TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

BACHELOR DEGREE IN
BUSINESS ADMINISTRATION AND ECONOMICS

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BAE
Business Administration and Economics

Managerial Decision Making
Controlling and enhancing decision quality

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Recap

- What is dynamic problem solving?
- What is data-driven decision making?
- What are the growth hacking steps?

Opening question

1. Have you ever made a decision that seemed right at the time but later turned out wrong?
2. Do you think the mistake was in the decision itself or in the process that led to it?

Controlling decision quality

The decision-making process, like any other process, should be evaluated to assess its quality. In this context, we refer to controlling the quality of a decision at the moment it is made—**regardless of whether the outcome is successful**. This is because outcomes can sometimes depend on external factors beyond our control, which may lead to a poor result despite having made the best possible decision, or conversely, a favorable outcome from a poor decision.

How do you judge if a decision making process is of a good quality?
Which questions would you pose to the decision makers?

Controlling decision quality

What can we do to correct these deficiencies? Bazerman and Moore (2012) examine five concrete and complementary strategies for making better decisions:

1) decision-analysis tools and, now, AI;
2) debias your judgment
3) take an outsider's view
4) nudge people toward wiser decisions

1) Decision analysis tools and AI

Decision analysis usually guides decision making using the logic of **expected value**. To compute an option's expected value, you multiply its value by its probability. So, for instance, to compute the dollar value of a lottery ticket, you would need to multiply the dollar value of its payout by the probability of receiving that payout.

Some examples: Linear Regression, Multiple Regression, Linear Programming (LP), Time Series Forecasting, Markov Decision Processes (MDP), Data Envelopment Analysis (DEA), Bayesian Linear Models, Principal Component Analysis (PCA), Discriminant Analysis, Logistic Regression.

But, the final decision is up to the human, so…

Remember, we have difficulty integrating information, and we are also inconsistent. Given the same data, we will not always make the same decision. Our judgment is affected by mood, subjective interpretations, environment, deadlines, random fluctuations, and many others nonstable characteristics.

AI for reducing… or enhancing biases?

A company is considering switching to a **4-day workweek** to boost employee productivity and job satisfaction. The management team is already leaning toward the idea because they have seen a few articles supporting it and heard success stories from other companies. However, they want to ensure they are making a well-informed decision rather than just confirming their existing beliefs.

Prompt 1: Can you provide evidence and arguments supporting the idea that a 4-day workweek increases productivity and job satisfaction?

Prompt 2: Can you provide evidence and arguments against the idea that a 4-day workweek increases productivity and job satisfaction?

Key insights from experiments

Improving Decision Accuracy with AI Assistance

•AI-assisted decision-making improves performance across various domains, from healthcare to military strategy.

•In a medical study, endoscopists using AI support were 3.48 times more likely to follow correct AI recommendations and outperformed both AI and human decision-makers acting alone.

•In military planning, AI-enabled tools significantly reduced decision-making time while maintaining operational effectiveness.

Reducing Cognitive Biases and Enhancing Rationality

•AI counteracts human heuristics and biases by offering data-driven recommendations.

•A study on human-AI collaboration in group decision-making found that AI reduced heuristic-driven errors by shifting decision-making from intuitive (System 1) to analytical (System 2) processing.

Transparency and Trust: The Role of Explainability

•Explainable AI (XAI) improves human decision accuracy by providing interpretability.

•In a mushroom identification experiment, users who received AI-generated explanations had significantly higher accuracy in distinguishing poisonous from edible mushrooms compared to those who only saw AI decisions.

•However, studies on government decision-making found that even experienced users struggle to detect AI errors, highlighting the limits of explainability in preventing automation bias.

Challenges of Over-Reliance and Algorithmic Trust Issues

•AI can lead to automation bias, where users overly trust its recommendations despite errors.

•In a study on medical AI, endoscopists followed incorrect AI recommendations 1.85 times more often than they would have on their own.

•In military contexts, concerns arose that AI could reduce agility in battlefield decision-making, making operations overly dependent on algorithmic predictions.

Human-AI Collaboration: Achieving the Best Outcomes

•AI performs best when complementing human expertise rather than replacing it.

•In hybrid medical decision-making, AI-assisted endoscopists consistently outperformed AI-only and human-only decision-makers.

•In government decision-making, AI-supported decisions were more consistent and rational, but required experienced oversight to prevent biased recommendations from going unnoticed

2) Acquire expertise

Many biases identified in decision-making research stem from inexperienced individuals making unfamiliar choices.

Experts may be less susceptible to biases due to real-world experience. **Experience** = Repeated feedback

Challenges to Learning from Experience:

- Delayed and unreliable feedback
- Inability to compare alternative decisions
- Overconfidence and misremembering past predictions

Key Distinction

- **Expertise** = Developing a strategic understanding of rational decision-making
- **Research Insights:** Decision biases persist even among experts in fields like investing, real estate, and medicine.

Without a structured framework, experience can reinforce biases rather than correct them.

Effective decision-making requires awareness, monitoring, and deliberate learning strategies.

So: Experience is valuable, but expertise is essential for improving judgment and avoiding bias.

Scenario

InnovaTech, a fast-growing tech startup, has officially decided to expand into the South American market, investing $50 million to establish operations in Brazil. The leadership team, led by the CEO, is confident in this decision, citing their previous expansion into Mexico as a resounding success.

The financial projections assume strong adoption of their product, minimal regulatory hurdles, and rapid profitability. In the internal meetings leading up to the decision, most executives were enthusiastic, and while one analyst raised concerns about economic volatility in Brazil, their objections were noted but did not alter the final decision.

The CEO has publicly stated, *"This move is the logical next step for our company. We've succeeded in new markets before, and there's no reason we won't succeed again."*

The decision has been made. However, if you were reviewing the process, would you question anything?

2) Debias your judgment

Kahneman et al.'s (2011) Checklist	
Question	***Associated bias***
Is there any reason to suspect the team making the recommendation of errors motivated by self-interest?	Self-interest
Has the team fallen in love with its proposal?	Affect heuristic
Were there dissenting opinions within the team? Were they explored adequately?	Group think
Could the diagnosis be overly influenced by an analogy to a memorable success?	Saliency
Are credible alternatives included along with the recommendation?	Confirmation
If you had to make this decision again in a year's time, what information would you want, and can you get more of it now?	Availability
Do you know where the numbers came from? Can there be… …unsubstantiated numbers? …extrapolation from history? …a motivation to use a certain anchor?	Anchoring
Is the team assuming that a person, organization, or approach that is successful in one area will be just as successful in another?	Halo
Are the recommenders overly attached to a history of past decisions?	Sunk cost
Is the base case overly optimistic?	Overconfidence
Is the worst case bad enough?	Disaster neglect
Is the recommending team overly cautious?	Loss aversion

3) Outside view

The **inside view** focuses on case-specific details, often leading to biases like overconfidence and anchoring.

The **outside view** relies on **reference classes**—historical cases that provide statistical insight into likely outcomes (Kahneman and Lovallo, 1993).

Benefits of the outside view:

- Reduces optimism bias and overestimation of success.
- Encourages **realistic forecasting** by using aggregated past data.
- Prevents reliance on a **single misleading analogy**.

Two methods for applying the outside view:

- **Reference Class Forecasting (RCF):** Uses historical data distributions to predict outcomes.
- **Case-Based Decision Theory (CBDT):** Weighs past cases based on similarity to the current case.

Empirical studies show that executives using the outside view, especially via RCF (Lovallo et al., 2023), make **more accurate investment forecasts**. Lovallo et al. (2012) found that Investors using the **inside view** (focusing only on their specific project) **overestimated returns** (average 29.35%). When prompted to take the **outside view** (comparing with past similar investments), **82% revised their estimates downward** (average adjustment: -6%). Shows that **using a broad reference class corrects over-optimism** in investment decisions.

4) Outside view – Example

A **movie studio** is trying to predict box office earnings for an upcoming **superhero film**. See Lovallo and Kahneman (2003).

🔷 **Step 1: Select a Reference Class**

- The studio identifies **past superhero movies** with similar budgets, actors, and release seasons.
- Example: Comparing to **recent Marvel/DC films** rather than all action movies.

🔷 **Step 2: Assess the Distribution of Outcomes**

- Analyzing data shows that superhero films earn an **average of $200M**, with past hits making **$1B+** and flops earning as little as **$50M**.
- Example: "Avengers" made **$1.5B**, while some lesser-known films earned **under $100M**.

🔷 **Step 3: Make an Intuitive Prediction**

- Based on hype, a strong cast, and marketing, the studio predicts **$600M** in box office earnings.
- This is their **initial gut-feeling estimate** before adjusting for bias.

🔷 **Step 4: Assess Reliability of the Prediction**

- Comparing to past superhero forecasts, industry experts note **moderate predictability** (correlation = 0.5).
- Meaning: **Superhero films tend to perform within a range, but surprises happen** (e.g., unexpected blockbusters or flops).

🔷 **Step 5: Correct the Intuitive Estimate**

- Since forecasts are **often overly optimistic**, the studio **adjusts its prediction downward**.
- Using the **correction formula**, the forecast moves **from $600M to $350M**—a more realistic estimate.

4) Nudging

Nudge (I)

How we make decisions is not solely based on personal preferences or rational analysis; it is also shaped by how information and alternatives are presented to us. **The structure of the environment** in which choices are made can significantly influence our decisions, often in ways we may not consciously recognize.

This brings us to the concept of choice architecture, which refers to the **design of environments** in which people make decisions. It shapes how options are presented, subtly guiding behavior without restricting freedom of choice (i.e., nudging).

Every setting where choices are presented – from grocery stores to online platforms – is shaped by someone, whether consciously or not. This "choice architect" influences behavior through subtle design elements without overtly restricting freedom. For example, consider how placing fruits at eye level in a cafeteria increases the likelihood of healthier eating choices.

The critical insight here is that no choice environment is neutral; the way options are organized inherently guides decisions. Thus, choice architecture is about shaping the context in which decisions are made to encourage better outcomes while preserving autonomy.


D'oh, the donuts are wayy over there.
Think I'll have fruit
My cunning choice architecture will soon have Homer eating healthy
JACK POT
$$$$
KEEP OUT
$$$
$
HEALTHY FRESH FRUIT

Nudge (II)

Building on the foundation of choice architecture, Richard Thaler and Cass Sunstein (2008) introduced the concept of nudge. They define it as ***any aspect of choice architecture that alters behavior predictably without forbidding options or significantly changing economic incentives***. Nudges are rooted in behavioral economics and the philosophy of "libertarian paternalism", which seeks to guide individuals toward beneficial behaviors while maintaining their freedom to choose otherwise.

Nudges work by leveraging cognitive biases. For instance, people are more likely to stick with default options due to inertia or status quo bias, where individuals prefer to maintain current conditions rather than make active changes. This tendency explains why automatic enrollment in retirement plans significantly increases participation rates; opting out requires more effort than simply accepting the default.

Another common bias exploited by nudges is the framing effect, where the way information is presented impacts decisions. For example, people respond differently to a message framed as a gain ("90% success rate") versus a loss ("10% failure rate"), even though both convey the same information. Similarly, anchoring bias leads individuals to rely heavily on the first piece of information encountered when making decisions, such as the initial price shown during a sale, which shapes perceptions of value.

Nudge (III)

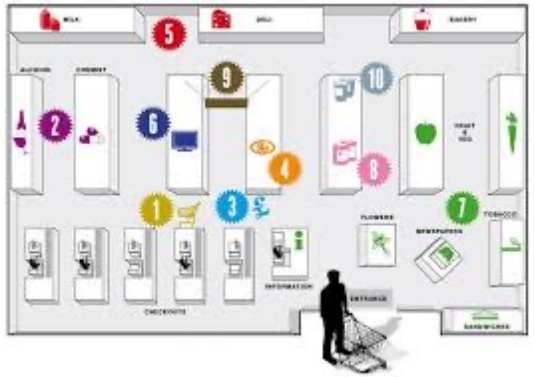
To better understand how nudges influence behavior, it is essential to explore the mechanisms through which they operate. These mechanisms are practical applications of the principles discussed earlier and demonstrate how small changes in choice architecture can lead to significant behavioral shifts:

- **Defaults:** People tend to accept pre-set options. For example, Johnson and Goldstein (2003) noted a 16.3% increase in organ donation when this choice organ donation is the default.
- **Framing:** The way information is presented influences decisions. Nelson et al. (1997) found that when welfare was framed as benefiting undeserving individuals, people's attitudes were more strongly shaped by their beliefs about the causes of poverty.
- **Salience:** Making certain information more noticeable can drive behavior. Highlighting energy consumption on utility bills encourages conservation by drawing attention to personal usage compared to peers (Schultz et al., 2007).
- **Social Norms:** People are influenced by the behavior of others. Informing individuals that their neighbors recycle more can increase recycling rates (Cialdini et al., 1990).
- **Feedback:** Providing real-time feedback helps individuals adjust behavior. For example, energy usage monitors promote efficiency by showing immediate consumption data (Allcott, 2011).

Nudge (IV)

Are you able to spot nudges around you?

- **Social Media Notifications:** Designed to capture attention and increase engagement.
- **Supermarket Layouts:** Essentials placed at the back to encourage impulse purchases along the way.



Try nudging

At *Bright Future University*, many students skip early morning lectures, even though attendance is linked to better grades. The administration wants to improve participation without forcing students to attend.

What can we do?

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