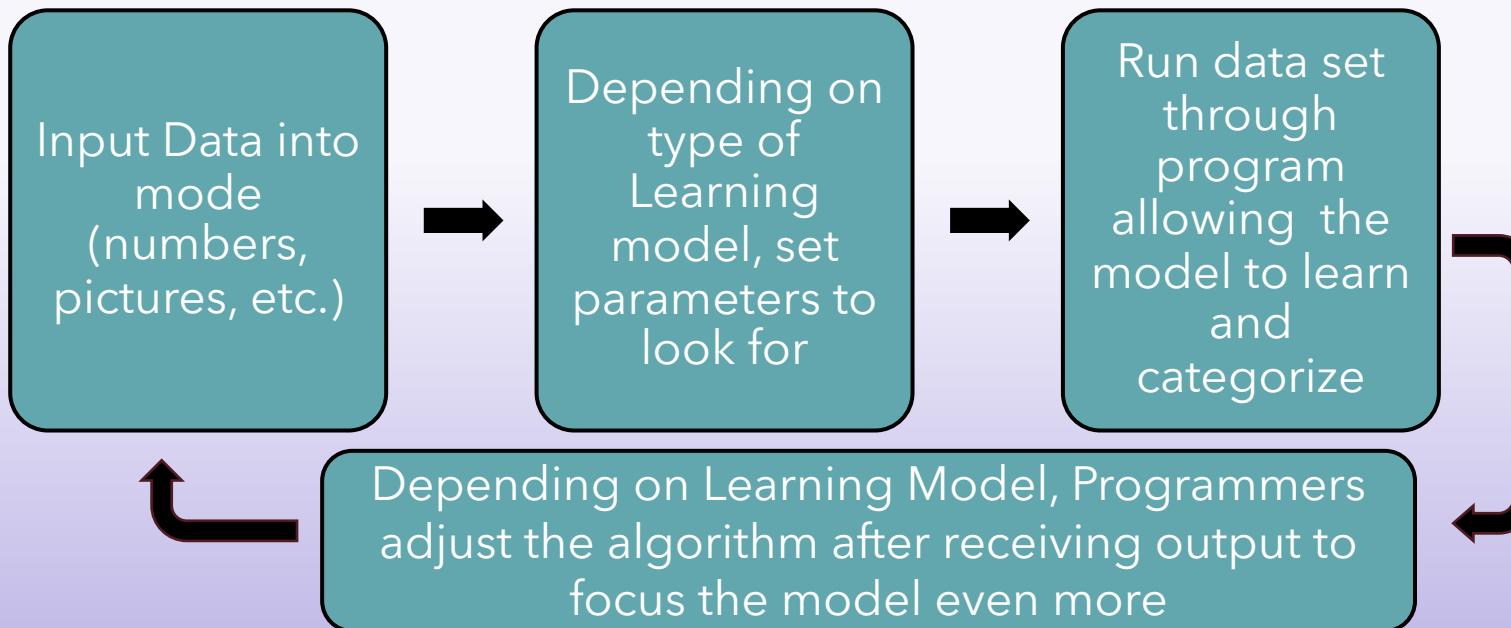


# What is it?

## Machine Learning

Broadly defined as the capability of a machine to imitate intelligent Human Behavior.  
But is is much more than that...

"An Approach to data analysis that involves building and adapting models, which allow programs to 'learn' through experience" ~ DeepAI.org



### **Machine Learning Vs. Artificial Intelligence**

- Many people use Machine Learning and Artificial Intelligence interchangeably
- Machine Learning is a branch of computer science that deals with the method of creating and designing algorithms
- This approach facilitates the creation/design of Artificially intelligent Machines and Programs



Source: [BuiltIn.com/artificial-intelligence. Machine Learning](https://builtin.com/artificial-intelligence-machine-learning)

# What is it?

Machine Learning cont.

Machine Learning can be further broken down into 3 major categories

## **Supervised Learning**

- The process of teaching a model by inputting data **and**, also correct output data
- The pair of Input/Output data is referred to as **"Labeled Data"**
- Goal is to work through an optimization cycle to stop/limit loss or error
- Often used to create models for 2 forms of problems

**1) Classification:** When a model finds classes in which to put its outputs

**2) Regression:** The models finds outputs that are real variables

## **Unsupervised Learning**

- The process of teaching a model by using only input data
- The model is forced to look for patterns in given inputs to make decisions because there is **no Labeled Data**
- The model learns by finding useful properties in the dataset
- Uses **"Clustering Algorithms"** in order to group unlabeled data
- **4** types of Clustering Algorithms
  - 1) Exclusive Clustering
  - 2) Overlapping Clustering
  - 3) Hierarchical Clustering
  - 4) Probabilistic Clustering

## **Reinforcement Learning**

- The process of teaching a model by interacting with its environment
- **No Labeled Data** is presented
- If the model is successful in a task, it is given a reward
- If not given a reward after a trial, the model learns a different way that may ensure a reward
- Over time a model improves and becomes better by trial and error
- Learns similarly to that of a child

Exploration

Exploitation

# What is it?

Machine Learning cont.

## Real World Applications

### Supervised



- Spam Detection
- An algorithm is created with set parameters, outlining what may be signs of spam E-mails
- A set of emails are first provided to show the algorithm the parameters
- Each time an email is sent the algorithm runs, checking for those parameters before appearing in your inbox
- E-mail providers rely on their vast data storage capabilities to make the best algorithm possible

### Unsupervised



- Fraud Detection
- One of the most important applications of unsupervised learning today
- An algorithm that has no previous knowledge or parameters sorts through thousands of payments
- By having the ability to look through all of someone's transactions the computer will be able to pick out ones that are not like the rest.
- Resulting in the possible detection of fraudulent charges

### Reinforcement



- Autonomous Driving
- The combination of all miles driven by cars on autopilot are stored and used to better their system
- When testing Autonomous driving, a constant series of trial and error are deployed so the system betters itself over time
- As of 2020, Tesla collected over 1.3 Billion miles of real-world data aimed at improving the autopilot system

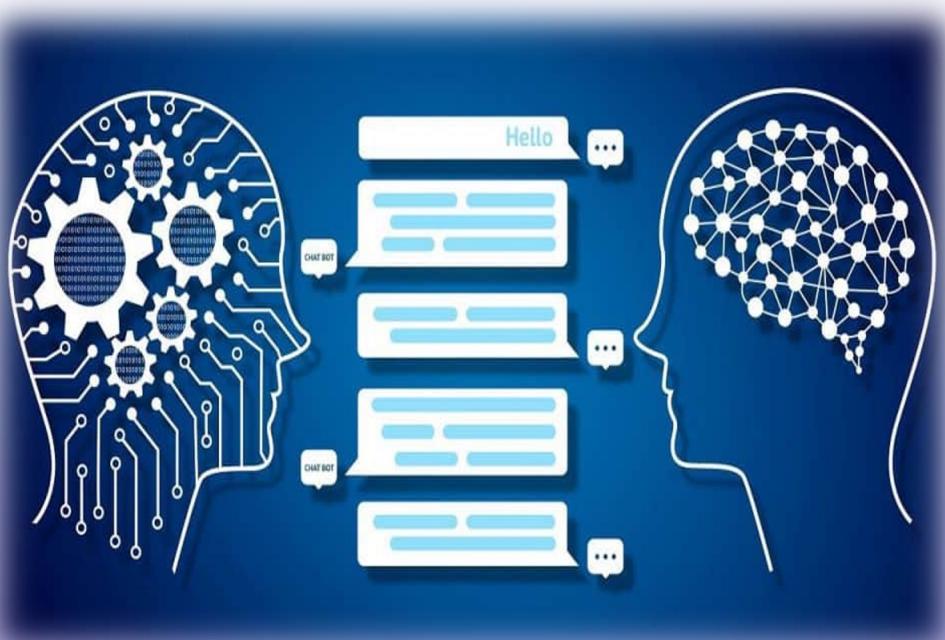
# What is it?

## Natural Language Processing

A version of Machine Learning Technology that gives a computer the ability to interpret, understand and manipulate human language

### How does it work?

**Computational Linguistics:** The science of understanding and constructing human language models with software. A framework that helps understand conversational human language



Source: AnalyticsInsight.net/natural-language-processing

### Natural Language Processing Tasks\*

#### Part-of-speech Tagging

NLP software tags words in sentences to show their contextual usage, such as nouns and verbs, helping computers understand meaningful word relationships.

#### Speech Recognition

This task turns voice data into text by breaking words into smaller parts and understanding accents, slurs, intonation, and nonstandard grammar usage in everyday conversation.

**Key Application:** Transcriptions

#### Word-sense disambiguation

Some words may have different meaning depending on its context:

1. A **bat** is a nocturnal creature
2. A baseball player uses a **bat** to hit the baseball.

NLP software identifies a word's intended meaning, either by training its language model or referring to dictionary definitions.

#### Sentiment Analysis

Sentiment analysis is an artificial intelligence-based approach to interpreting the emotion conveyed by textual data. NLP software analyzes the text for words or phrases that show happiness, anger, doubt, etc.

\*This is just a few of the major tasks Natural Language Processors look at.

# What is it?

## Examples of NLP

### Real World Applications

#### Multitask Unified Model



- A new algorithm that is designed to answer complex questions
- Trained on entirety of the open web, so knowledge is vast
- Uses NLP to effectively combine multiple searches into comprehensive results
- MUM has **1,000x more Neural Nodes** than his predecessor BERT, allowing it to process significantly more information faster
- Effective at comprehending 75 different languages

**Ex)** What are the cultural Differences between the United States and Italy?

#### Amazon Alexa



- The Alexa ecosystem is built based on NLP and is a multistep process
- The Process**
- 1) Amazon records your words and sends the speech to off-site servers to be analyzed
  - 2) Model breaks down the audio into individual sounds, consults a database
  - 3) Then identifies important words (**Various NLP tasks**) in order to understand the task at hand
  - 4) Amazon sends the info back to your device for Alexa to respond
- Amazon Alexa has vast databases in order to answer human input

#### Microsoft Translate

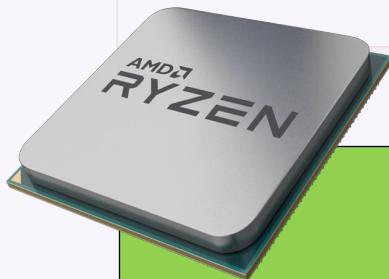


#### Translator

- Microsoft Translator has seen a large shift in AI usage in the past 2 years
- A new model, the **"Z-Code Model,"** streamlines the translation process as well as making it cheaper to run
- Prior to the Z-code system the translator required 20 models to translate
- Instead of training on pairs of languages, the new model uses **transfer learning**
- This new model is powered by Nvidia's GPUs and its Triton Inference Serve Software

# What is it?

## Hardware



### CPU

Central Processing Unit

Tasks approached sequentially when given large amounts of complex data

CPUs are made as a general use chip, not specialized for a certain task

The Number of cores determine how many tasks can be completed simultaneously



### GPU

Graphics Processing Unit

GPUs are designed and made for a specific use, such as AI, making them more efficient

Use a special process called Parallel Computing to break down complex tasks

Breaking down complex tasks into manageable simultaneous calculations

# What is it?

## Data

The worldwide data footprint, how data determines the abilities and success of AI models

### **The Worldwide Data Presence**

- According to the International Data Corporation, as of 2020, the global datasphere reached 64 Zettabytes, expected to reach 175 by 2025
- 1 Zettabyte = 1,000,000,000,000 Gigabytes
- To put that number into perspective, the world datasphere has the same storage as 26 Billion I-Phones combined!
- It is important to know that not all this data is available to use in AI models

### **What Kind of Data is Needed?**

- The success of AI systems heavily depends on the size of the data set, and more importantly, the quality of the data
- Due to the emphasis on clean data, a new form of business is emerging that have a focus on cleaning large amounts of data sets.

### **Importance of Clean and Correct Data**

- When a Model is first created, its "mind" is a blank slate, knowing only what data is input
- Due to this lack of contextual knowledge, the data needs to be **perfect and "clean"** for whichever task is at hand
  - Ex) If an individual was born and only saw trees in the fall, in Theory that individual would believe all trees were red, yellow, orange, and brown
    - Due to a human's ability to observe their surroundings, that baby would soon learn trees are only that color in the fall, and green in the spring
    - A computer, on the other hand, does not have the context clues to observe trees in the spring, so will come to the decision that all trees are red, yellow, orange and brown

Without the input of trees from each season, the model will **not be able to correctly identify** a tree in the future

# What is it?

Data

The Relationship between Artificial Intelligence and Data

While artificial Intelligence relies on data to operate its models, data is quietly improving with the use of AI

The growth of AI application forces similar growth in the data storage industry

## The Symbiotic Cycle

```
graph TD; A((AI models help optimize the process of collecting, storing and cleaning large datasets across industries)) --> B((The growing amount of clean, stored data directly improves the output quality of new and existing AI models)); B --> C((These models can then help further improve the collection, storage and cleaning of data, continuing the cycle)); C --> D((For AI models to complete tasks, the level of data quality needs to increase)); D --> A
```

AI models help optimize the process of collecting, storing and cleaning large datasets across industries

The growing amount of clean, stored data directly improves the output quality of new and existing AI models

These models can then help further improve the collection, storage and cleaning of data, continuing the cycle

Without the ability to Input and Store data, nearly all AI applications would seize to exist

For AI models to complete tasks, the level of data quality needs to increase

# How do You Play?

Investing in AI

The different approaches  
to AI investment

## Breaking Down AI Investment into 3 Major Strategies

### 1. ETF Focused

- Lowest risk of the 3 strategies due to the diversification of the fund
- Allows for the ability to invest in a **diverse and unique** group of companies both big and small
- A good approach for Artificial Intelligence as many small companies may not last through the beginning phases of this technological shift

### 2. Mega & Large-cap Focused

- A safer strategy but still holds a degree of risk when investing in such new Technology
- The safest option when investing in individual companies as the big guys have the money, and resources to **apply AI Models quickly and properly**
- Going to allow for a steadier gain over longer periods of time when compared to the small and micro-cap companies

### 3. Small & Micro-Cap Focused

- The riskiest of the 3 strategies, but potential reward is also larger
- There are many small and upcoming AI-oriented companies popping up in the market, and they all are **ambitious and chasing innovation**
- The smaller companies are cheaper to get into and allow you to invest in **many different companies**
- Not the best approach due to the vast uncertainty for the future direction



Lower Risk



Higher Risk

# How do You Play?

## Artificial Intelligence ETF's

Largest Artificial Intelligence ETF's	Assets Under Management
Global X Robotics & AI ETF (BOTZ)	\$2.53 Billion
Global Robotics and Automation Index ETF (ROBO)	\$1.47 Billion
ARK Autonomous Technology & Robotics ETF (ARKQ)	\$1.12 Billion
Global X Autonomous & Electric Vehicles ETF (DRIV)	\$854.51 Millions

### Benefits

- Due to the large scope of Artificial Intelligence, many AI ETF's focus on one aspect of the industry
- This allows for investors to invest in a specific sector of AI while still obtaining a diversified group of stocks
- Sectors such as Autonomous Driving, Robotics, and exponential technologies are just a few

### Drawbacks

- Although many ETFs are passively managed, an expense ratio is commonly charged, paid to the fund each year
- While ETFs are one of the safest strategies, because they focus on a broader market their returns are sometimes less than that of individual Companies

### Safety

- ETF's have little to no diversifiable risk, making it one of the safest forms of investment in an industry
- Rebalancing of positions allows for a decrease in risk

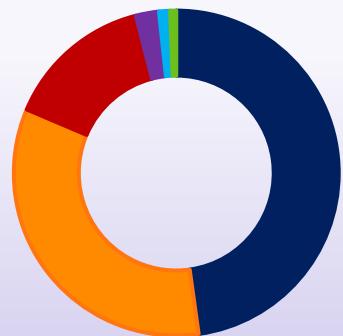
# Who are the Winners?

Investing in ETF's



- Aims to invest in firms positioned to gain from growing robotics and AI use, encompassing industrial automation, non-industrial robots, and self-driving vehicles.

## Sector Breakdown



- Information Technology
- Industrials
- Healthcare
- Financials
- Consumer Discretionary
- Energy

## ETF Index Risk

Index	Beta
S&P 500	1.21
NASDAQ-100	1.01
MSCI EAFE	1.14

## Top Holdings

1. Nvidia: 13.26%
2. Intuitive Surgical: 9.35%
3. Keyence Corp: 6.97%
4. Fanuc Corp: 5.8%
5. Dynatrace Inc: DT

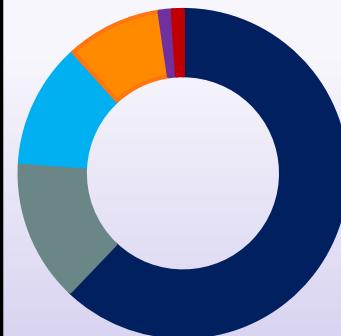
## Quick Facts

**Assets under Management:** \$2.41B  
**Expense Ratio:** 0.69%  
**# of holdings:** 42 companies



- Aims to invest in firms leveraging AI technology in their offerings, including those developing AI-driven products/services and hardware for big data analysis.

## Sector Breakdown



- Information Technology
- Communication Services
- Consumer Discretionary
- Industrials
- Financials
- Health Care

## ETF Index Risk

Index	Beta
S&P 500	1.1
NASDAQ-100	.95
MSCI EAFE	.96

## Top Holdings

1. Amazon: 3.25%
2. Alphabet: 3.23%
3. Meta Platforms: 3.19%
4. Alibaba: 3.18%
5. IBM: 3.14%

## Quick Facts

**Assets under Management:** \$507M  
**Expense Ratio:** 0.68%  
**# of holdings:** 87 companies

# How do You Play?

Mega/Large-Cap companies

## **Benefits**

- Early to the party, the first to embrace the onslaught of AI applications for years
- A majority of the Mega/Large-Cap companies have enough money to make deals and investments in smaller breakthrough companies
- The larger companies own and have access to ample amounts of Data in order to properly use their AI applications

## **Drawbacks**

- The advent of a disruptive technology like AI opens the door for potential returns like that of the dotcom era
- Chance of lower returns when compared to the small and micro-cap stocks that make it through the rough periods

## **Is this the best strategy going forward?**

In the current climate, the direction of Artificial Intelligence growth is still unknown.



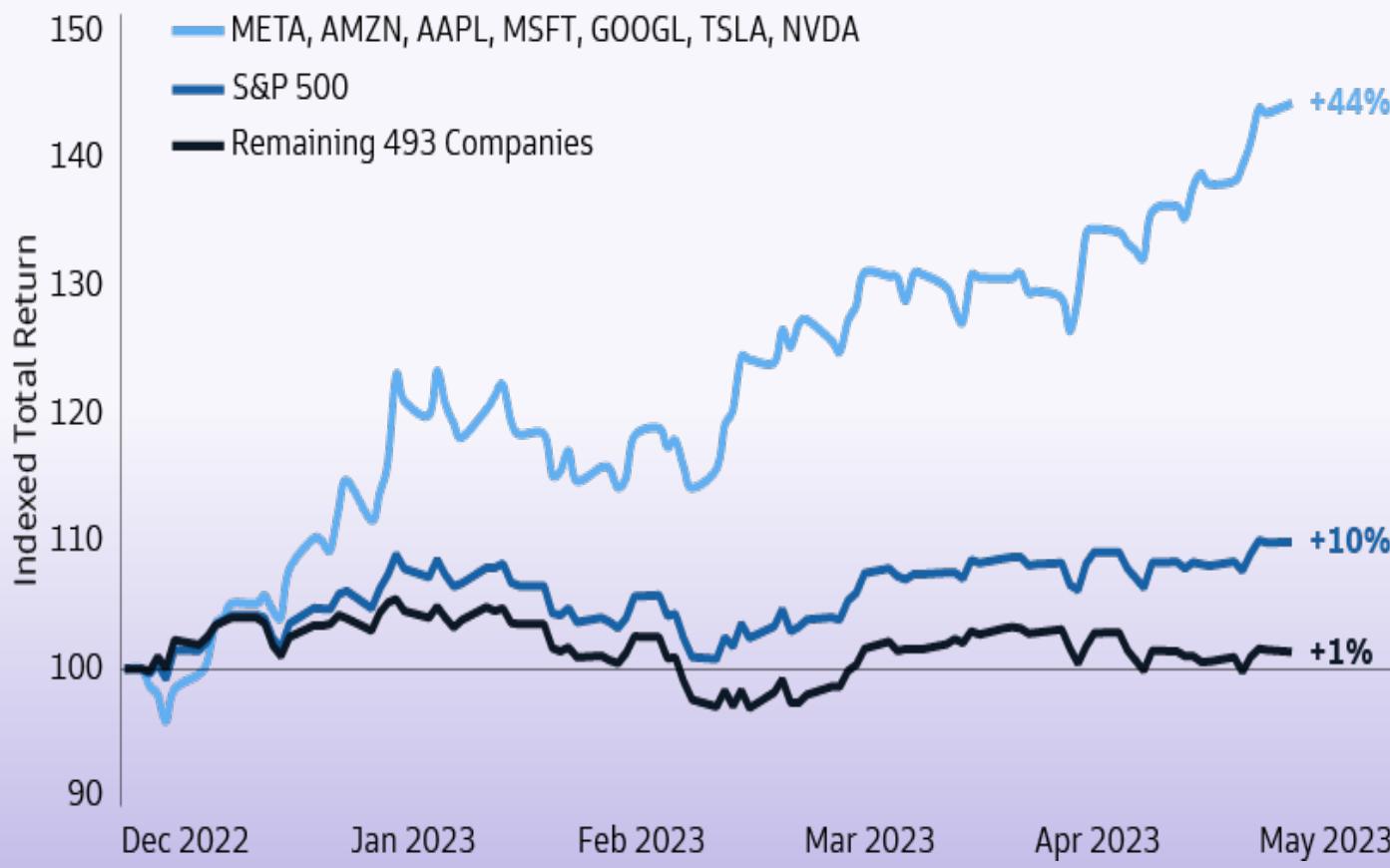
Because of this, large companies have the ability to move and flow with the inevitable shifts



Generating positive market returns throughout the life of the Artificial Intelligence boom and beyond

# How do You Play?

Mega/Large-Cap companies



Source: Goldman Sachs Asset Management Mega-cap Mega Performs

## Mega-Cap Tech Controlling the Markets

- 2023 has been the year of Mega-Cap dominance, 7 companies responsible for 90% of the S&P 500's total gains YTD.
- Mega-Cap stocks that have shifted their focus into Artificial Intelligence are controlling the growth of the S&P 500 in 2023
- A strong indicator of the AI industries' power for the future

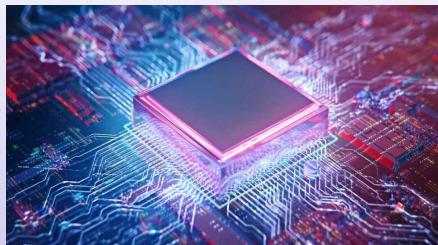
# Who are the Winners?

Nearly every Industry in the world will see an uptick in production due to the introduction of AI, but some more than others.

Artificial Intelligence is creating a new wave of job creation, mainly in the data Science industry as well as system sustainability.

Some of the most promising and exciting stocks that will benefit from AI are looked at deeper in this presentation, ranging in size and industry in order to get a full grasp of the impact AI is having on the world

Companies researched have been broken down into 4 major categories



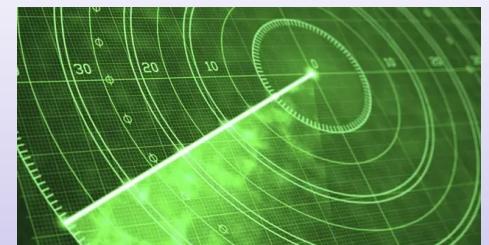
**1. Chip Manufacturing**



**2. Wide-reach Application**



**3. Data Storage and Solutions**



**4. Under the Radar**

# Who are the Winners?

## Chip Manufacturing



### Who are They?

- Nvidia is a Graphics Processing Unit manufacturer applicable in various industries
- Nvidia creates graphics cards for specific uses such as gaming and Artificial Intelligence
- 87% of revenues come from GPU production

### The future of AI

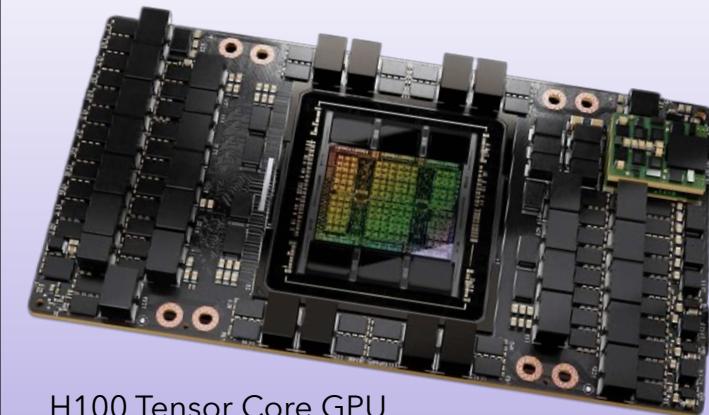
- Leading the GPU production side of AI due to their specialization of their GPUs
- Global GPU market is expected to increase 10-fold by 2032 from 40 billion to 400 billion!
- AI and Nvidia are both here to stay and benefit greatly from each other

### The H100 Tensor Core GPU

- The Next-Gen GPU designed for Artificial Intelligence applications
- Compared to its predecessor, the A100, the H100 provides up to 9x faster AI training and 30x faster AI inference speedups on LLMs
- **What makes it revolutionary?**
  - The H100 has 80 billion tensors, 40% more than the A100
  - H100 has 2 types of cores, built using a 4-nanometer manufacturing process
  - The 4N process is a cutting-edge process designed by Taiwan Semiconductors specifically tailored for Nvidia's computer needs

### Potential Concerns?

- The stocks recent exponential increase in 2023 is causing concern for some investors
- Nvidia has increased greatly in this new wave of AI growth and is here to stay
- Still an amazing investment for long term growth



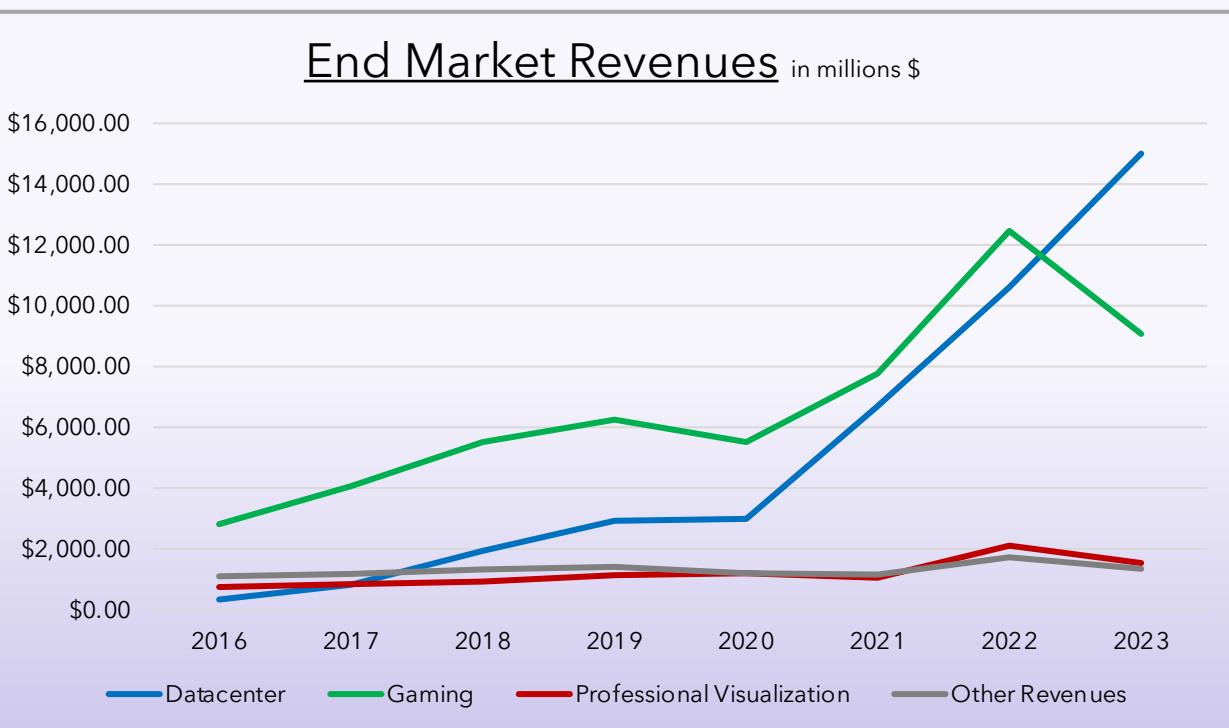
H100 Tensor Core GPU  
Source: Nvidia.com

# Who are the Winners?

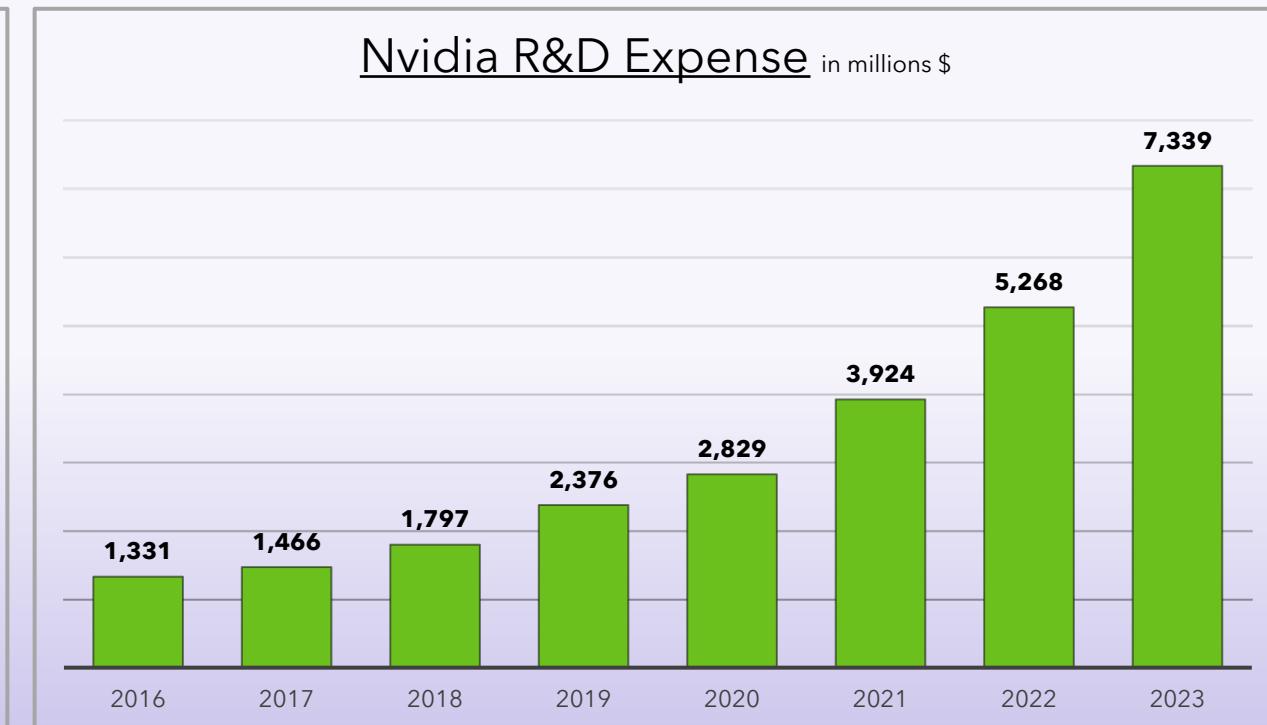
## Chip Manufacturing



### By the Numbers



From 2016-2023 we see a shift in revenues as datacenter revenues skyrocketed in 2020 after an increase in demand from internet companies using Nvidia GPUs for cloud services which is a continuing trend



Nvidia has increased their R&D investment by an average of 28% YoY since 2016 with the largest YoY increase happening in 2023 due to the further research in Artificial Intelligence

# Who are the Winners?

## Chip Manufacturing



# ASML

### **Who are They?**

- Manufacturers of complex lithography systems that are critical to the production of microchips
- ASML produces the machines that the largest Chip makers in the world use to produce their respective chips
- The only company in the world to construct and sell EUV Lithography machines
  - The most expensive step in the Microchip process

### **The Use of the Machines**

- Dozens of Modules are built in 60+ locations that are shipped to one factory in the Netherlands for the final construction
- The cost of a single machine is \$200 Million
- Next-Gen machine, "High NA," will cost over \$300M
- Only 5 chipmakers purchase these machines

### **How Do the Machines Work?**

- The Lithography machine uses Extreme Ultraviolet light that is an exceedingly brief and potent wavelength used in substantial amounts to imprint intricate and compact designs on microchips.
- EUV light is produced through fast explosions of molten tin, reflected by unique Zeiss mirrors - the world's flattest surfaces. Only a small portion of these light particles reach the silicon wafer's surface to print the chip's intricate designs.

### **Why a Winner of AI?**

- All chip manufacturers in the world rely on ASML's product
- Hardware is one of the most important aspects of growth in AI, and ASML is the foundation



← EUV technology further in depth

"The machines that they produce, each one of them is among the most complicated devices ever made"

~ Professor Chris Miller, Tufts University

# Who are the Winners?

## Chip Manufacturing



# ASML

## By the Numbers

---

	2015	2016	2017	2018	2019	2020	2021	2022	2023*
<b>EUV Shipments</b>	1	4	11	18	26	31	42	40	53
<b>EUV Revenues</b>	\$70.50	\$331.2	\$1,084.2	\$1,880.1	\$2,799.7	\$4,463.8	\$6,284	\$6,280.3	\$9,169.6
<b>Avg. Sale Price</b>	\$70.50	\$82.80	\$98.56	\$104.45	\$107.68	\$143.99	\$149.62	\$157.01	\$173.01

The constant increase in Avg. sale price of their EUV machines shows the increasing demand from their customers as the need for advanced micro chips grow

## Company Health

### Net Profit Margin

- 25.56%, a profit margin that exceeds the market average
- Represents the high quality of ASML's cost control even while constructing and shipping some of the most expense machines ever made

### Return on Equity Analysis

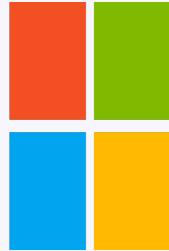
- ASML's ROE is 79.86%, a strong and healthy ROE
- Highlighting their ability to convert their equity financing into profits even through the worldwide chip shortage issues of the past few years

### Debt to Equity Analysis

- ASML has a current D/E ratio of .428 or 42.8%
- ASML has more Cash on hand than total debt
- A good sign ASML is using their Debt wisely in order to continue growth.

# Who are the Winners?

Wide-reach Application



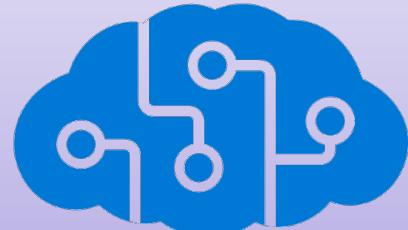
# Microsoft

## Azure AI

- Azure is Microsoft's cloud service, which is the second largest in the world with a market share of 21%
- 85% of Fortune 500 companies use Azure for their Cloud services
- From Q3 2022 - Q3 2023, Intelligent Cloud revenue has increased 16.3%
- Azure AI is a new application that offers a portfolio of AI services designed to help developers, data scientists, etc. with their work
  - Using their Data and computing infrastructure, users can create their own Speech, Deep-Learning, and language AI Models

## AI Investment

- To date, Microsoft has invested approx. \$13 billion dollars into **OpenAI**, the company behind Chat-GPT
- This gives Microsoft a 49% ownership in the company
- With this investment, Microsoft is integrating OpenAI's technology into almost every aspect of their business
- Microsoft is also the exclusive provider for OpenAI's computing power
- This investment cements their vision that AI is here to stay, and they are guiding the journey



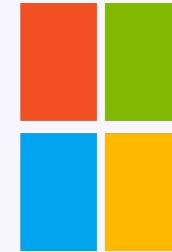
# OpenAI

## The Next Few Years

- What seems like an all-out AI assault by Microsoft over the past few years is setting them up for the future, but it is not all smooth sailing
- Amy Hood, Microsoft CEO said that the benefits of AI investment may not be realized until the second half of 2024, having many investors worried
- Microsoft is **not** investing in AI for the short-term gain, but for the long-term potential for dominance in the industry

# Who are the Winners?

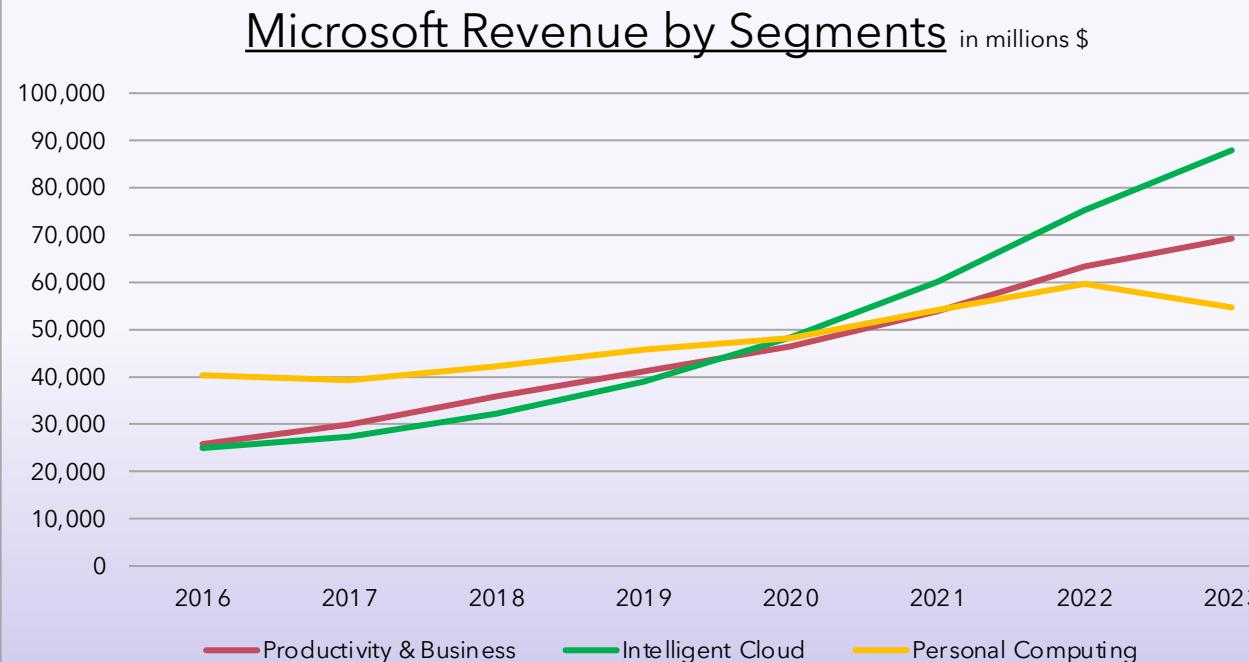
## Wide-reach Application



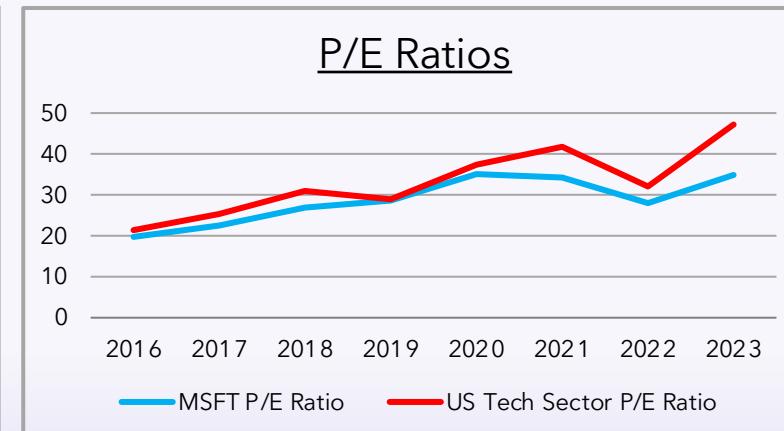
# Microsoft

## By the Numbers

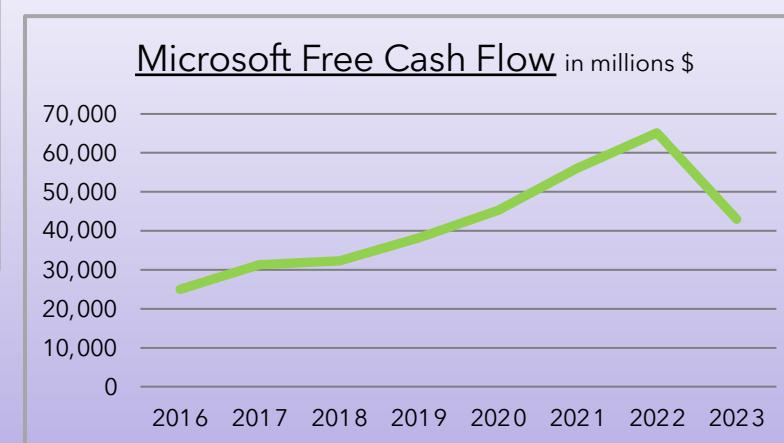
---



Since 2016 we have been watching Microsoft's shift from Personal Computing to the intelligent cloud. The large shift in focus to Azure and their AI applications have caused the uptick in revenues with Intelligent cloud bringing in nearly 42% of their revenues



Microsoft has had a lower P/E ratio than the rest of the Tech Sector. Microsoft's P/E ratio has them undervalued when compared to the rest of the industry



Microsoft has had very healthy FCFs over the last 7 years allowing them to invest in Artificial Intelligence. The recent decline is due to the OpenAI investment

# Who are the Winners?

## Wide-reach Application



### Advertising with AI

- Ad Revenue is the majority of Googles annual revenues
  - As of Q1 2023, 78% of total revenues were from Ads
- Google is implementing AI powered advertising to help customers find their **target** Audience
- Artificial Intelligence can input search and activity data to locate and input the **most relevant** ads
- **Ex:** Watching YouTube videos that are targeted towards teenagers are going to have more ads reflecting the interest of teens
- On average, revenue from advertising has increased by 41% since 2012!



Bard further explanation

### Bard AI

- A conversational generative AI chatbot based on the LaMDA family of Large Language Models
- Bard AI allows more accurate search results for **complex questions**, thus helping information become more useful

### The Mission

- Googles Mission has always been to organize the worlds Information to make it **universally accessible**
- The advent of AI applications are making this goal even more achievable than before
- In Google's latest Experiments, they have created the Next-Gen Large Language Model called **PaLM 2**

### Responsibilities & Safeguards

- Google is giving each aspect of its company an AI makeover but are making sure they do it properly and responsibly
- Google created a new search lab where individuals can sign up and test new AI search applications before they are fully released

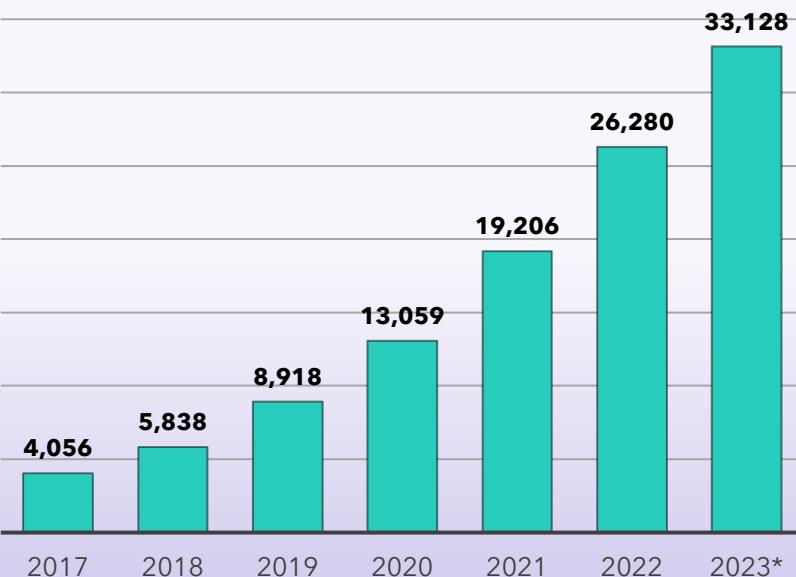
# Who are the Winners?

## Wide-reach Application



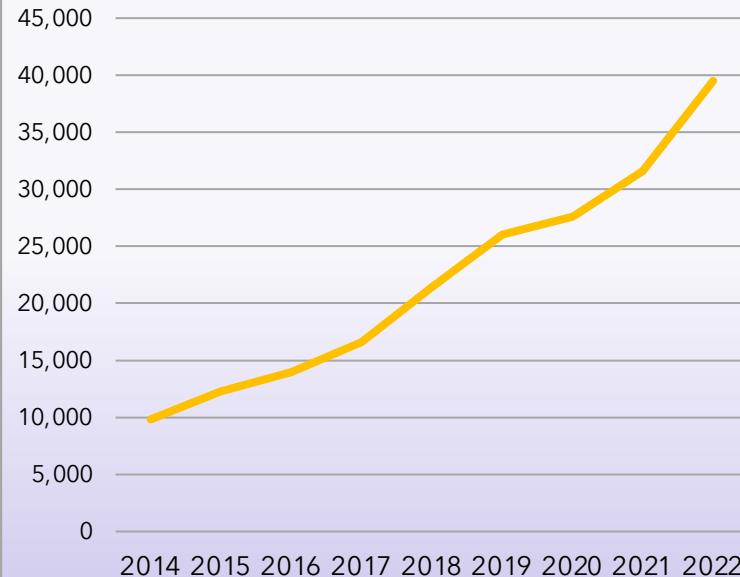
## By the Numbers

Google Cloud Revenues in millions \$



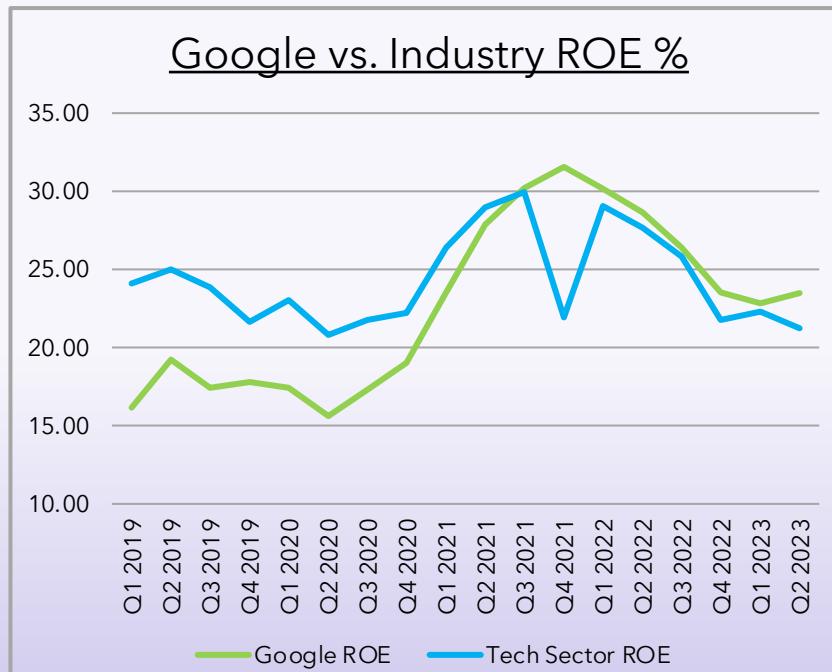
Google's cloud revenues are the fastest growing revenue segment over the past 6 years. The google cloud business turned profitable for the first time in Q1 of 2023, a good sign for the future

R&D Investments in millions \$



Google has spent many years research and developing Artificial Intelligence models but had increased their Investments in R&D even more since 2020

Google vs. Industry ROE %



Since 2021 Google's ROE has increased and stayed higher than their competitors. This is a good sign that Google is properly using their financed funds over long periods of time

# Who are the Winners?

## Data Storage & Solutions



### Acquisition of EMC

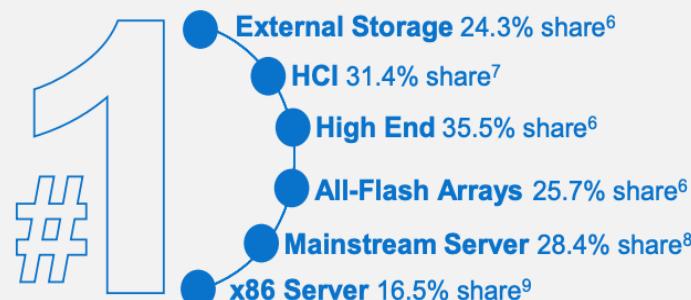
- Purchase of the storage giant, EMC in 2016 allowed Dell to make a huge leap into the data storage market, perfect for the rapid AI growth we are currently seeing in 2023
- Q2-2021: Dell was the largest external enterprise storage systems supplier, accounting for 32.3% of worldwide revenue.

### Business Model Shift

Around the same time as the EMC acquisition, Dell began to undergo a drastic model shift from primarily PC driven profits to IT and Data solutions. A move that is showing very beneficial today.

- Since model shift began, Dell has increased their R&D investment by an average of 13.7% YoY
- Revenue has also increased at an average of 14.4% YoY since 2016

### **Infrastructure Solutions Group**



### **Storage**

- #1 in virtually every storage category
- TTM External Storage Share bigger than #2, #3, and #4 competitors combined<sup>6</sup>
- Streamlined offerings under "Power" portfolio

Dell Technologies 2023 Investor Presentation

Over the past 4 years, Dell has returned 96% of FCF's, equal to 5 billion dollars to shareholders

### Project Helix

- A collaboration with Nvidia to deploy high performance generative AI solutions
- Enterprises across every industry can harness the power of generative AI to aid in the acceleration of Productivity and enhancement of business strategies
- The use of both Nvidia's groundbreaking H100 GPU and Large Language Models help drive the project
- Dell is the supplier of data storage for the platform

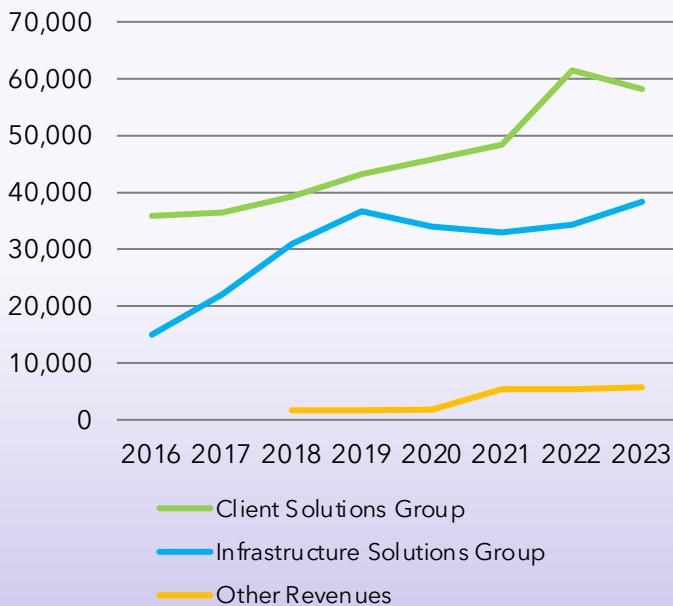
# Who are the Winners?

## Data Storage & Solutions

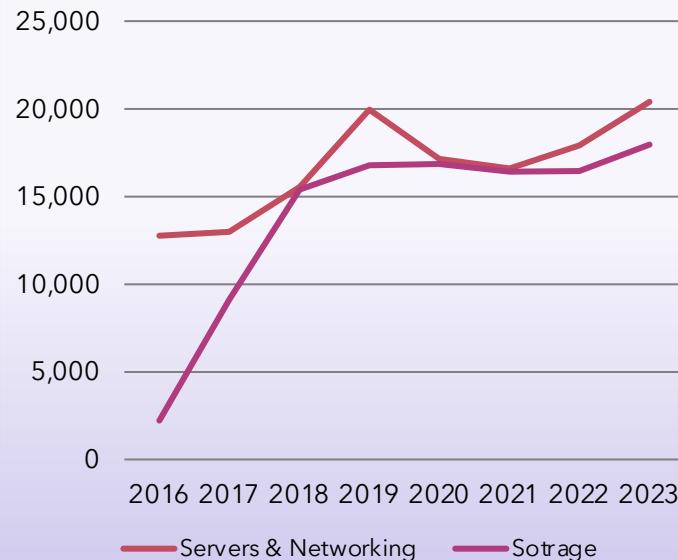


### By the Numbers

**Revenue Breakdown** in millions \$



**Infrastructure Group Breakdown** in millions \$



**Free Cash Flow** in millions \$



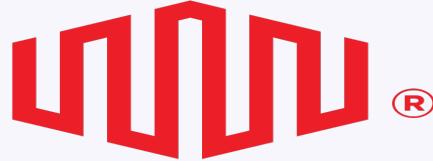
Dell saw the largest sector growth over the last 7 years from Infrastructure solutions, aided primarily by the acquisition of EMC

Looking further into the Infrastructure solutions, Dell have continued to increase their Storage Revenues. Server & Networking have also seen growth over the last 7 years

While the graph of Dells FCFs does not look promising, this is due to the introduction of their capital returns policy implemented in 2021. The long run target is to return 40-60% of FCFs back to shareholders

# Who are the Winners?

Data Storage & Solutions



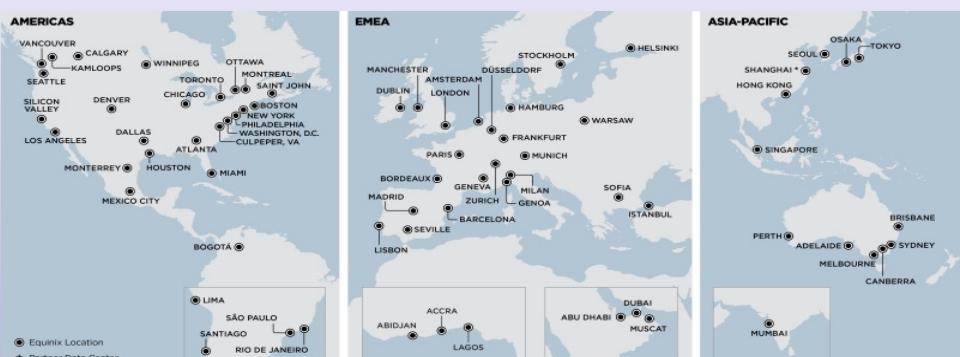
E Q U I N I X

## Who are They?

- A worldwide Digital Infrastructure company
- Responsible for connecting each aspect of a company's digital presence regardless of their industry

## Data Footprint

- \$35 billion dollars invested to establish 240 data centers and an unmatched footprint
- Uptime (Server Reliability): >99.99999%, an industry-leading number

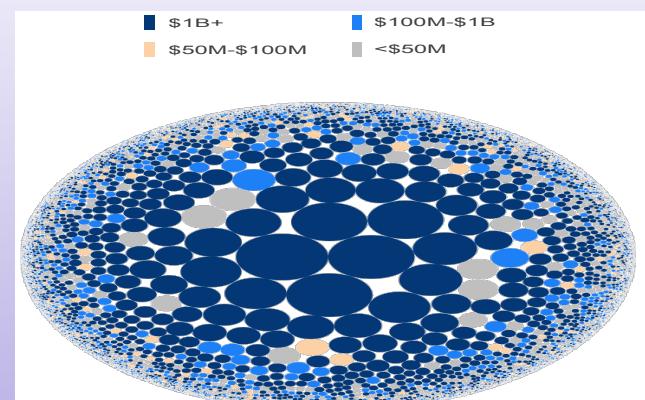


## Property Ownership

- Equinix has made it a top priority to own its Data centers, thus establishing long-term economic control of assets
  - 63% of recurring revenues from owned properties
  - <15% of revenues are from locations leases that end prior to 2038
  - 56% of data centers are owned
- 50 Projects currently underway in 25 different countries, expanding the data footprint in strategic locations
- Equinix has proven the growth justifies the premium of owning the buildings
  - 80 consecutive quarters of revenue growth (20 years!)

## Client Base

- 69% of customers have revenues over \$1 billion, 12% between 100M-\$1B
- 260+ fortune-500 companies
- Exposure to large customers helps Equinix limit the effect of economic downturns
- Total Addressable market is quickly expanding



# Who are the Winners?

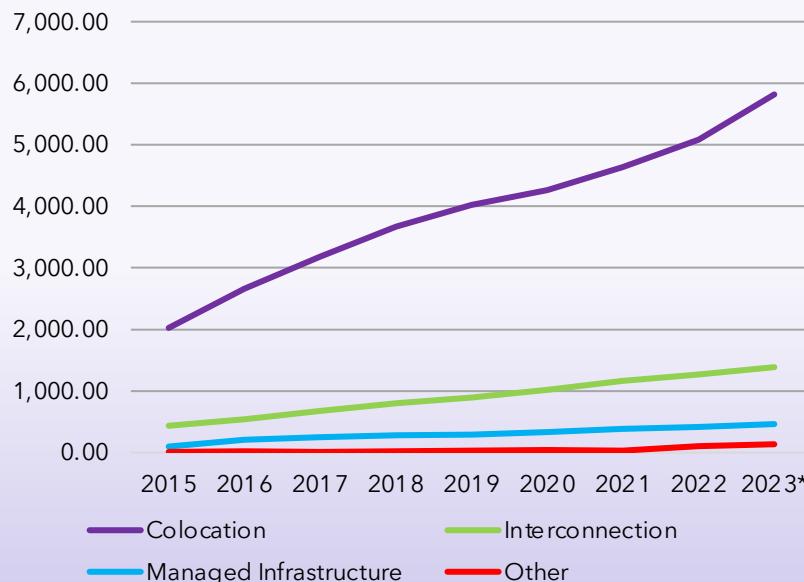
Data Storage & Solutions



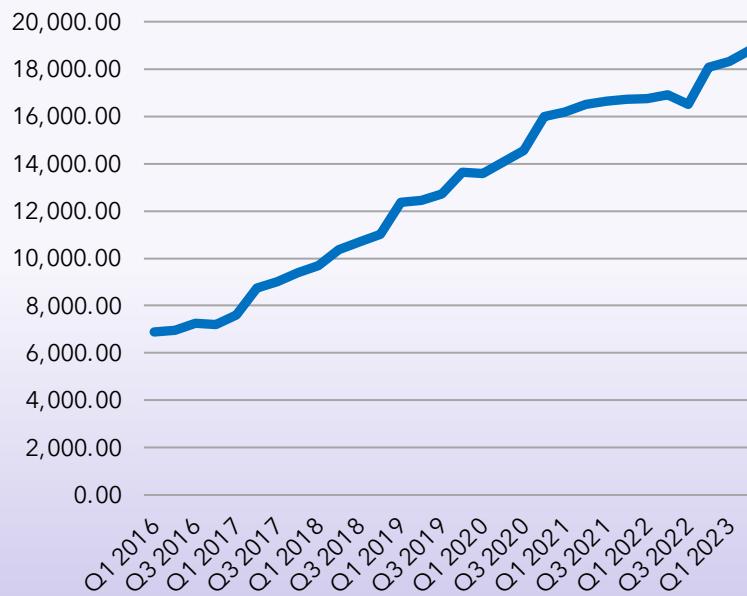
E Q U I N I X

## By the Numbers

Equinix Segment Revenue in millions \$



Property, Plant & Equipment in millions \$



Equinix EPS



As more companies need data storage locations, Equinix's colocation revenues have been skyrocketing in comparison to their other revenue streams.

Equinix owns or has long term leases on most of their data storage locations and are staying by this model by increasing their PP&E assets, thus constantly expanding their footprint.

Equinix's EPS has been steadily growing except for 2020 due to the supply chain issues that arose from Coronavirus. A sign that Equinix is becoming more profitable over the years

# Who are the Winners?

Under the AI Radar: Large-Cap



## Who Are They

- Global leader in cloud-based Human Capital Management software & solutions
- Delivers payroll for 1 in 6 US workers, 40+ Million people and growing worldwide
- ADP has a total addressable Market of \$150 billion across payroll, workforce management, payments, analytics, etc.

## ADP Data Cloud

- A way for companies to understand where their workforce compares to others by using the aggregate data of 30+ million employees and over 30 different HR metrics
- ADP is constantly adding more AI tools to the data cloud in order to further their grasp on workforce analytics
- Making data from 800,000+ firms in North America available for all to benefit from

Data changing the world of HR Video

## Why are they under the radar?

- An HCM company is not what comes to mind when investing in AI, but ADP has positioned themselves to thrive in the new age
- ADP has established an AI & Data Ethics council to ensure AI safety when deploying AI products
- ADP is not directly creating the AI technology but have applications that will reach millions

## How ADP Will Benefit From AI

- ADP has the most data of any Payroll company in the world
- Due to their vast data resources, they are already one step ahead of the competition for application of AI
- As of 2023, they are taking a safeguarded approach to ensure the security and safety of its 30+ million customers while also attempting to provide the best applications possible
- ADP uses AI models to anticipate the evolution of work behaviors

# Who are the Winners?

Under the AI Radar: Large-Cap



## By the Numbers

Dividend Payout Ratio



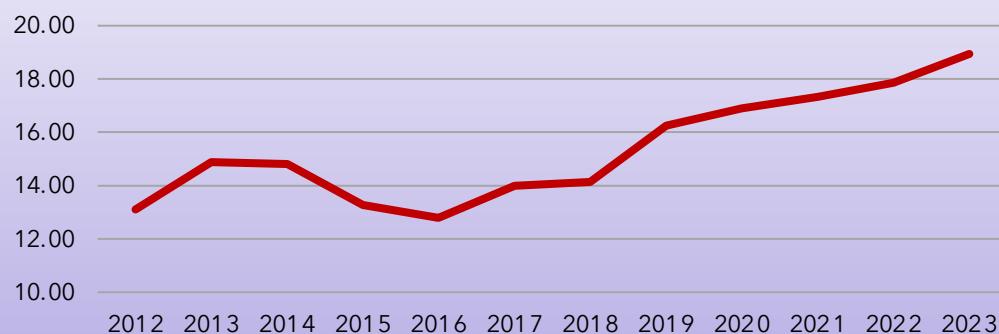
ADP has consistently maintained a high payout ratio, making sure to give over 50% of profits back to investors. Since 2017 the payout ratio has stabilized, allowing for stable and strong dividend payments

ADP's earnings per share have constantly grown over the past 20 years at an average of 19.2% per year. Indicating ADPs increase in profitability

Earnings Per Share



Profit Margin %



ADP has been able to increase its profit margin by over 4% per year since 2012 to a very strong 18.94% in 2023. A very strong margin when compared to the industry

# Who are the Winners?

Under the AI Radar: Mid-Cap



## CROWDSTRIKE

### Who Are They?

Subscription-based cybersecurity technology company that provides in cloud workload, endpoint security, and cyberattack response services

- Since Crowdstrike's founding in 2011, they have been pioneers in AI-led innovation in cybersecurity
- **AI applications fit into three categories:**
  - 1) Combating increasingly sophisticated attacks by identifying adversary behavior and patterns of threat
  - 2) Closing the cybersecurity skills gap by leveraging AI to automate security tasks and expedite detection and response.
  - 3) Addressing the complexities of hyper-scale data issues through rapid and large-scale analysis of intelligence and threat telemetry

### Indicators of Attack (IOAs)

**IOA:** demonstrates the intentions behind cyberattacks and the techniques used by the threat to accomplish their objectives.

- Crowdstrike has created the industries first AI-powered indicators
- **How they work:** By using technology inspired by the animal visual cortex structure (Deep learning and Neural Networks) to uncover and anticipate new adversarial patterns
- Plans to be completed and released by late 2023

### Why an AI Industry Winner?

- The worldwide cybersecurity market size as of 2022 was around 153.65 billion, predicted to triple by 2030
- In order to corner this fast-growing industry, Crowdstrike is making sure to stay one step ahead of both their competition and their threats by breaking into AI **early and correctly**



# Who are the Winners?

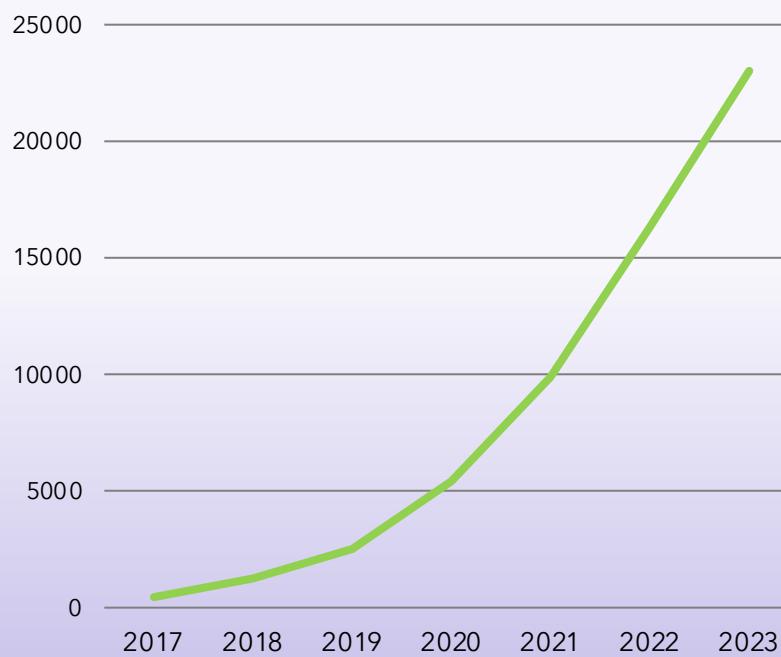
Under the AI Radar: Mid-Cap



**CROWDSTRIKE**

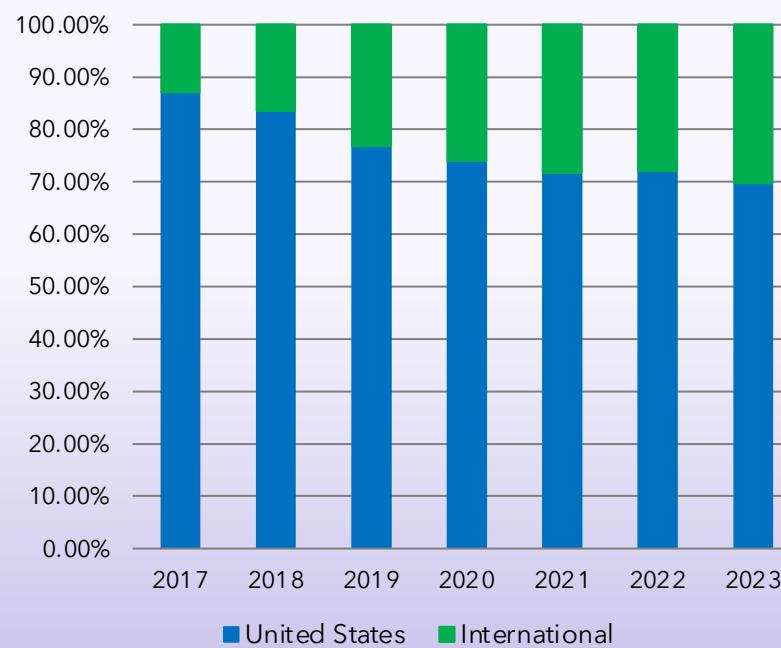
## By the Numbers

Total Customer Subscriptions



Subscriptions have been growing at an average of 716% since 2017

Revenue Breakdown as % of total



Crowdstrike is growing its presence in the international market, tapping into an important and large revenue stream

### Company Health

- While Crowdstrike is not profitable as of Q2 2023, they have healthy financials
- **Cash Ratio = 1.28**, shows even without turning a profit they a cover their short-term obligations with cash
- **Current Ratio = 1.73**, a strong ratio that indicates they are actively covering their short-term liabilities

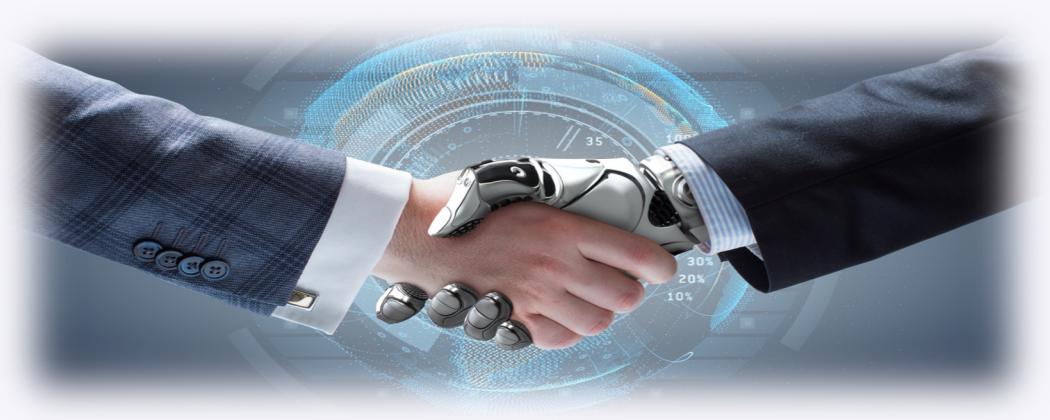
### Free Cash Flows in millions \$

	2016	2017	2018	2019	2020
--	------	------	------	------	------

<b>FCFs</b>	12.5	292.9	441.8	676.9	747.1
-------------	------	-------	-------	-------	-------

Crowdstrike FCFs are a positive reminder that they have ample cash to continue covering obligations and new investments

# Who are the Losers?



## Macro Level

- All companies will see the effects of Artificial Intelligence, **but not all will adapt correctly to overcome the shift**. This is where you will see companies that will hurt.
- On the Macro Level, companies are determining the best way to approach Artificial Intelligence Applications
  - Some slowly, some quickly
- According to the Challenger Job Cut reports in May of 2023, nearly 4,000 job losses were due to AI

### **...But not all is bad**

While AI technology is a different revolution than witnessed before, looking to history for guidance is important.

- The Industrial Revolution in the beginning of the 19<sup>th</sup> century was the largest worldwide production shift in history, and job losses only occurred for a short period of time after
- Many fear AI taking jobs, but it is important to see that with an increase in production comes an increase in new job availability in the long run

## Micro Level

- The main losers will be **individuals**, not companies.
- Workers in certain sectors of the economy will experience job loss, such as clerical jobs and introductory level positions like basic accounting
- On the individual level, people need to make sure to stay up to date on the direction of AI regardless of the industry they are in
- This will help them make the best decisions possible on where to invest their money, as nobody truly knows the exact path AI will take
- Millions of workers over the next decade will have to shift their profession and skillset for new and emerging jobs

# Who are the Losers?

## History Doesn't Repeat Itself, It Rhymes

Looking to past worldwide changing events is important to understand how society will shift due to Artificial Intelligence

- For many, AI will be, potentially, the single most lucrative investment in their lives
- The deciding factor of this investment for individuals will be whether they are up-to-date and aware of each and every shift in AI, both positive and negative

## Flashback to the Those who Didn't Adapt

### **YAHOO!**

Yahoo dominated in a different industry, and in 2005 were one of the leading players in online advertising. Yahoo reported a 45% increase in revenue in 2005, and solidified their Advertising footprint

- Yahoo mistakenly undervalued the importance of search and opted for traditional media outlets
- They neglected the modernization of news content and user experience losing to competitors like Google
- At its Peak, Yahoo and AOL were worth \$125 billion, and were just acquired in 2021 for \$5 billion, a 96% decline

### **Kodak**

Kodak dominated the photography film industry when they came out with the first ever digital camera in 1975 and continued to be the face of photography for many years

- This was all until the digital revolution came and Kodak held back from investing in new technology over fear of hurting their lucrative film business
- This was the first of many mistakes made that caused a lack of innovation and a file for bankruptcy in 2012