



# THE ECONOMICS OF (BIG) DATA

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# The Economics of (Big) Data

I What about Data?

II What about Economics?

III What about Economics of Data?

IV What about Privacy?

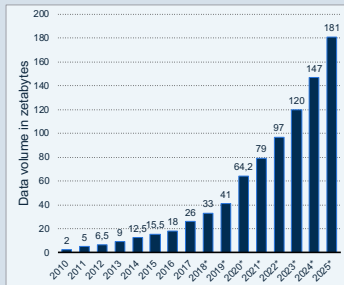
V What about Data Governance?

VI The Importance of Economics of (Big) Data

# Influence of Data on Economics

## Vast Growth of Data Availability

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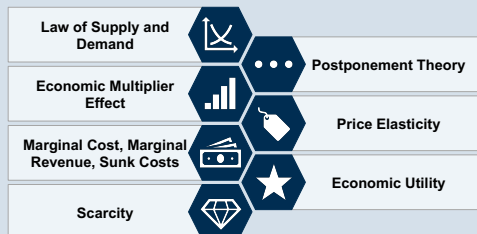
- 90% Of all data was created in past two years
- 200 Billion of IoT-devices in 2020
- 40% More Internet users five years ago

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Source: Statista (2021)

## Core Economic Concepts

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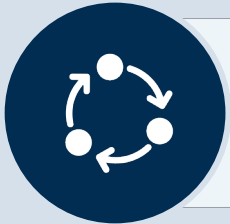
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- Big Data results from the datafication of most interactions
- Data conveys the accurate descriptions of reality
- Data analyses increase accuracy of economic variables

# Overcoming the Data Scarcity Dilemma



Are your IT resources focused on capturing or **acquiring** the **most important data** in support of the organization's strategic business initiatives and the key supporting use cases?



Are your data science resources focused on the development of the top priority, **reusable analytic assets**?



Does your technical and cultural environment **support/reward** the capture, refinement, and reuse of the data and analytic assets across multiple business units?



Does your organization have an agreed upon **governance methodology** to manage the scarcity dilemma by prioritizing and focusing your data and analytic resources against those best use case opportunities?

# Transforming the Economic Value Curve



**Lift** refers to the percent increase or decrease in a particular metric such as orders, purchases, engagements for users who received a special treatment vs. a control group.

amazon

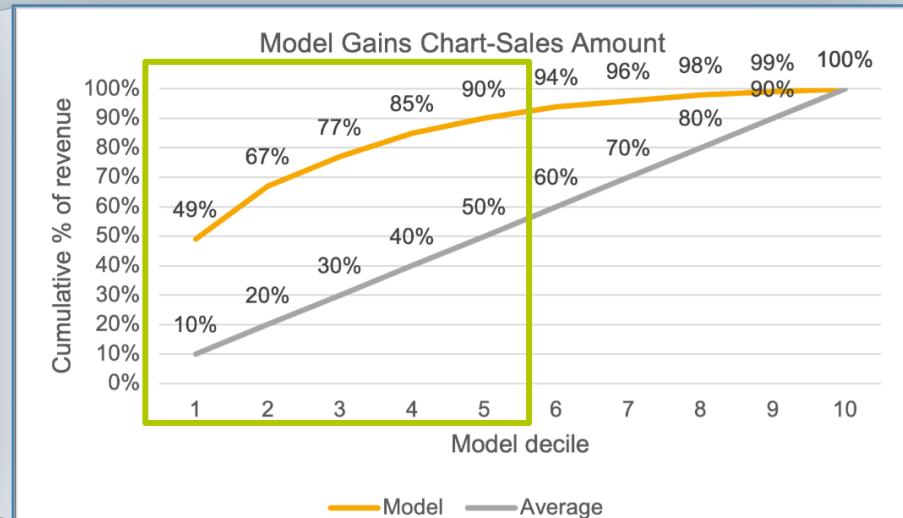
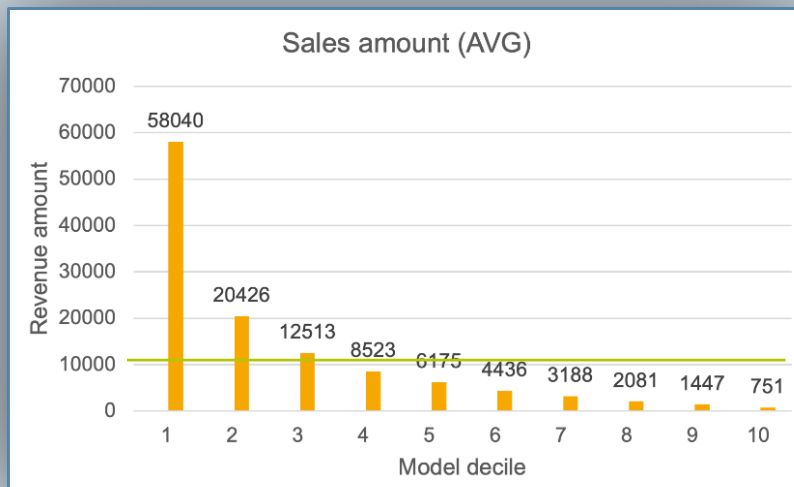


PAYBACK



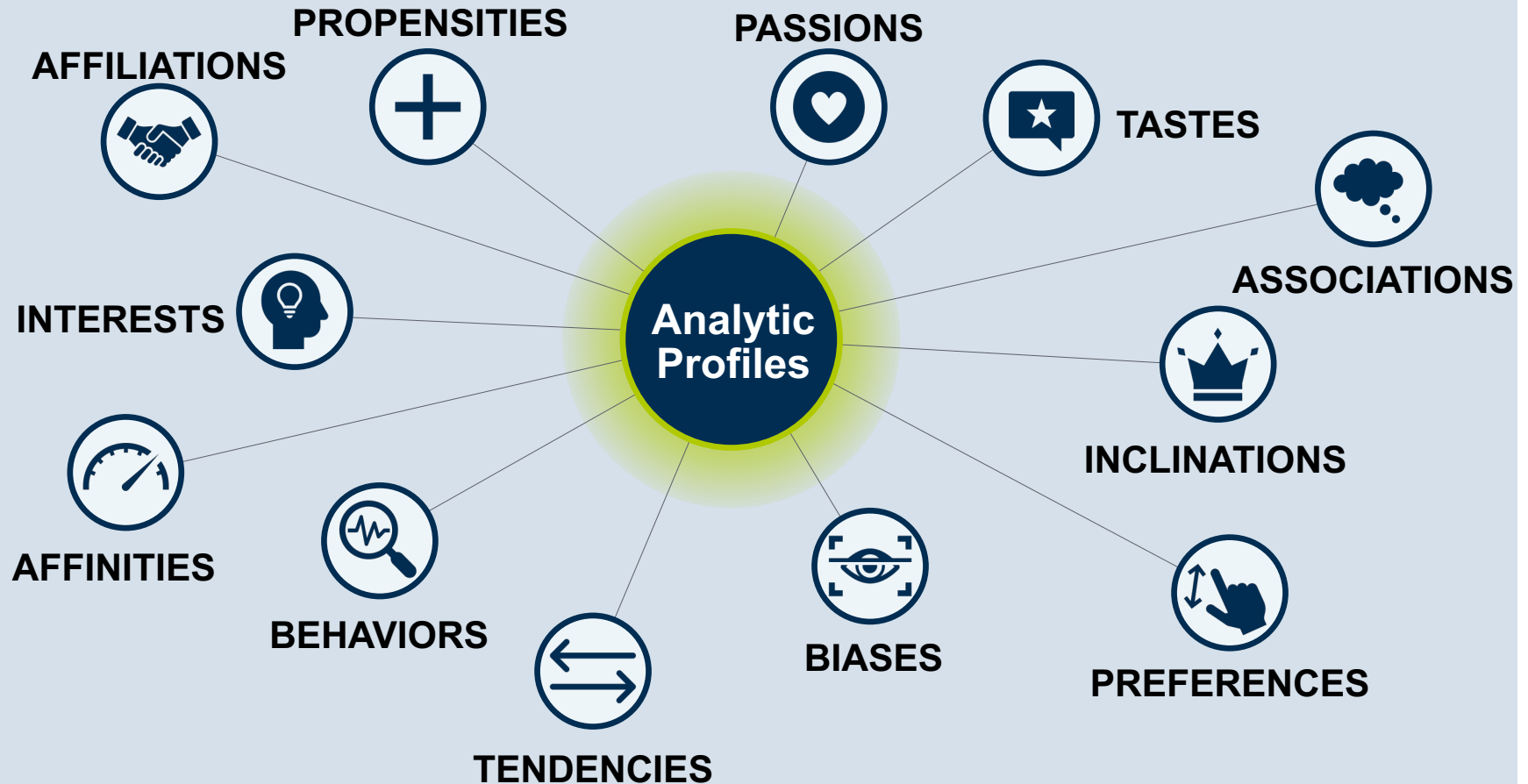
It is not the volume of data that monetizes, but it is the **granularity at the level of the individual** that monetizes.

# Predicting Lift to Change One's Economic Value Curve



By focusing marketing spend on the top 5 deciles of customers (propensity-to-buy analytic score), we can capture 90% of predicted customer spend with only half the budget.

# Analytic Profiles Capture Individual Entities' Analytic Insights





**Economic Efficiency** is measured by the relationship between the value of the ends and the value of the means.



Identifying  
operational  
deficiencies



Proposing  
recommendations  
(prescriptive  
analytics)



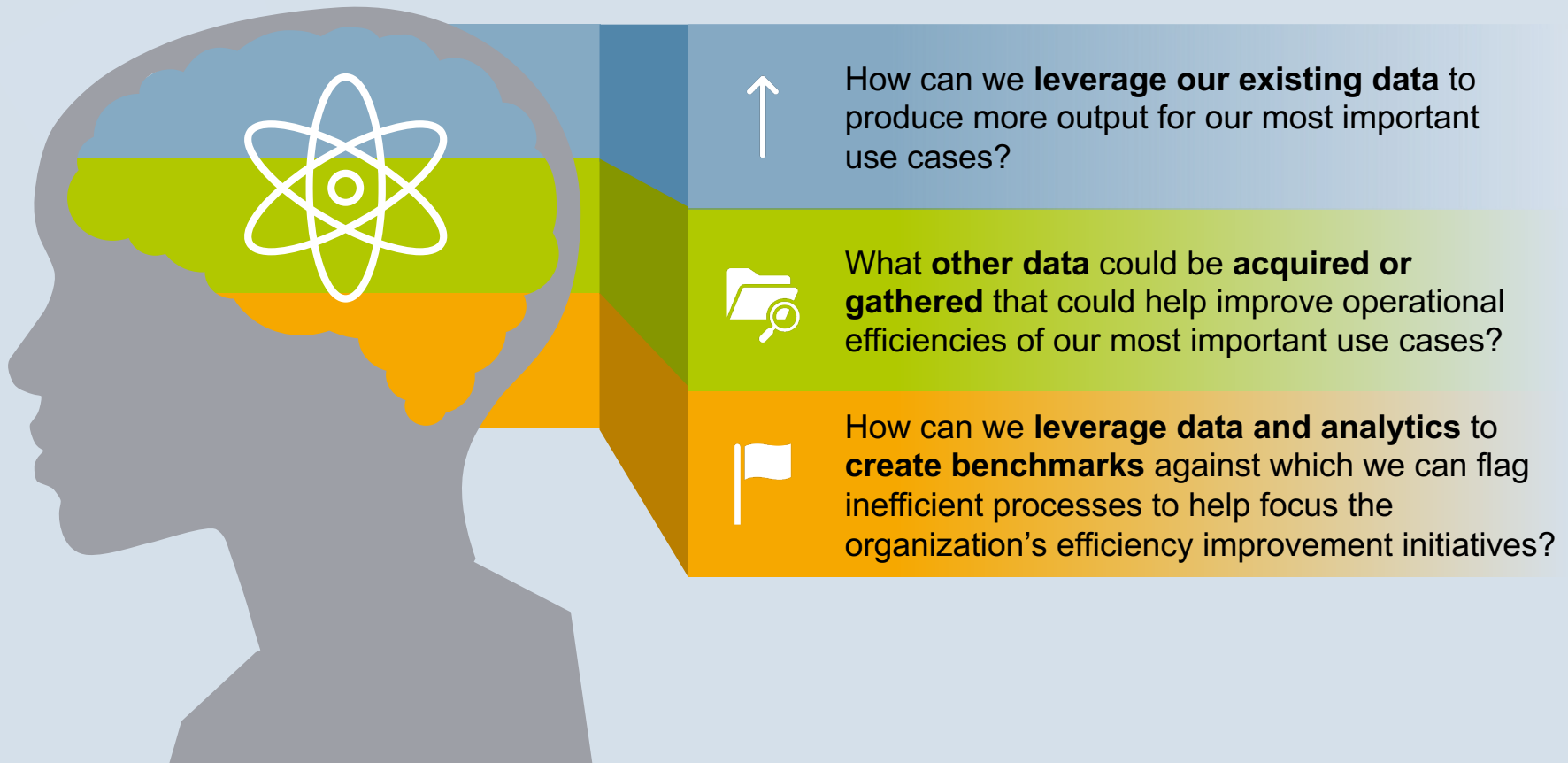
Aggregation of  
usage patterns  
across customer  
segments



New monetization  
opportunities



# Managing Efficiency Challenges





**Capital** are already-produced durable goods and assets, or any non-financial asset that is used in the production of goods or services.

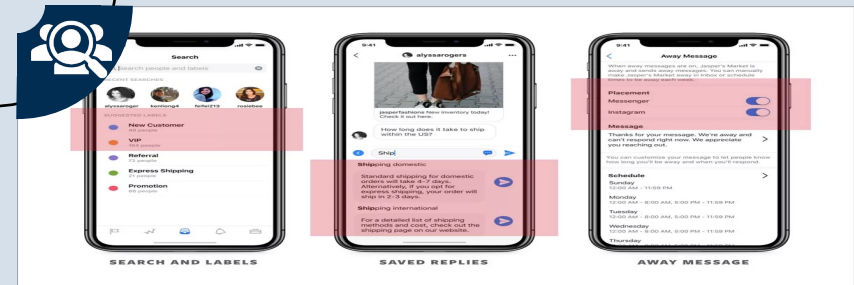
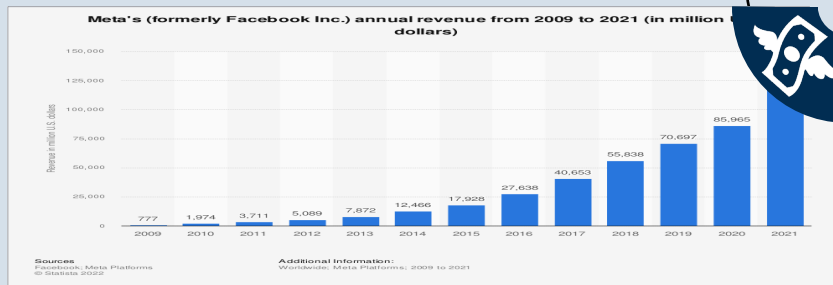
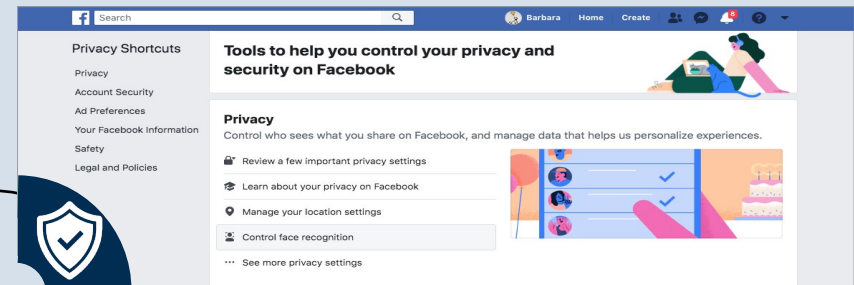
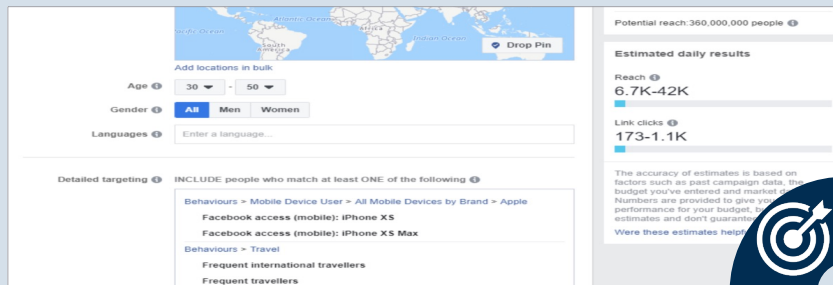
Driving the on-going **optimization**  
of key operational and business  
use cases

**Mitigating** security, compliance,  
regulatory, and governance **risks**;  
avoiding security breaches,  
litigation, fines, theft; building  
**customer trust**

Uncovering new **revenue**  
**opportunities**  
based upon superior customer, product,  
and operational insights about unmet  
customer and market needs

Delivering a more **compelling**  
**customer experience**  
that increases customer satisfaction,  
advocacy, effectiveness of selling and  
cross-selling new products and services

# Leveraging Data Capital The Rise of Facebook/Meta

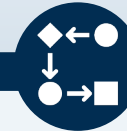




**Not all data is of equal value!** The ultimate determinant of the value of a supply of data depends upon the demand for that data driven by its applicability and predictive relevance.



*What is your **data supply inventory** and what is the **condition** of that data from quality, accessibility, completeness, granularity, and latency perspective?*



*Do you have a **process** for identifying, validating, valuing, and prioritizing the use cases or demand against which to apply the data or supply?*

# Supply: The Decision to Produce Data



## Active Collection

Data Collector collects and stores the data while incurring costs



### Fixed costs

e.g., installation



### Variable costs

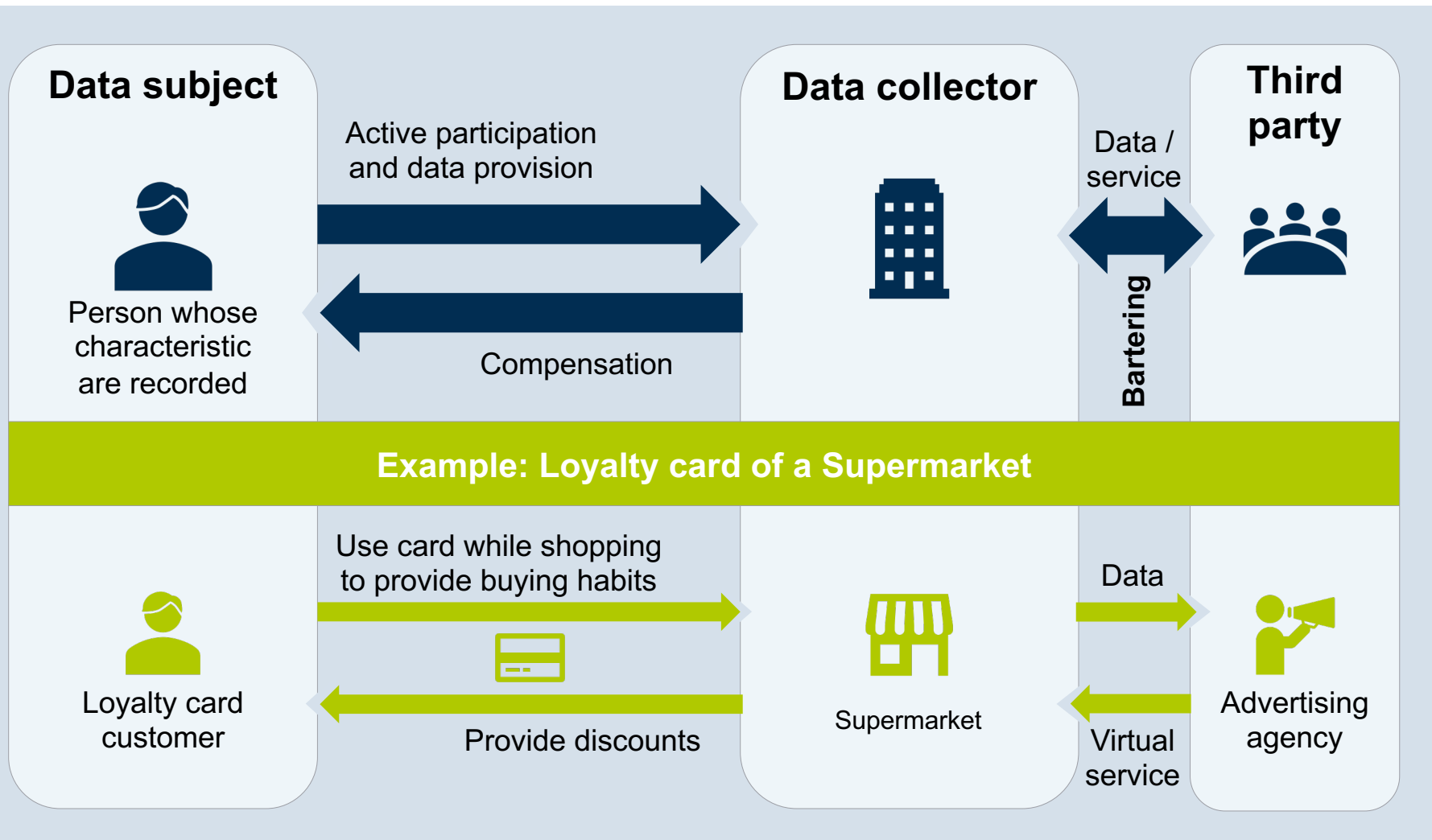
e.g., storage capacity



## Data as Byproduct

e.g., transactional data

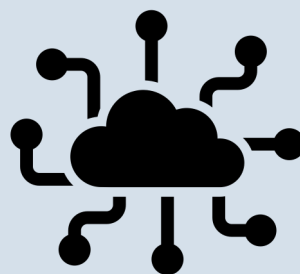
# Supply: Personal Data – Bartering



# Demand: Data has Two Primary Functions in Modern Economics

Data as an **input** into  
the **production of  
goods and services**

Fosters **innovation**  
and **efficiency**



**Functions of data in  
modern economics**



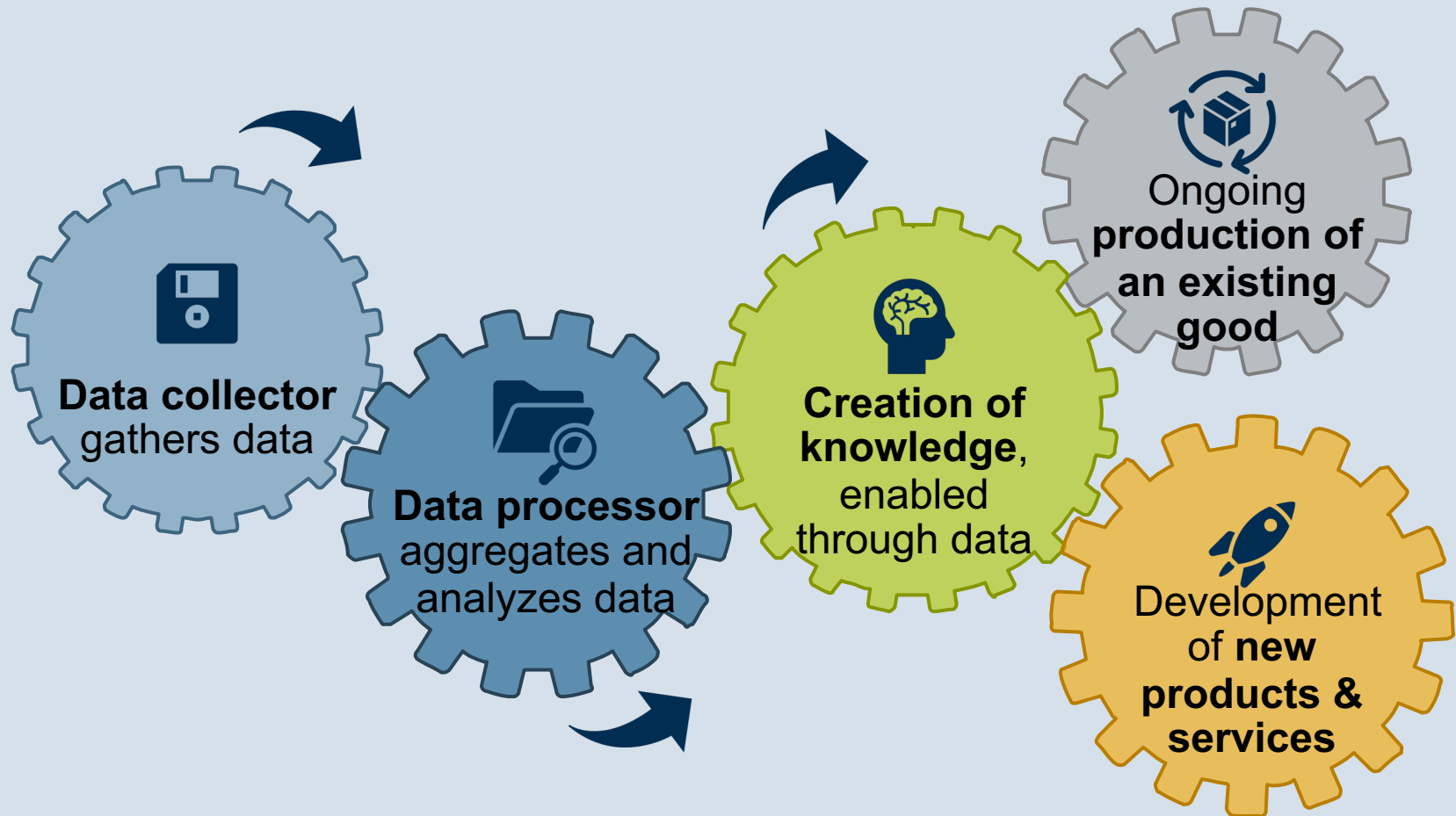
Data **creates and  
shifts information**  
across economic  
agents

Affects **strategic  
interactions** and  
**information frictions**

# Demand: Data Serves as a Factor of Production



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# Data-driven Product Management A/B-Testing at Amazon

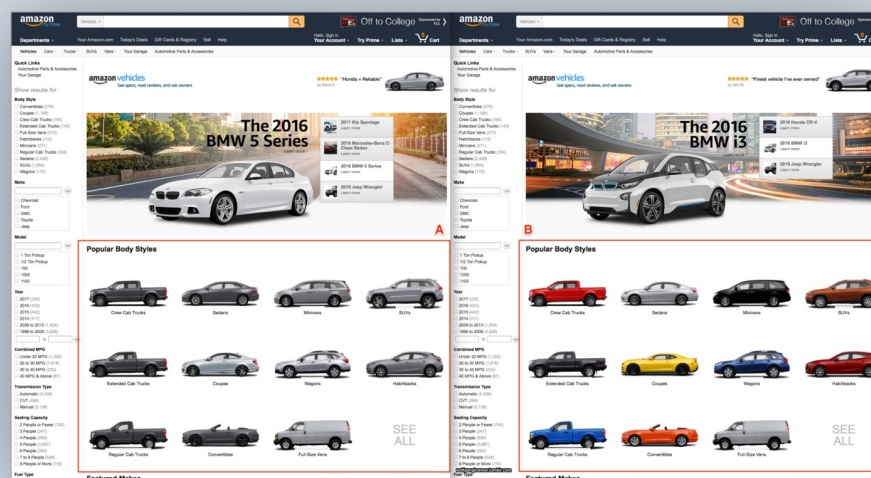


- Two different designs are sketched
- Designs are presented to real customers
- Customer behavior is observed

- Behavioral data gets aggregated and analyzed

- More engaging webpage-design is being identified

- AmazonVehicles adopts the more engaging webpage-design
- New design will be monitored, evaluated and improved using the same process



# Demand: Data Creates Information and Shifts it Across Agents (1/2)



**Data on characteristics of potential buyers**  
(e.g., interests, buying habits)

**Deliver more superior personalized goods / services**  
e.g., advertisements for desired products

**Seller**



**Buyer**



**Make more informed buying decisions**  
by assessing more accurately how they fit one's needs

**Data on characteristics of potential products**  
(e.g., product reliability via reviews, popularity via social media)



# Demand: Data Creates Information and Shifts it Across Agents (2/2)



## Opportunistic Behavior – Price Discrimination

**Data collector**  
with market power



Airline in a poorer country



Contractor / craftsman

Charging higher prices

**Customer**



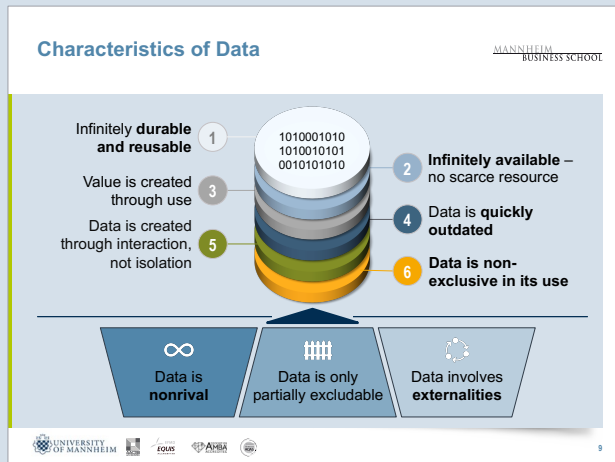
Citizen from a wealthier country



Owner of a very valuable home



More information can **increase economic efficiency**. Still, **acquiring exclusive information** that others don't have provides a **strategic advantage**, potentially making some groups worse off.



## Characteristics of data imply heterogeneity

- Data differ in a large number of attributes
- Difficult to determine a single price

**WITHIN narrow classes  
of data varieties:**



Definition of **meaningful  
markets and prices possible**



**OUTSIDE narrow classes  
of data varieties:**



Use degree of  
complementarity



Use degree of  
substitutability