

## **What innovation teams can learn from behavioral economics**

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## **Design thinking and the human brain**

Designers may disagree about the precise definition of design thinking, but few would contest the idea that design thinking is a powerful enabler of innovation productivity. By employing methods and processes that derive from design thinking, innovation teams increase the rate at which good ideas are generated and the likelihood that they are successfully brought to market. Design thinking, most agree, enables businesses to make better decisions by prescribing improved processes and principles for solving problems.

Process improvement gets too much of the attention, however. Process outcomes are only as good as the thousands of everyday decisions made by people within the process. That's a problem because people are highly prone to cognitive biases and emotion-driven reasoning that contribute to poor decision-making. We are especially prone to decision-making traps when we believe there is the potential for significant gain or loss, and when uncertainty is high – precisely when design thinking purports to be most useful.

Research has shown, for example, that most people, especially those in leadership positions, are overly optimistic about certain issues. Over-optimism is what permits innovation to happen – if people rationally considered the failure rates for startups and new products, far fewer would venture down that cost/benefit path. But delusional optimism also causes us to hang on to bad ideas longer than we should, to misjudge how smoothly things will go, and to discount external factors that have significant impact.

Help in identifying and finding solutions to the cognitive traps that lead innovation teams astray may lie in two emerging fields known as Behavioral Economics and Neuroeconomics, both part of a larger area of inquiry called the decision sciences. While many people associate economics with commerce, economics can be broadly defined as the study of choices as they are affected by

incentives and resources. While traditional economics presumes that people behave in a logical and rational manner, behavioral economics borrows from the social sciences and asserts that people are prone to numerous decision-making errors, particularly when risk and reward are involved. Neuroeconomics expands behavioral economics by also looking at brain activity that correlates with choices.

A central tenet behind these fields is that our cognitive makeup, and the brain itself, have remained mostly unchanged for centuries. In many ways, our brains are better suited to hunting and avoiding predators than they are to evaluating complex decisions with billions of dollars at stake. This means that our own brains can mislead us. And because these biases are hardwired into our thinking process, we fail to recognize them—even as we fall right into their traps.

This paper will look at several cognitive phenomena that researchers have identified and show how they impact the front end of innovation, where small decision-making errors can cascade into much larger problems downstream. It will also suggest imperatives for innovation teams to help minimize these errors.

### **The allure of “disruptive innovation”**

First kisses, winning the lottery, and certain illegal drugs all have one thing in common; they cause the brain to release large amounts of the neurotransmitter Dopamine. Dopamine is released when an unexpected reward is presented. It makes your brain feel fantastically good and is extremely addictive – brain scans show Dopamine lights up the same areas of the brain as cocaine use. In nature, we learn to repeat behaviors that maximize rewards. Dopamine is therefore believed to provide a teaching signal to parts of the brain responsible for acquiring new behavior.

When we realize large gains that had an unanticipated or low probability of payoff, our brains are flooded with dopamine, much more so than when we realize outcomes that offer smaller gains and/or are not a big surprise. In other words, winning big feels vastly better than just winning. We are biologically drawn to finding the next Google more than we are to slow and steady growth.

The brain loves long shots. (Zweig)

Focusing on the big hits, however, can cause us to overlook the “boring” stuff that actually serves us quite well. Similarly, design teams and innovation champions can have a tendency to go for “disruptive” solutions, or BHAGs (Big Hairy Audacious Goals), in the sense that they want to do something novel and game-changing, rather than “ordinary.” But doing so can distract them from what really matters. Teams will usually end up with a better result if they make their directive to design something that meets user needs and that is grounded in user research, whether or not it seems innovative or disruptive.

Take the Segway, for example. Prior to its release in 2001, the buzz around its innovativeness knew no bounds. “As big a deal as the PC,” said Steve Jobs. To prepare for the anticipated demand, the firm erected a factory capable of churning out 40,000 Segways a month. As of September 2006, approximately 5 years after it hit the market, 23,500 Segways had been sold, far below expectations. Dean Kamen, inventor of the Segway, performed ergonomic research, but he hadn’t understood his customers well enough and was distracted by a focus on big innovation.

Contrast this with Starbucks, an idea that, on the surface, sounds neither innovative nor particularly big – a coffee shop where people enjoy hanging out. But what Howard Shultz understood was that people need a “third place” – a term coined by sociologist Ray Oldenburg to describe places other than home or work for relaxation. Shultz had seen the café experience work in Italy and knew enough about American coffee drinkers to believe that they would pay a

premium for a third place. His creation was grounded in understanding people, and his goal was to create a compelling experience, not to innovate.

New innovation teams are especially susceptible to the pitfalls of “disruptive innovation.” When an innovation group is first formed, it can be tempted to try and create the kind of disruptive innovations that will transform the company. That’s the last thing that they should do, however. Rather, they need to demonstrate that the group’s creation was a good idea in the first place. Teams that don’t demonstrate immediate actions are often disbanded.

The takeaway for innovation teams is simple: aim to connect with people, not to innovate or disrupt. Even just articulating that as a team’s mandate can cause reframes that lead to better decision-making. In one study of students taking a new product development class at the University of California Berkeley, project teams that articulated “innovation” or “novelty” as their end goal ended up developing products that were judged to be not as innovative as those developed by teams which focused down and articulated a desire to create compelling solutions for a particular group’s needs (Hey). Innovation, it seems, is hurt by a focus on being innovative.

### **Why planning fails us**

In January 2007, Microsoft released its newest version of the Windows operating system, Windows Vista. Originally hailed by Microsoft as a “platform for innovation,” the release came some two and a half years after the originally announced release date. For all the hype built up around Vista, the software has received numerous poor reviews, falling short of both users’ expectations and Microsoft’s sales expectations. But this kind of thing is nothing new for Microsoft. Project slippage has become so commonplace that IT departments around the world account for it when planning system updates. Moreover, software bugs are so anticipated in new

releases that the sentiment among IT professionals is that Microsoft product release dates are good markers for when *not* to purchase their software.

Why does Microsoft, which has decades of experience with software development and a war chest of resources, regularly fall behind schedule and fall short of users' expectations? Indeed, Microsoft is not alone. Debacles like this are all too common in business and innovation. In planning major initiatives, innovation and business leaders routinely exaggerate benefits and discount costs, setting themselves up for failure. Most capital-intensive initiatives come in late and over budget, never living up to expectations. Depending on the product category, for example, 40-90% percent of new product launches fail, and those odds haven't changed much over the past 30 years.

In "Delusions of Success: How Optimism Undermines Executives' Decisions," Lovallo and Kahneman attribute the high number of over-budget, over-time, low-ROI business failures to what psychologists call the Planning Fallacy. Managers, they say, often make decisions based on delusional optimism, rather than a rational weighting of gains, losses, and probabilities. As a result, they pursue projects that are doomed to failure.

It's human nature to be highly optimistic. In a survey of car owners, for example, the vast majority considered themselves to be above average drivers. People regularly exaggerate their own talents. They assign much higher probability to the truth of their opinions than is warranted, while simultaneously misattributing the true causes of events. In a survey of one million college students, a full 70% of students believed themselves to be above average in leadership ability when compared to their peers.

Innovation leaders may be especially susceptible to these biases. Innovation requires the belief that one can overcome a great many obstacles and beat the overwhelming odds to bring a new product, service, or business successfully to market. If innovators rationally weighed the risks, many might not even try. In the consumer packaged goods industry, for example, 30,000 new products hit the shelves every year, but 70 to 90 percent of them don't stick around for more than 12 months.

These biases show up not just in innovation teams, they appear across organizations. In one study of annual reports by public companies, researchers found that executives tend to attribute favorable outcomes to factors under their control – such as corporate strategy or innovation initiatives; while unfavorable outcomes are much more likely to be attributed to uncontrollable external factors, such as inflation or weather. Their self-confidence leads them to believe that they'll be able to avoid or easily surmount potential problems in executing a project. And their misattribution bias leads them to take credit for lucky breaks.

That American auto companies were caught completely off guard by the SUV backlash may be partially explained by these phenomena. In the early '90s, SUVs sales exploded in the United States for lots of reasons. But Detroit is full of engineers, and engineers like to establish simple causality. Auto engineers and business executives alike attributed success of SUVs to their design merits. Convinced that customers were simply drawn to the large cabins, higher ride height, bigger engines, and perceived safety, they underestimated the effects that historically low gas prices had. Peace in the Middle East, a strong dollar, friendly South American relations, and several other factors drove the price of gasoline so low that car buyers were indifferent to abysmal gas mileage. American auto companies, eager to take credit, focused even more of their resources on SUV design and production. When the price of gas skyrocketed, they were caught flat-footed.

When managers overestimate their abilities, when they misattribute the causes of certain events, and when they exaggerate their sense of control, planning, forecasting, and expectations become distorted. Indeed, the very existence of a plan often induces overconfidence. People forget that a plan is just one of many possible scenarios. Any complex undertaking is subject to a myriad of possible problems – from technology shifts to changes in organizational politics to rising oil prices – and while the probability of any one of these events could be low, the aggregate probability of something going awry can be high.

When planning, people tend to generate their predictions by thinking about the particular, unique features of the task at hand, and constructing a scenario for how they intend to complete the task. When people want to create a forecast or plan, they usually think about everything that goes into it – the where, when, and how. They figure out the time and resources required and visualize the steps from beginning to successful conclusion. All this is the "inside view," and it doesn't take into account unexpected delays and unforeseen catastrophes. Asking people to visualize the "worst case" still isn't enough to counteract their optimism - they don't visualize enough problems.

Khaneman and Lovallo recommend taking an "outside view." The outside view, also known as reference-class forecasting, completely ignores the details of the project at hand. It requires no estimating of the pieces that impact the project's course, but instead prescribes looking at the time and resources required to finish analogous projects in the past. This is counterintuitive, since the inside view contains so much more detail about how the project will happen. It's tempting to think that a carefully tailored prediction, taking into account all available data, will give better results, but experiments have shown otherwise; the more detailed subjects' visualization, the more optimistic and less accurate they become (Yudkowsky). Instead, examine the experience of a class of similar projects, lay out a distribution of outcomes for the reference class, and then

position your project within that distribution. The resulting forecast will likely be much more accurate.

### **The power and pitfalls of analogies**

Faced with an unfamiliar problem or opportunity, designers and innovators often leverage analogs to develop strategies and solutions. They recall a similar situation, draw lessons from it, and apply those lessons to the current situation.

SouthWest Airlines did this when it benchmarked an Indianapolis 500 pit crew to improve plane turn-around time. In 1997, Intel made a renewed push into the low end microprocessor business after comparing themselves to the 1970s steel industry. Steve Jobs kicked off Apple's brand strategy and renewed focus on design when he announced in 1998 that Apple would become the Sony of PCs.

For business managers, strategy by analogy is common. Case studies play a central role in an MBA education. Designers and innovation teams also rely heavily on analogies to determine innovation strategy, as well as to create new products, services, and businesses. Analogical reasoning is a powerful tool because it allows us to distill highly complex scenarios into easily understood references. With analogies, innovators need not understand every aspect a problem. "Rather, they pay attention to select features of it and use them to apply the patterns of the past to the problems of the present." (Gavetti and Rivkin)

The very thing, however, that enables us to leverage the power of analogies – pattern recognition – also makes us susceptible to poor reasoning. In the 1980s, a researcher named Thomas Gilovich asked 14 sportswriters and 18 college football coaches to rate descriptions of hypothetical football players. They were asked to rate them as being more or less likely to be excellent players.

The raters were far more likely to rate the hypothetical players as excellent when the description contained superficial similarities to real, highly successful professional players. For example, when a hypothetical player was described as attending the same school as a successful real player, the rater was much more likely to predict that the player would be successful, even though the school one attends is a poor indicator at best of football playing ability. Raters would say “he’s like…” or “he reminds me of…” to describe these fictional players without any knowledge of their skills.

Humans are quick to make comparisons, assume there are more parallels than there actually are, and then draw conclusions based on superficial, or even irrelevant, information. This stems from our well-documented facility to find patterns and meaning – it’s how the brain synthesizes information from the past and uses it to understand the present and anticipate the future.

Evolutionarily, early humans were better off if they quickly came to associate rustling grass with saber tooth tigers and yellow berries with nausea. This instinct is extremely useful in life-or-death situations where small distinctions (like the shade of yellow) are irrelevant. But this innate rush to hastily associate can cause us to overlook small distinctions that do matter (Bonabeau). Dangers arise when we draw an analogy on the basis of superficial similarity, instead of deep causal factors. Often people aren’t even aware they’re reasoning by analogy, making them more susceptible to its pitfalls. The results can be disastrous.

The dotcom boom provides many examples of analogous reasoning used poorly. When Amazon.com emerged in the mid 90s, nearly everyone else wanted to be the Amazon of something – furniture, homes, mortgages, pet supplies. Never mind this is all stuff that doesn’t easily go into a small box for overnight delivery, or that Amazon had developed a sophisticated warehousing and logistics system that was difficult to copy, or that shopping for books is fundamentally different than shopping for these other things.

In 1998, Pets.com emerged as “the Amazon.com of pet supplies.” Two years later, after burning through \$200M, its doors closed. A closer inspection of the analogy might have revealed numerous shortcomings. Why should one shop for pet supplies (namely cat, dog or bird food) in a venue other than where one usually purchases groceries, particularly since shipping charges made ordering from Pets.com just as expensive? While customers appreciated the wide selection of books at Amazon.com, people usually pick one pet food and stick with it – a vast selection of cat food didn’t provide any incentive to visit Pets.com. Cost structures were also fundamentally different. The average checkout price for pet supplies was lower than for books, customers didn’t return as frequently for new purchases, and books were cheaper to ship.

Two cognitive phenomena compound our tendency to overweight superficial similarities.

Anchoring describes the human tendency to rely too heavily on one piece of information when making decisions. During decision-making, individuals often anchor to specific information or a specific value and then adjust that value to account for other elements of the circumstance. Once the anchor is set, there’s often a subconscious and lasting bias towards it that can be hard to eliminate. Dan Ariely, a professor at MIT’s Sloan School of Management, illustrates with a simple experiment. He asked his MBA students to write the last 2 digits of their social security number on a piece of paper. He then asked them to submit mock bids on a bottle of wine. At the end of the exercise, students laughed at the suggestion that their social security number would influence their bid amounts, but the correlation was high. The half of the audience with higher two-digit numbers submitted bids that were between 60 and 120 percent higher than the other half. The simple act of thinking about the first number strongly influenced the second, even though there was no logical connection between them.

The tendency to rely on superficial similarities is also compounded by our tendency to seek confirmatory information and dismiss contradictory data. There are several possible explanations for the Confirmation bias. Embarrassment over having to withdraw a publicly declared belief or stubbornness can both cause it. One explanation may lie in the workings of our brain. Human brains and senses have evolved to rapidly evaluate social situations and others' states of mind. Getting along with other tribe members and identifying threats quickly, after all, was a crucial element to early human survival. Although it can be a very fast process, the initial impression has a lasting effect as the brain fills in the gaps of what it perceives, while being reluctant to admit to any mistake.

Anchoring and confirmation bias present difficult problems for innovators who use analogies, consciously or not. Having adopted an analogy, perhaps a superficial one, innovators will tend to seek out confirming evidence, while dismissing contradictory data. Meanwhile the analogy becomes an anchor that determines and distorts how we process all subsequent data. (Gavetti and Rivkin)

Gavetti and Rivkin suggest avoiding superficial analogies using these four steps:

- 1) Recognize the analogy and identify its purpose. Is an analogy being used? How?
- 2) Understand the source. Why did the strategy work before? Lay out a chain of cause and effect that explains why the original strategy or solution worked.
- 3) Assess similarity. Is the similarity more than superficial? Does the causal logic identified for the source hold up for the target?
- 4) Translate, decide, and adapt. How does the strategy need to adapt to the new setting? What makes you believe it will work?

## **Improving decision-making**

In any given organization, tens of thousands of decisions are made each day, both big and small. At every stage of the decision-making process, biases and cognitive errors can negatively impact the choices we make. Complex and high stake decisions, the kind innovation teams often face, are the most prone to distortion because they tend to involve the most assumptions, the most risk or reward, and the most uncertainty.

The decision-making traps presented here are not specific to innovation teams, but the consequences for innovation teams can be especially severe, particularly because these traps all pertain to the front end of innovation, where poor decisions can quickly cascade into large problems. Falling into these traps usually hampers an innovation team's ability to achieve what they're ultimately on the hook for: revenue and profit growth. When innovation teams don't deliver growth over the short and long term, they may find they have less credibility in the organization, fewer resources and flexibility, and frustrated team members – leading to further biases and emotional reasoning.

In addition to the strategies outlined above, perhaps the best protection against decision-making traps is simply awareness; awareness of our tendency to shoot for homeruns, to be overly optimistic, to over-weight superficial similarities, to be influenced by various anchors, and to seek confirmatory evidence. Over time, we can learn to recognize these thinking errors and protect ourselves against them by building tests and disciplines into our decision-making processes. When leaders acknowledge, for example, that people are prone to these mistakes, it encourages and legitimizes checks and balances that can catch biases before they become bigger problems. Innovation teams might consider assigning one or more people to take opposing viewpoints on key decisions. These people would make the case for alternative interpretations and courses of action. When this kind of complimentary tension is welcomed, it forces reflection and ultimately leads to better decisions.

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