



**The
Economist**

MAY 6TH-12TH 2017

Crunch time in France

Ten years on: banking after the crisis

South Korea's unfinished revolution

Biology, but without the cells

The world's most valuable resource

Mastering The Economics of Data, Analytics and Digital Transformation

Bill Schmarzo

Customer Advocate, Data Management Innovation, Dell Technologies

Adjunct Professor, Menlo College

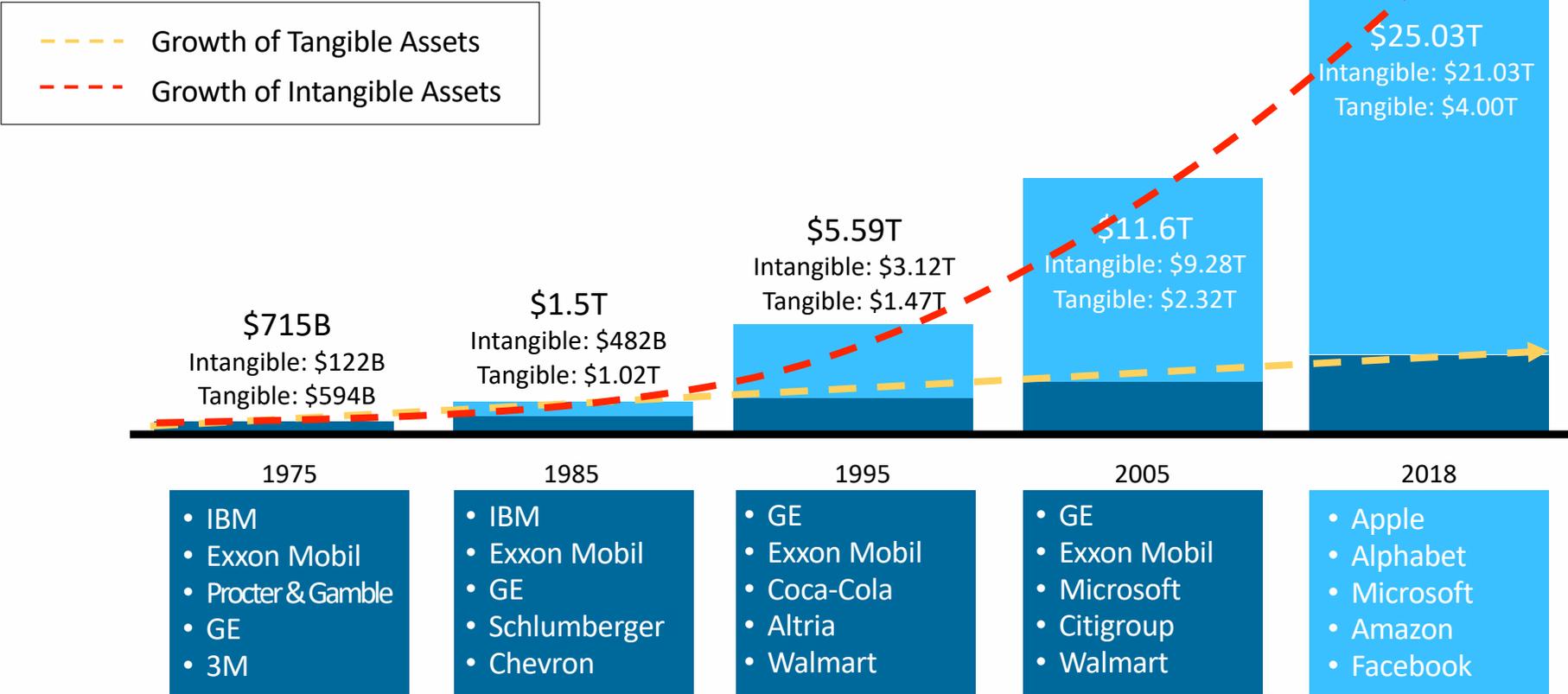
Honorary Professor, National University of Ireland Galway

“Dean of Big Data”

Data is
the new oil



Harnessing the Economic Power of Data



- 1975
- IBM
 - Exxon Mobil
 - Procter & Gamble
 - GE
 - 3M

- 1985
- IBM
 - Exxon Mobil
 - GE
 - Schlumberger
 - Chevron

- 1995
- GE
 - Exxon Mobil
 - Coca-Cola
 - Altria
 - Walmart

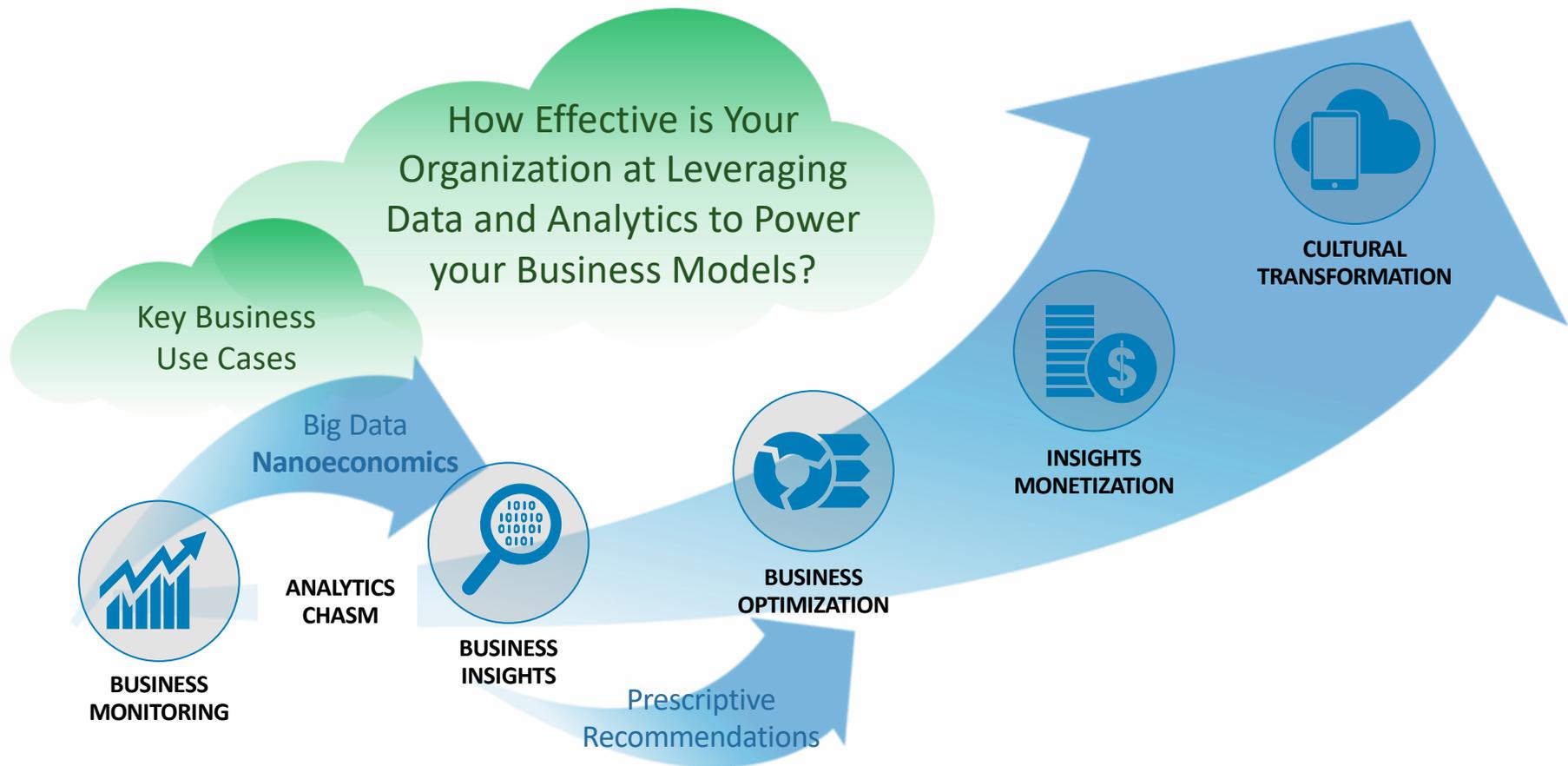
- 2005
- GE
 - Exxon Mobil
 - Microsoft
 - Citigroup
 - Walmart

- 2018
- Apple
 - Alphabet
 - Microsoft
 - Amazon
 - Facebook

Market Cap World's Most Valuable Companies

Source: ["\\$21 Trillion in Intangible Assets is 84% of S&P 500 Value"](#), IP Close Up

Data & Analytics Business Model Maturity



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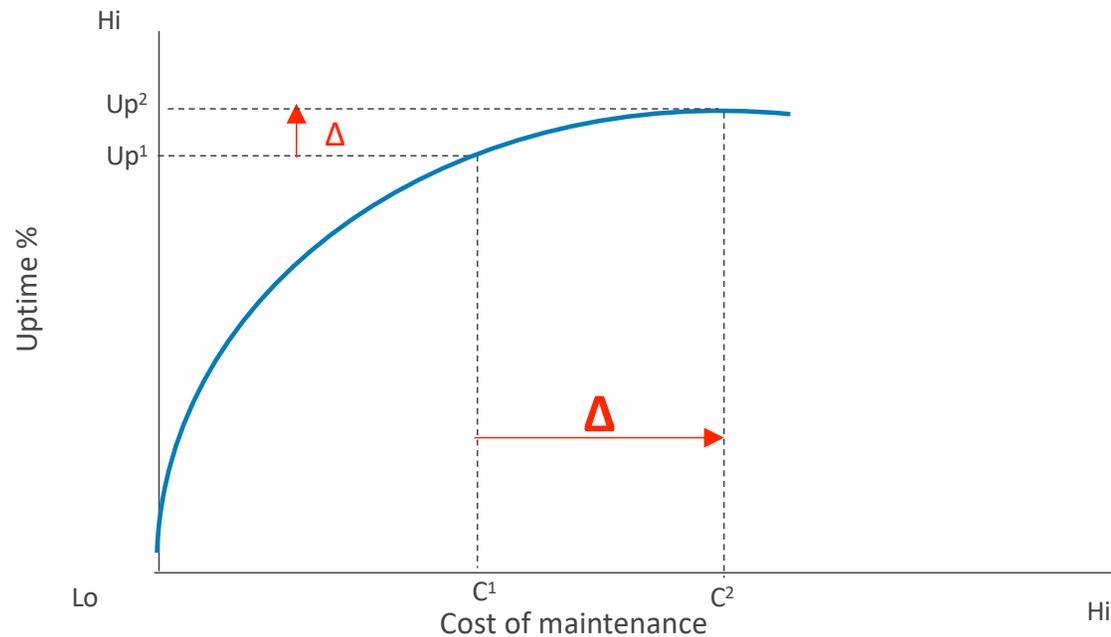
The world's most valuable resource

Leveraging Data Science and Nanoeconomics to Cross the Analytics Chasm

Data and the new rules
of competition

Economic Value Curve Challenge

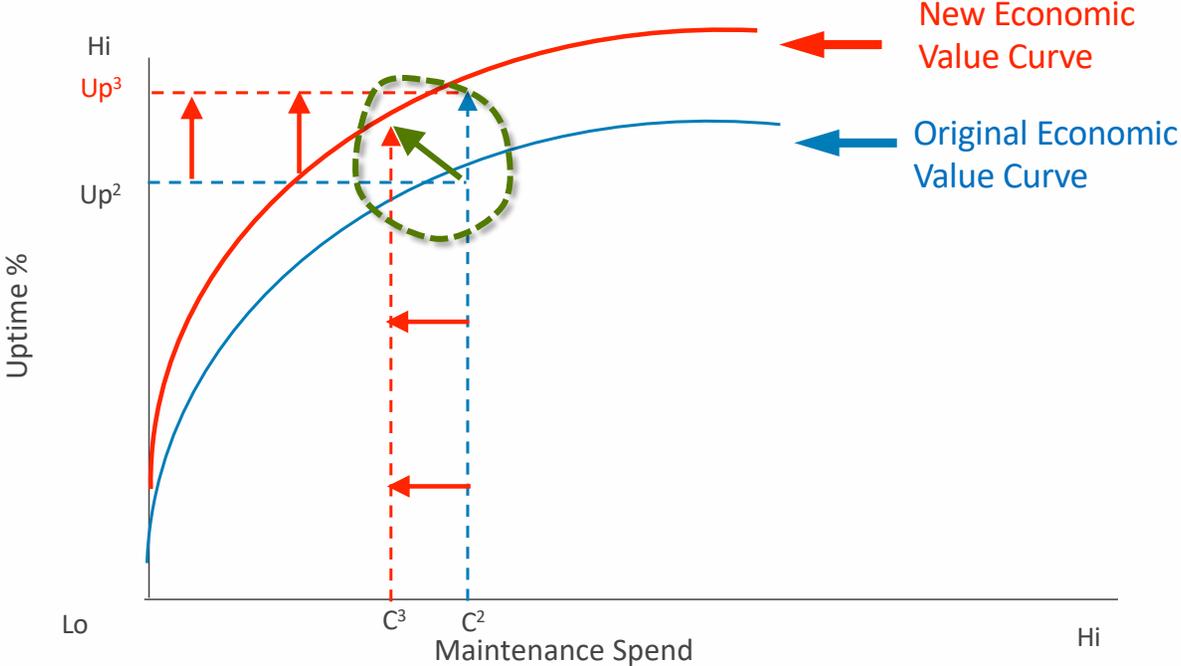
Economic Value Curve measures relationship between a **dependent variable** and **independent variables** to achieve a particular outcome. Unfortunately, **Law of Diminishing Returns** dictates that additional spend yields only marginal improvements.



Maintenance costs could include direct and indirect costs such as work hours, overtime costs, extra parts and inventory, extra consumables, and the costs associated with fixing parts that were not going to break

Nanoeconomics to Transform Economic Value Curve

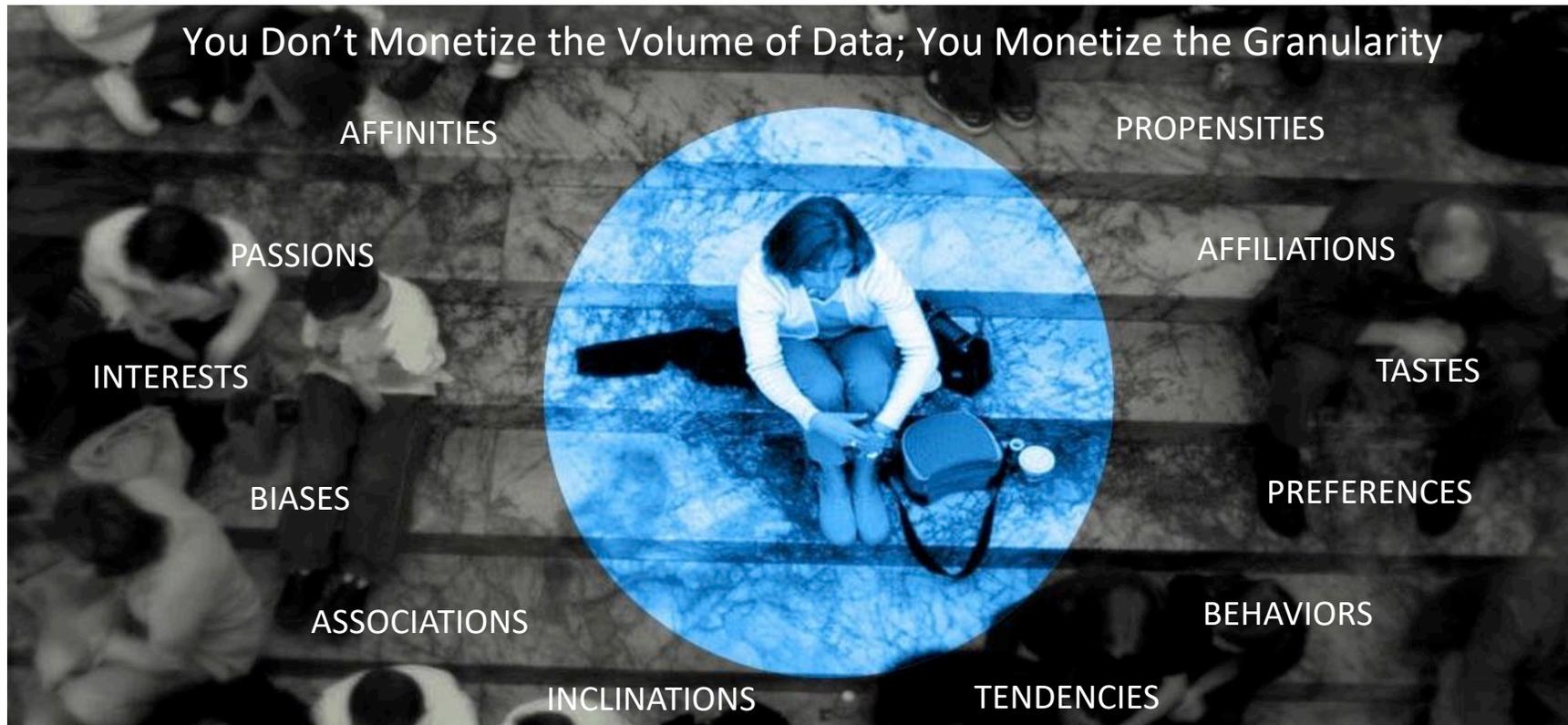
Organizations can beat the **Law of Diminishing Returns** using **Nanoeconomics** to take **Precision Actions** at the **Individual Entity Level** that creates a new **Economic Value Curve**. Result: **“Do More with Less”**



Maintenance costs could include direct and indirect costs such as work hours, overtime costs, extra parts and inventory, extra consumables, and the costs associated with fixing parts that were not going to break

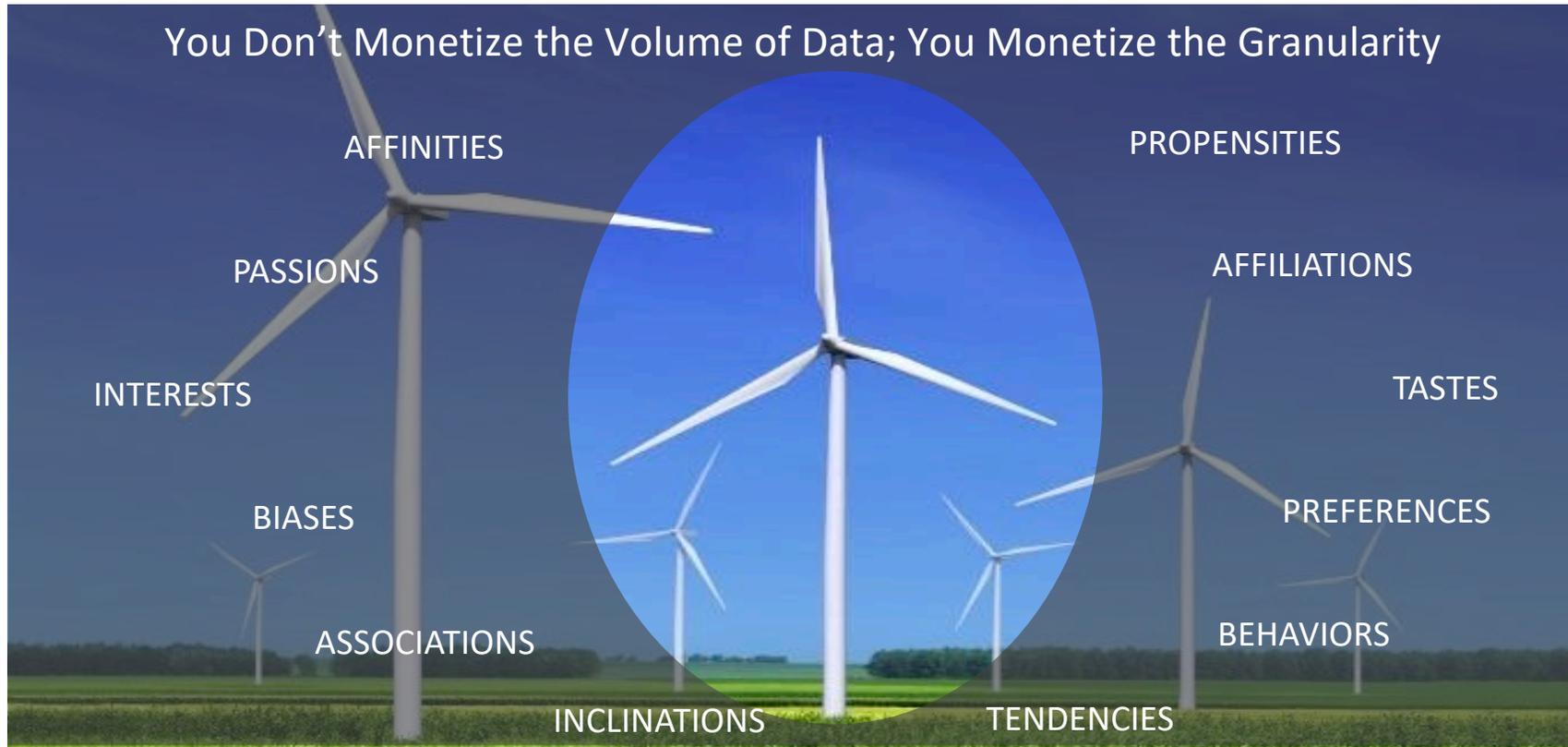
Nanoeconomics: Transitioning from **Averages** to **Propensities**

Nanoeconomics is the economic theory of individualized (human or device) **predicted behavioral and performance propensities**



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Analytic Profiles: Codify and Refine Entity Predicted Propensities

Analytic Profiles codify, share, re-use and continuously-refine the predicted propensities, patterns, trends and relationships for the organization's key human and device assets

Traditional Data

- Purchases
- Product Preferences
- Add-on Preferences
- Drink Preferences
- Visit Frequency
- Visit Recency
- Visit Monetary
- Market Basket
- Group Size
- Coupons
- Consumer Comments
- Store Manager Notes



Bill Schmarzo Chipotle Analytic Profile	NCE Score	Var	Trend
Demographic segments 3.2	92	1.85	▲
Behavioral segments 3.1	67	3.25	▼
Loyalty Index 2.0	82	2.25	▲
Frequency Index 1.0	65	1.90	▼
Recency Index 1.0	92	1.89	▼
Lifetime Value Calc 1.0	99	1.05	▲
Event Propensity 1.0	14	1.74	
Promotion Propensity 1.1	02	1.15	
Advocacy Propensity 2.1	08	1.20	
Attrition Propensity 1.2	09	1.25	



Non-traditional Data

- Social Media Posts
- Home Value
- Employment history
- Job Change Frequency
- Job Change Recency
- Industry certifications
- Industry awards
- Social Media Connections
- Education degrees
- Rank of college
- College donations
- Volunteer activities
- Parking tickets

Data Monetization Driven Around Analytic Profiles

It is around the organization's key **Business Entities** (human and/or device) using **Analytic Profiles** that the organization will seek to optimize their key business and operational use cases



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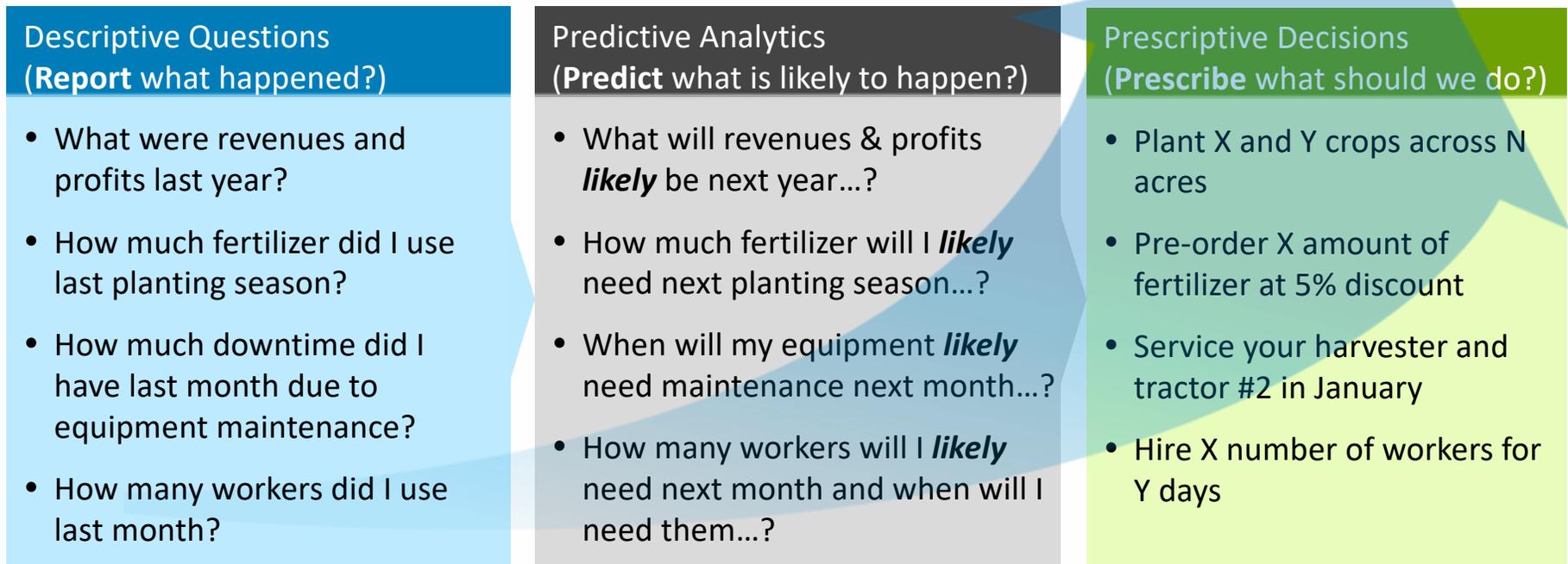
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Data Literacy & Thinking Like a Data Scientist

Data and the new rules
of competition

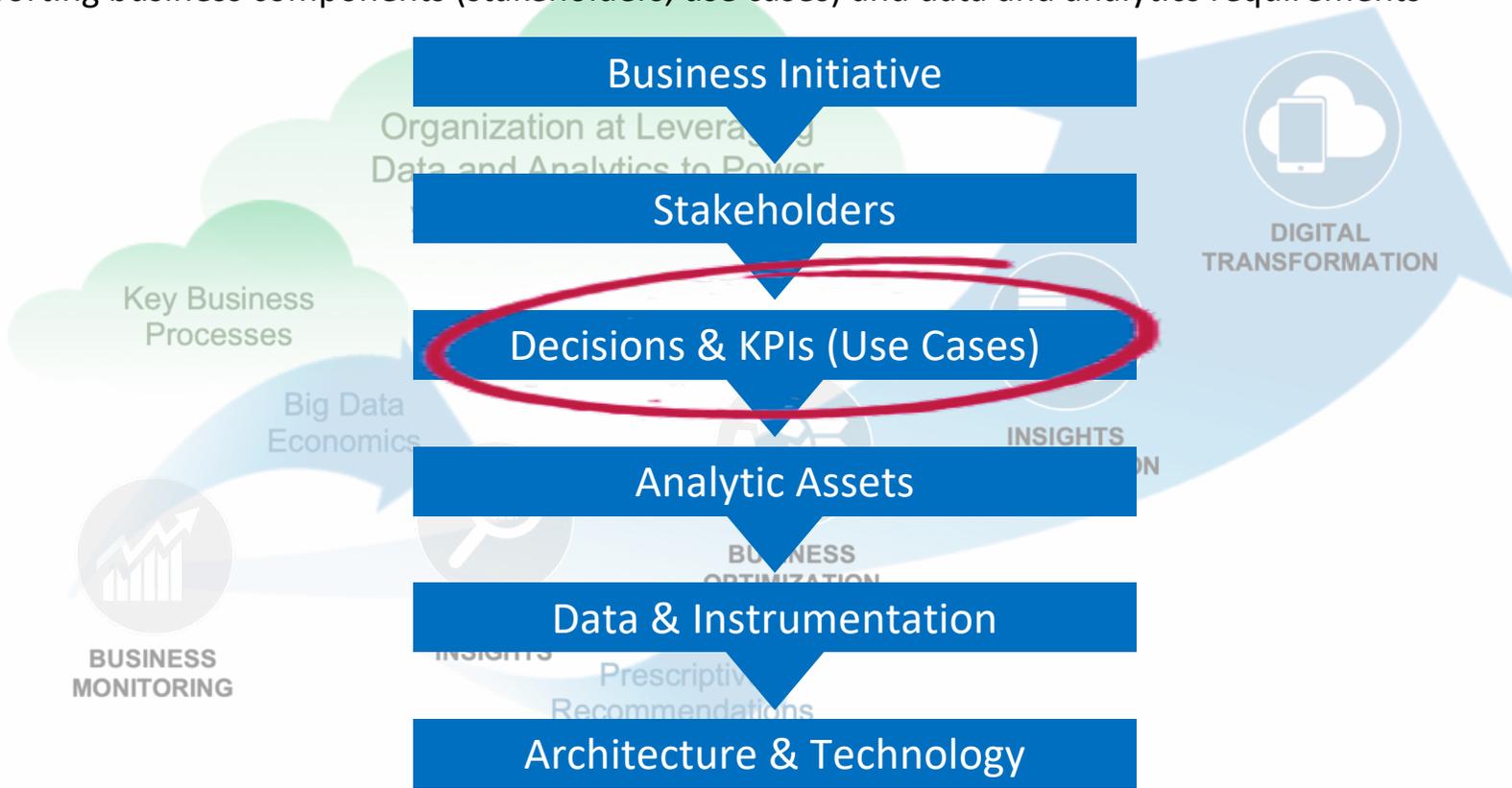
What is Data Science?

Data Science is about identifying those variables and metrics that ***might*** be better predictors of performance



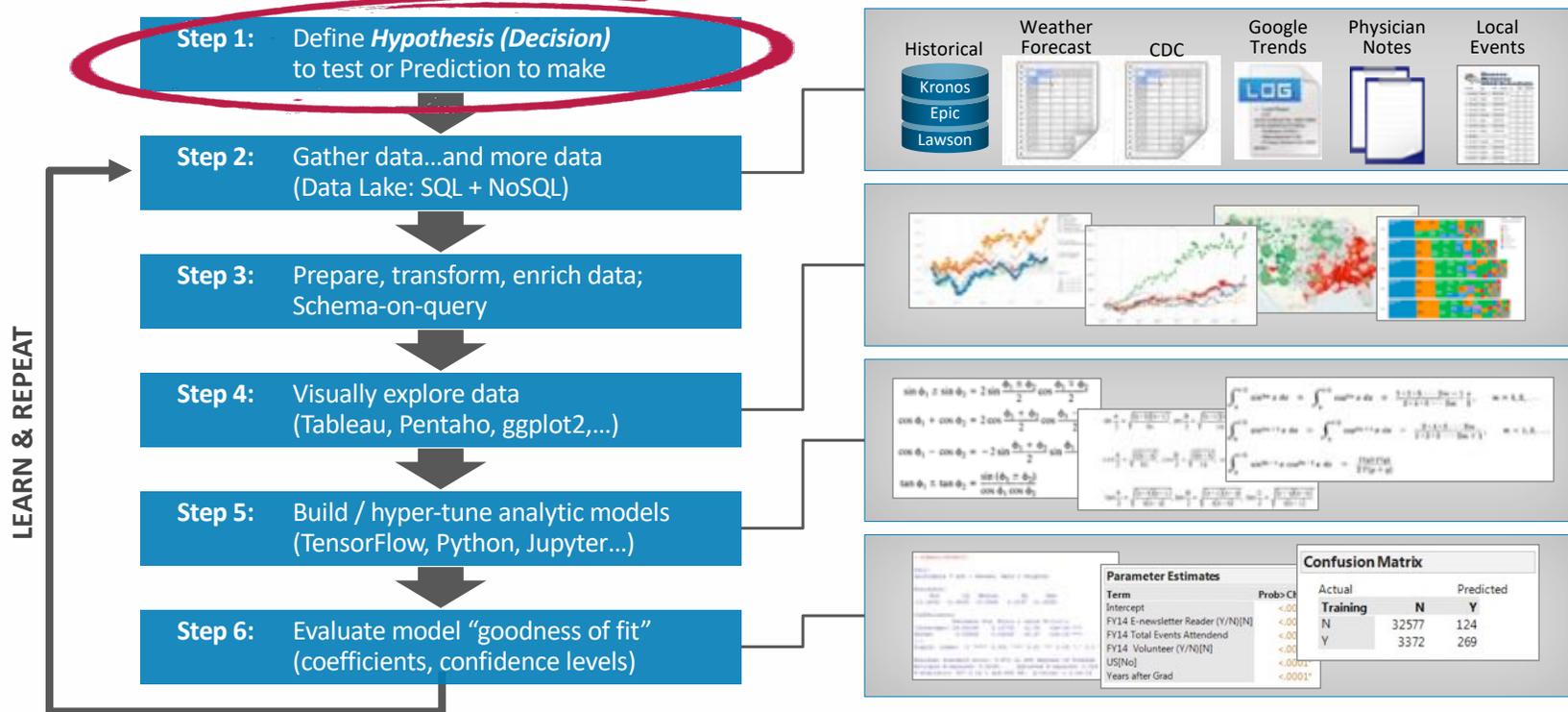
Data Science Value Engineering Framework

The Value Engineering Framework decomposes an organization's **Strategic Business Initiative** into its supporting business components (stakeholders, use cases) and data and analytics requirements



Data Science Collaborative Engagement Process

Rapid exploration, rapid testing, failure-enabling, AI / ML-empowered “Scientific Method”



“Scientific Method” is an empirical method for gathering knowledge and insights to prove/disprove a specific hypothesis

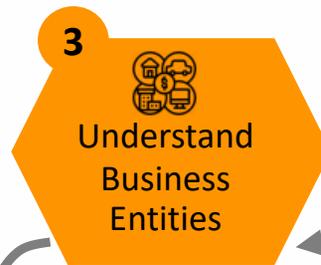
The Art of “Thinking Like A Data Scientist”

Collaborative ideation, design-centric, human-empowered “Scientific Method”

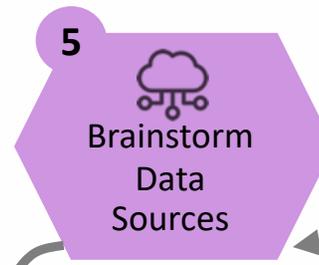
(1) Identify **Business Initiative** and **KPIs** for measuring progress & success



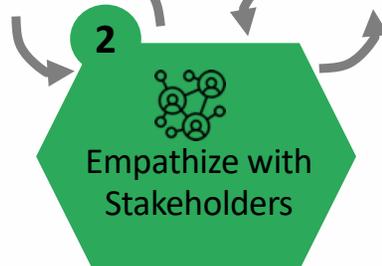
(3) Identify **Business Entities** and what insights would we want about each



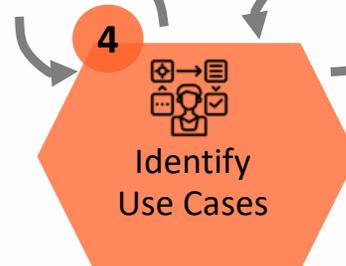
(5) Identify what **Data** we *might* want about each Business Entity



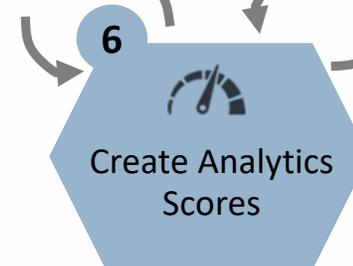
(7) Identify prescriptive **Recommendations** that support **Decisions**



(2) Embrace Design Thinking to empathize with internal & external **Stakeholders**



(4) Identify and Prioritize key initiative **Decisions & KPIs** (Use Cases)



(6) Individualized **Analytic Scores** support making informed decisions



(8) Map **Analytics Scores** to prescriptive **Recommendations**

“Scientific Method” is an empirical method for gathering knowledge and insights to prove/disprove a specific hypothesis

Hypothesis Canvas:

Completed by:

Date:

Iteration:

(3) Business Value <ul style="list-style-type: none"> •Increased top line revenue •Better (faster) customer experience •Fresher inventory •Increase overall profits •Increased asset utilization 	(1) Hypothesis Increase Same Store Sales by 7.1% over the next 12 months				(11) Impediments <ul style="list-style-type: none"> •Lack of quality data •Lack of analytic skills to create predictions •Store/Field Management buy-in •Modern technology architecture •Financing/budget 																		
	(2) KPI's Average Sales per Visit, Store Traffic, Sales per Employee, Line Wait Time, % Abandonment, Mobile Orders, Positive Social Media Mentions, Table Turns																						
(6) Decisions <ul style="list-style-type: none"> •Staffing •Local Events Sponsorship •Promotions & Types •Corporate Catering •Loyalty Program •Non-corporate Catering •Inventory Management •Suppliers •Customer Satisfaction •New Product Intros 	(5) Entities <ul style="list-style-type: none"> •Stores •Customers •Suppliers •Store Managers •Competitors 		(4) Stakeholders <ul style="list-style-type: none"> •Store Operations •Corporate Marketing •Field Marketing •Procurement •Finance 		(12) Risks (FP/FN) <ul style="list-style-type: none"> •Poor execution affects customer satisfaction •Increased demand stresses employee satisfaction •Weather disrupts local events •Increased demand impacts product quality •Suppliers can't keep up with increased demand 																		
	(7) Predictions <ul style="list-style-type: none"> •Demand (Traffic) Forecast •Promotional Response •Basket Size •New Product Demand •Staff Availability •Abandonment •Mobile Orders •Weather 							(8) Data Sources Value <table border="1"> <tr><td>POS</td><td>●</td></tr> <tr><td>Market Basket</td><td>◐</td></tr> <tr><td>Demographics</td><td>◑</td></tr> <tr><td>Traffic</td><td>◑</td></tr> </table>		POS	●	Market Basket	◐	Demographics	◑	Traffic	◑	(8) Data Sources Value <table border="1"> <tr><td>Comments</td><td>◑</td></tr> <tr><td>Social Media</td><td>●</td></tr> <tr><td>Weather</td><td>◑</td></tr> <tr><td>Local Events</td><td>◑</td></tr> </table>		Comments	◑	Social Media	●
POS	●																						
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(13) Financial Assessment <table border="1"> <tr> <td>Avg Sales / Store</td> <td>Profitability</td> <td>Customer Sat</td> </tr> <tr> <td>●</td> <td>◑</td> <td>◑</td> </tr> <tr> <td>Product Quality</td> <td>Brand Building</td> <td>Employees</td> </tr> <tr> <td>◑</td> <td>◑</td> <td>◑</td> </tr> </table>			Avg Sales / Store	Profitability	Customer Sat	●	◑	◑	Product Quality	Brand Building	Employees	◑	◑	◑	(9) Variables (Dimensions) <ul style="list-style-type: none"> • Store location • Store size • Store open date • Local demographics • Local house values • Local economics • Products sold • Time of day • Day of week (weekends) • Holidays • Seasonality • Weather conditions • Traffic patterns • Miles from high school • Miles from mall • Local sporting events 				(10) Recommendations <ul style="list-style-type: none"> •Recommend Staffing •Recommend Local Events Promotions •Recommend Store Hours •Recommend Inventory •Recommend Catering Targets 				
Avg Sales / Store	Profitability	Customer Sat																					
●	◑	◑																					
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(14) Impediments Assessment <table border="1"> <tr> <td>Data</td> <td>Analytic Skills</td> <td>Store Mgmt</td> </tr> <tr> <td>◑</td> <td>●</td> <td>◑</td> </tr> <tr> <td>Technology</td> <td>Financing</td> <td>TBD</td> </tr> <tr> <td>◑</td> <td>◑</td> <td>○</td> </tr> </table>			Data	Analytic Skills	Store Mgmt	◑	●	◑	Technology	Financing	TBD	◑	◑	○									
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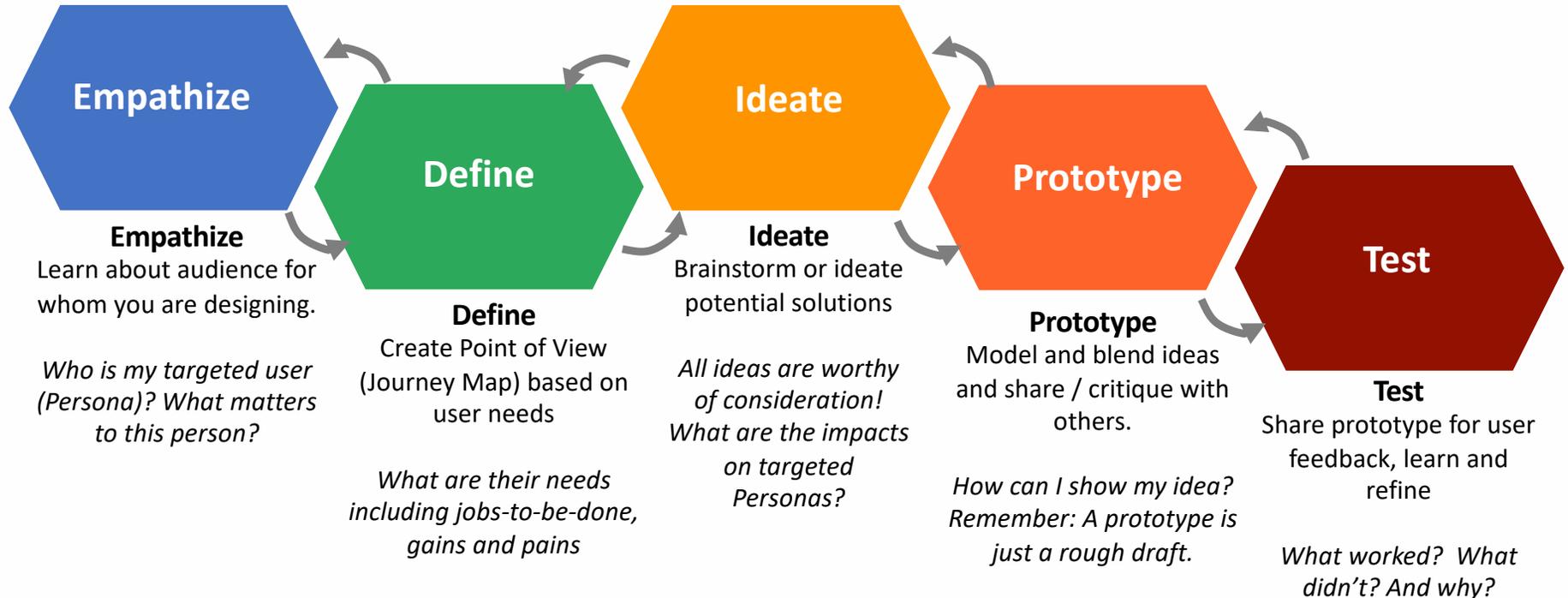
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Empowering Data Science with Design Thinking

Data and the new rules
of competition

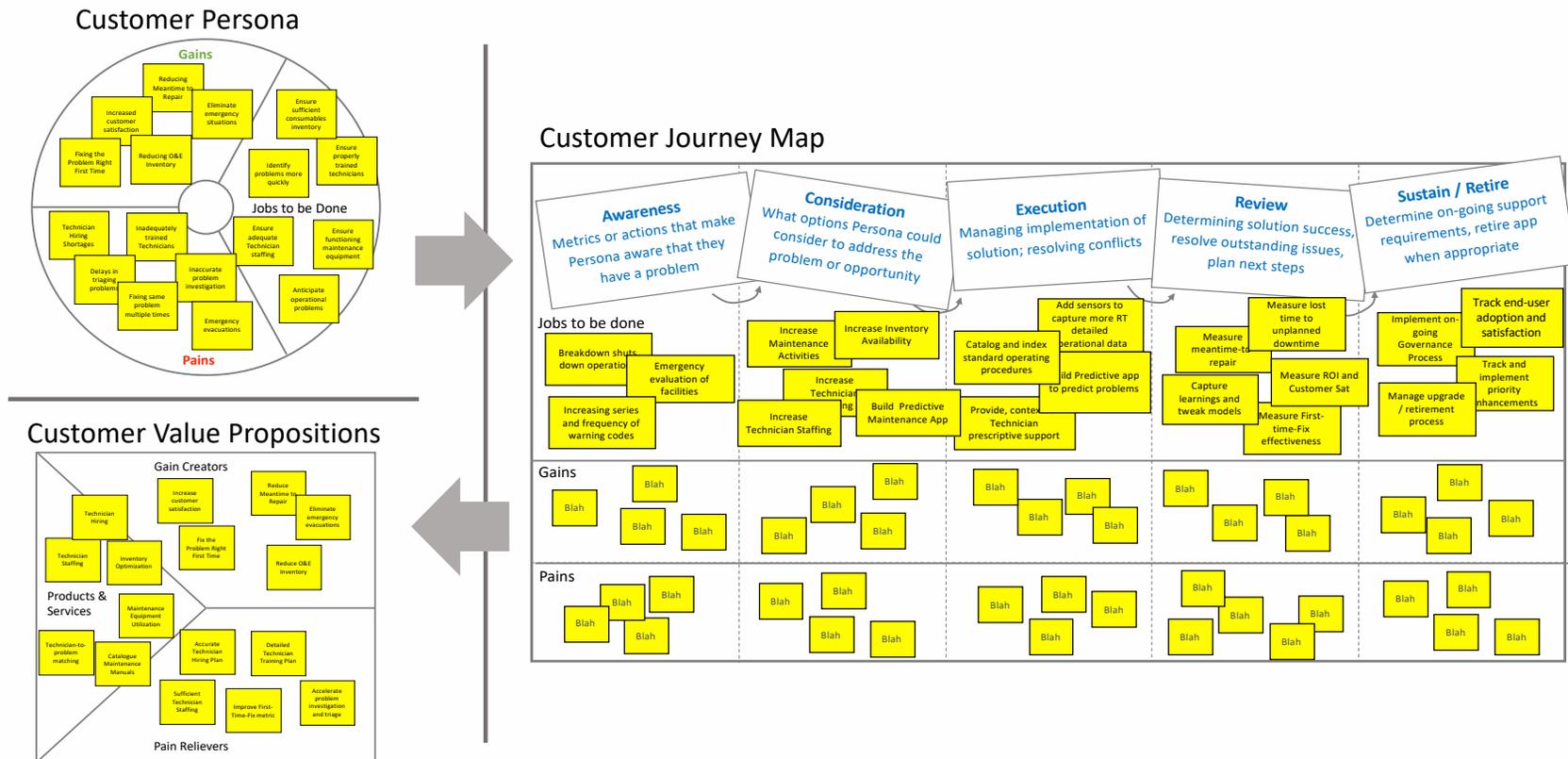
Design Thinking: Speaking the Language of Your Customer

Design Thinking uncovers and validates customer, product, operational needs via collaborative customer engagement within context and constraints of specific customer “journey”



Design Tools to Identify and Validate Sources of Customer Value

Design Thinking provides a mindset, tools, and techniques to **democratize ideation** across a diverse set of stakeholders within the context and constraints of specific customer “journey”



Design Thinking Humanizes Data Science

Design thinking involves observation to discover unmet needs within the context and constraints of a particular situation. It frames the opportunity and scope of innovation, generating creative ideas, testing and refining solutions. It creates a repeatable and scalable process for innovation.

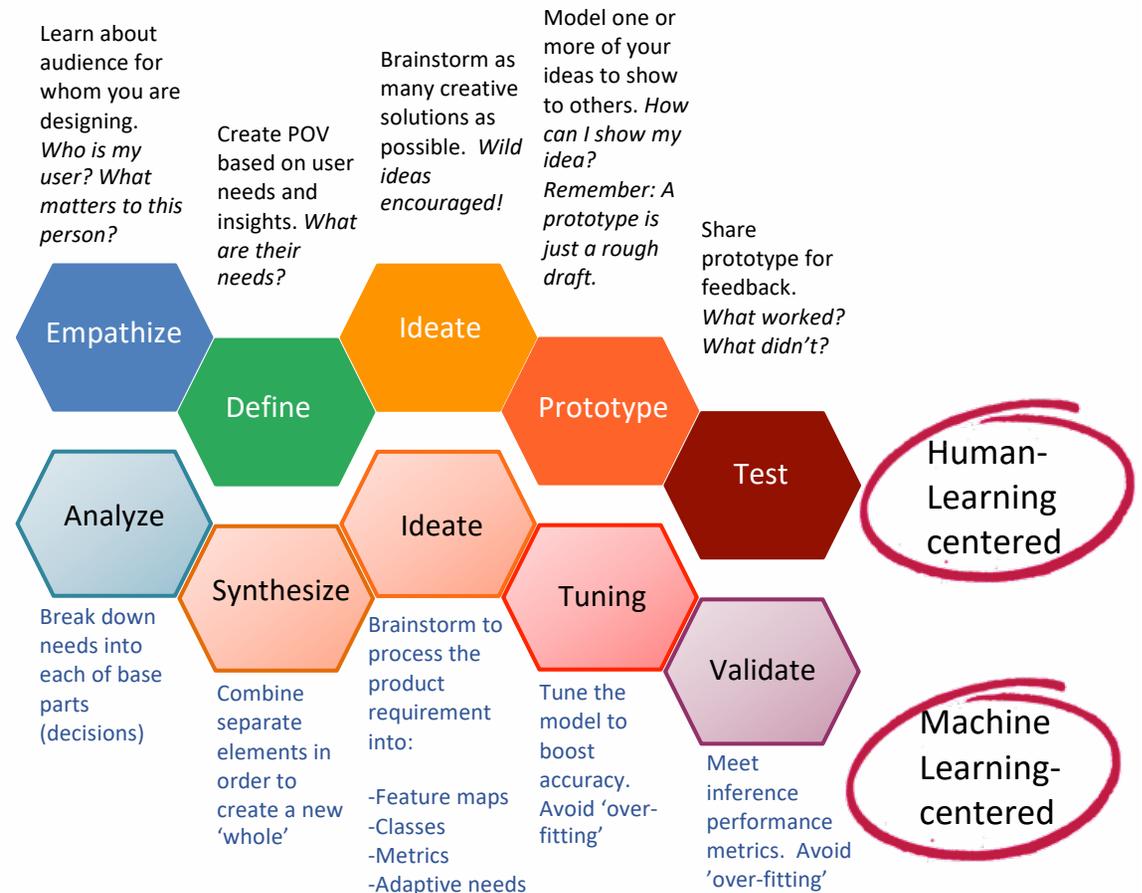
Design Thinking

designs products this way...

refines, tunes and predicts this way...

Machine Learning

Machine learning is a method of data analysis that automates analytical model building. Using algorithms that iteratively learn from data, *machine learning* allows computers to find hidden insights without being explicitly programmed where to look.



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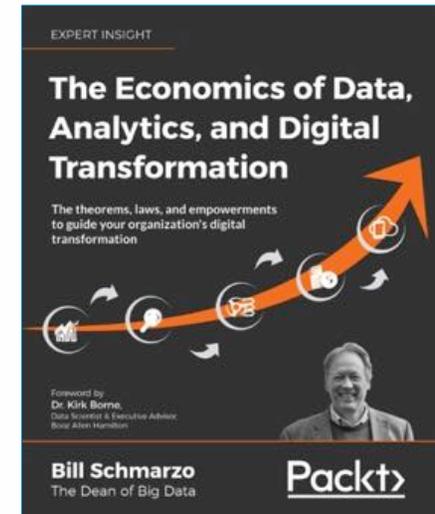
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Exploiting the Economics of Data and Analytics

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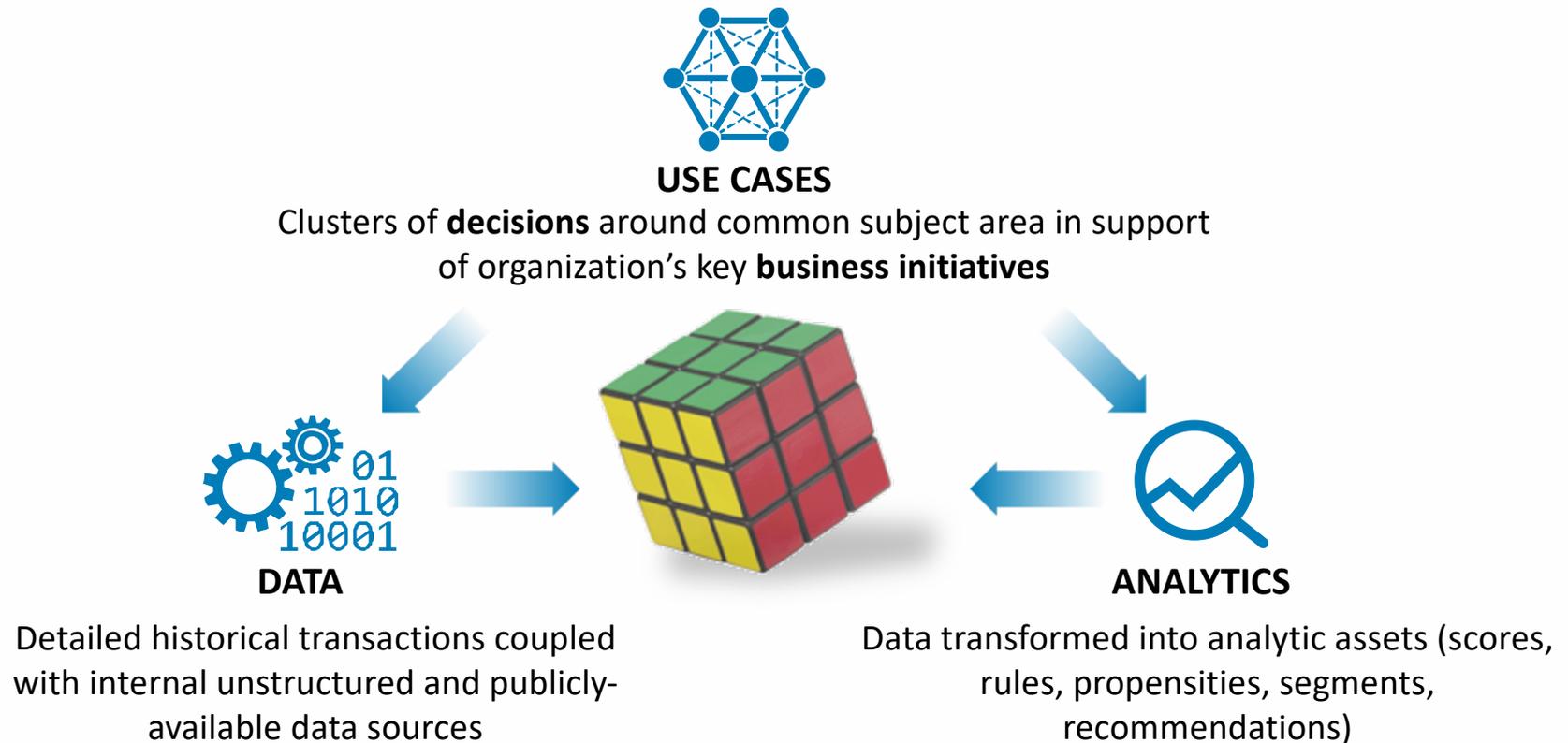
Quantifying the Economic Value of Data & Analytics

- Data is an asset that never depletes, never wears out, and can be used across unlimited use cases **at zero marginal cost**
- **Economics** is a “Value in Use” methodology for determining asset valuation
- **Economic Multiplier Effect:** ratio of the impact of an incremental increase in **investment** on the resulting incremental increase in **value**
- **Data Economic Multiplier Effect:** the accumulation of attributable and quantifiable value from the **use** of a data set against business use cases



Solving the Technology-to-Business Value Linkage Challenge

“You can not fully assess the value of your data in isolation of the business”



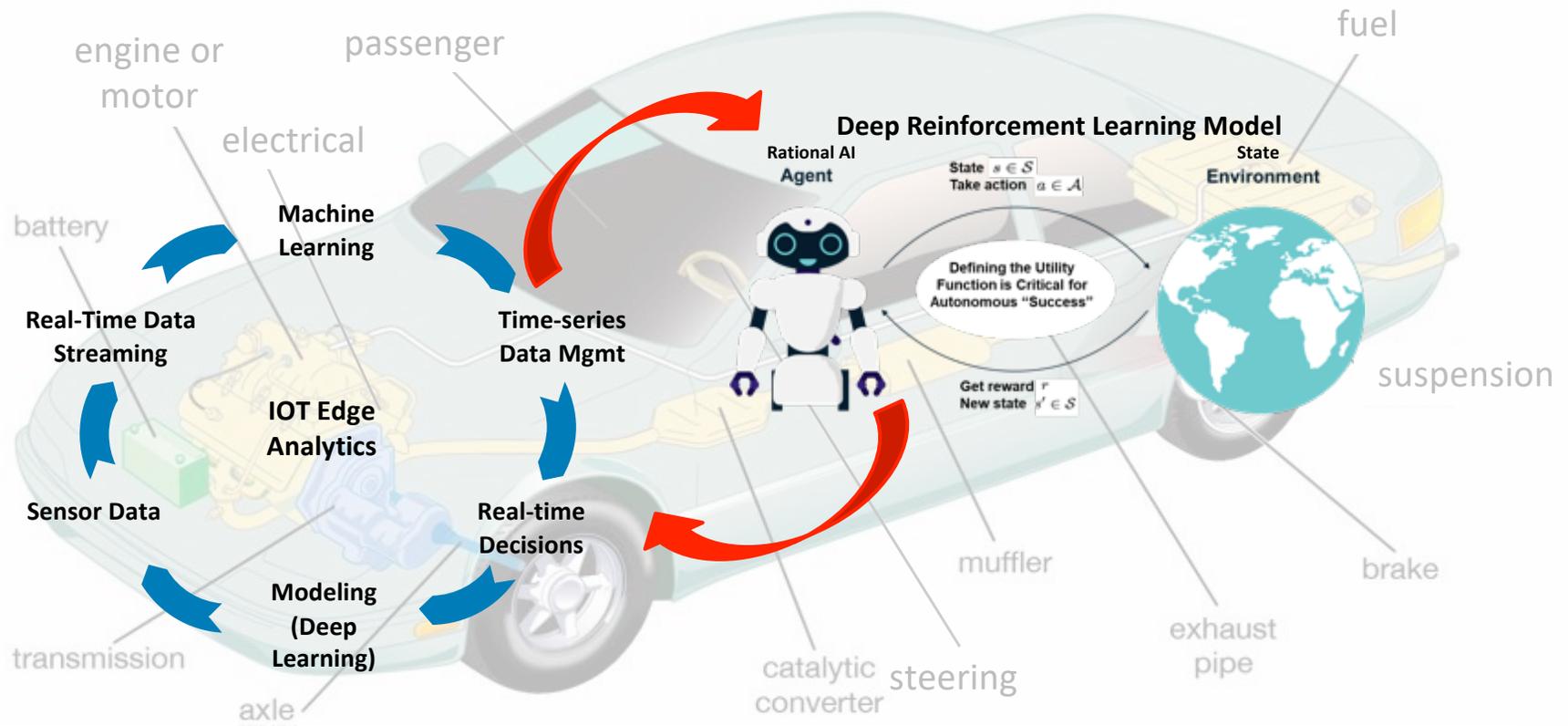
To Change The Game, You Need To Change Your Frame...

“
*If you buy a Tesla today, I believe
you're buying an **appreciating** asset,
not a **depreciating** asset*”

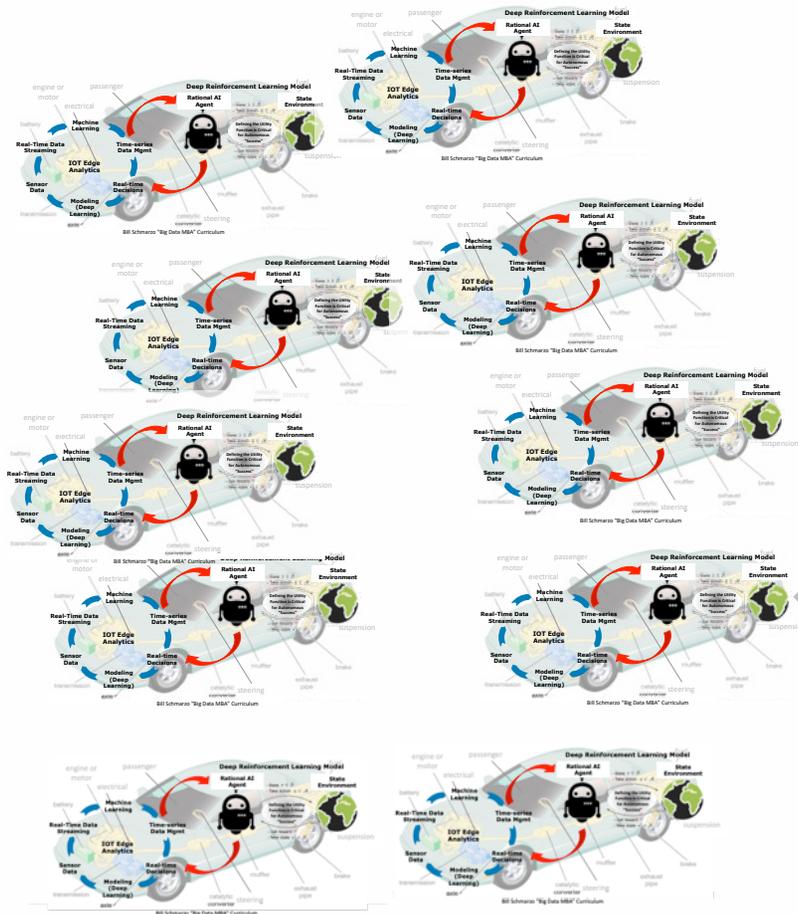
– Elon Musk
Tesla CEO

Leveraging AI to Create Assets that Appreciate

The more the **asset** gets used... the more accurate, more robust, more predictive, and consequently more valuable it becomes; asset value **appreciates**, not **depreciates**, through **continuous learning and adapting**



Compounding the “Economics of Learning”



Driving and operational data; “edge” use cases

Backpropagate learnings (updated models)

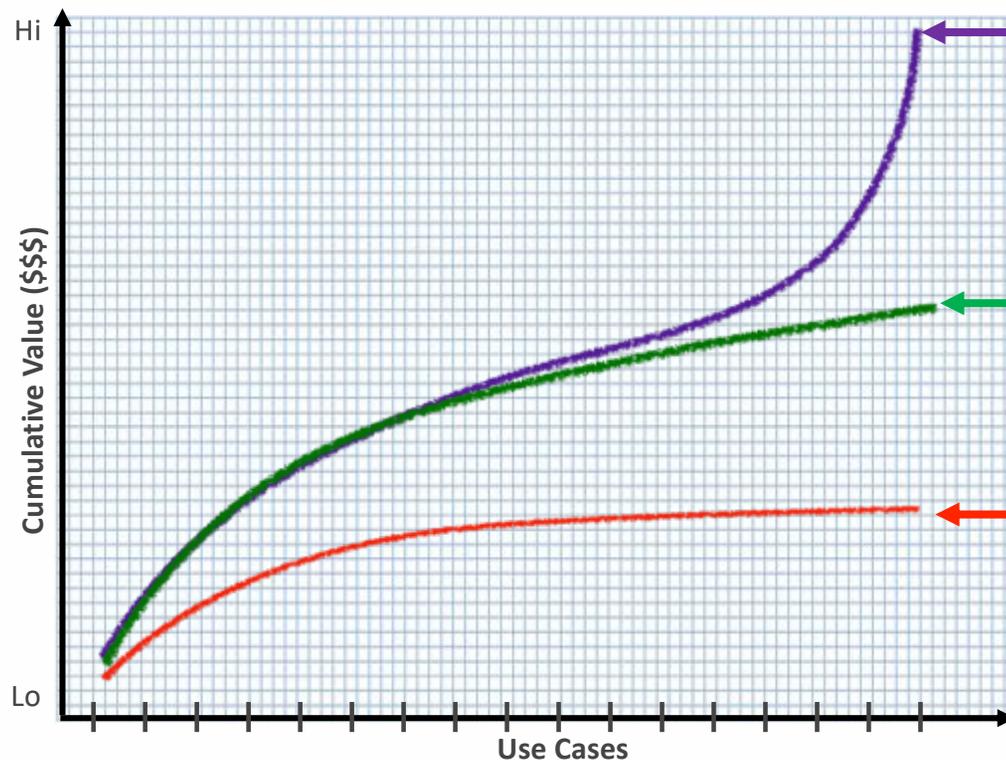
Tesla Autopilot Continuous Learning Environment

- Millions of Miles from 1,00,000+ Tesla Cars
- Billions of Miles from Autopilot Simulator

Law of 1% Compounding
 $1.01^{365} = 37.8x$

Schmarzo Economic Digital Asset Valuation Theorem

The “Economies” of Learning are more Powerful than the “Economies of Scale”



Effect #3: Economic Value Accelerates

- *Refining* analytic asset effectiveness ripples thru previous use cases that use same analytic asset—Tesla FSD and Google TensorFlow Effect

Effect #2: Economic Value Grows

- Reusing Data and analytic assets shrinks time-to-value and de-risks use case execution

Effect #1: Marginal Costs Flatten

- Reusing data and analytic assets reduces marginal costs for new use case (no data silos or orphaned analytics)

Questions...

Bill Schmarzo

- ❖ Author, Professor, Innovator, Corporate Advisor – Data Science & Data Monetization
- ❖ Customer Advocate, Data Management Innovation, Dell
- ❖ University San Francisco School of Management, Executive Fellow
- ❖ Honorary Professor, National University of Ireland-Galway
- ❖ Adjunct Professor, Menlo College

Books

- ❖ Big Data
- ❖ Big Data MBA
- ❖ The Art of Thinking Like a Data Scientist
- ❖ The Economics of Data, Analytics, and Digital Transformation

Contact me!

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