Smart Heuristics for Smart Management

How leaders can make effective decisions in a VUCA world.

by Jochen Reb, Shenghua Luan, and Gerd Gigerenzer

On January 2, 2024, Japan Airlines flight JL516 arrived at Tokyo's Haneda Airport with 379 people on board. Shortly after the plane touched the tarmac, it collided with a Japanese Coast Guard plane that was to deliver emergency supplies to Ishikawa Prefecture's Noto Peninsula, which had been hit by a magnitude 7.6 earthquake the day before. The Coast Guard plane had entered the runway, leading to the tragic accident in which five of its six crew died.[1] Amazingly, all 379 people on board the burning JL516 exited the plane to safety within 18 minutes of landing, in what British newspaper *The Guardian* called the "Miracle at Haneda".[2]

Video footage showed the explosion when the two planes collided, and how JL516, which was engulfed in flames, continued moving forward before slowly coming to a stop. Seeing these images, it is hard to believe that all the people on board, both passengers and crew–with the pilot leaving last–escaped this seeming 'death trap' with only a few passengers sustaining injuries. Experts noted that improvements in, and the increased use of, fire-resistant materials played a big part in each and every one of the passengers surviving the crash. Yet, a lot of commentators also emphasised the role of human decision-making. Indeed, both crew and passengers have been praised for their actions.

It seems that the crew combined excellent execution of learnt rules for emergencies with quick, adaptive decision-making in the unexpected and unfolding crisis. Both are examples of *smart heuristics*, that is, simple rules that match the requirements of a situation. Learnt heuristics are simple rules that the crew of Japan Airlines–an airline with a stellar safety record over the past decades–had practised repeatedly. These heuristics tend to consist of simple if-then rules such as: *If an emergency situation arises, ask passengers to remain calmly seated and await further*

instructions. This heuristic helps prevent panic and clogging of the aisles. Adaptive decision-making was exemplified in the use of only three of the eight emergency exits because the others were ablaze. Here, the simple rule was to only open exits that are safe, even if that meant there would be fewer doors available for evacuation. The underlying principle is quality over quantity: a safe exit, even if slower, is better than an unsafe exit. Passengers also followed several smart heuristics, the most important perhaps being that they left behind their hand luggage to facilitate a speedier exit.

Smart heuristics–whether learnt, practised, and consciously executed, or more intuitively applied on the spot–are key to successful decision-making under pressure and in crises. Yet, their applicability is much broader, as we argue in our new book, *Smart Management* (forthcoming from MIT Press). In this article, we want to share some of our key ideas.

SMART HEURISTICS FOR A VUCA WORLD

The term 'heuristic' is of Greek origin and can be translated as "serving to find out or discover". In science and art, heuristics are indispensable tools for discovery. New ideas and theories typically do not come out of analysis but from intuition and heuristics. As the famous mathematician George Pólya argued, mathematics, the most abstract of the sciences, requires both analytical and heuristic strategies: heuristics are used to arrive at theses and potential proofs, while analysis helps to prove or verify a thesis.[3] Neither one is superior to the other. At their best, they work together beautifully and effectively complement each other.

Unfortunately, many leaders are not aware of the value of heuristics. This is in no small part due to education systems favouring analytical approaches. Business school courses on management, leadership, and finance, for example, teach expected utility maximisation as *the* way to make rational decisions. However, they fail to point out sufficiently that this supposed 'gold standard' is only possible in what one of the fathers of decision theory, Leonard Savage, called "a small world". To maximise expected utility, a manager would have to be able to foresee *all* possible consequences of *all* options and evaluate these accurately on the single scale of utility (whatever that means). According to this narrative, "more is better": more options, more information, and more analysis enable better decisions. Heuristics, in contrast, have been falsely associated with pernicious biases that supposedly lead to worse decisions than expected utility maximisation. But given it is not conceivable to evaluate or even know all possible options, their consequences, and the respective probabilities of them occurring, utility optimisation and maximisation are simply impossible.

The reality is that any decision-making strategy can lead to bad decisions if it is not appropriate for the task at hand. This is the principle of *ecological rationality*, which is derived from Herbert Simon's theory of bounded rationality. Its essence is that rationality is not a property of the decision-making process itself. Instead, rationality is the result of a match between the organisation's decision-making strategy and the task environment. When a heuristic matches its task, it becomes a *smart heuristic*. In the case of JL516, the heuristic *quality over quantity* does exactly that by matching the task of a quick evacuation to a situation that is VUCA–volatile, uncertain, complex, and ambiguous. Effective leaders have a portfolio of decision-making strategies that they can draw on, making it an *adaptive toolbox of heuristics*. They developed this toolbox through years of experience and learning. From this box, they take out the appropriate heuristic tool for the task at hand. In contrast, utility maximisation is like the proverbial hammer to which every problem looks like a nail.

Consider SoftBank founder Masayoshi Son and what we call the *time machine heuristic*. Under the 'Strategy' section of SoftBank's 2000 Annual Report is a description of the "time machine management" strategy, which "fosters[s] the global incubation of superior business models found through its venture capital operations in the United States."[4] Technology-based business models such as e-commerce, social media, and ride-sharing services often spread across the globe in stages. They are typically invented and first go to market in the US. If they prove successful there, they are introduced to other developed economies such as the European Union (EU), Japan, and Korea. Subsequently, they are further rolled out to markets like China, India, Indonesia, and others.

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This heuristic relies on imitation, a key human strategy for learning, survival, and effectiveness. Son used it as a tool to make strategic business decisions, with Yahoo! Japan imitating the model of Yahoo! in the US–to great success–of a web portal that directs traffic, and provides information and services in areas such as news, finance, and shopping. SoftBank's hugely successful stake in Chinese e-commerce giant Alibaba–modelled after Amazon–is another example of the effectiveness of what could be described as a time(-space) machine strategy.

THE MANY BENEFITS OF SMART HEURISTICS

A key environmental characteristic favouring heuristics is uncertainty. In a VUCA world, instead of devising five-year plans that aim to utilise resources optimally in an uncertain future, smart heuristics provide crucial strategic flexibility and speed. In this way, heuristics make companies more robust against the unpredictability of a fast-changing environment.

In general, we argue that smart heuristics have several important benefits. The first is speed, as they allow for quick decision-making. Smart heuristics are also frugal, requiring limited amounts of information and processing. Moreover, despite being fast and frugal, they can be as, or more, accurate than slower and more complex strategies. And finally, they are transparent. Smart heuristics can be effectively communicated, taught, and learnt, and their transparency can also address fairness and discrimination concerns.

Smart heuristics are fast

Consider speed. Experts often rely on a strategy called *fluency heuristic*, which boils down to choosing the first option that comes to mind.[5] By doing so, instead of exhaustively considering all possible options, decision-makers can act quickly and avoid analysis-paralysis. Importantly, for this heuristic to be smart, expertise is required. For example, when expert handball players were shown game situations on video and asked which play they would make next, the first option that came to their minds tended to be considerably better than the second, third, or subsequent options which often deteriorated progressively in quality. Thus, a deliberative search produced inferior options instead.

This illustrates an important principle for smart heuristics: Less can be more. Less data, less search, and less processing can lead to better decisions being made amid uncertainty. You may think that perhaps this heuristic is only helpful in situations of time pressure such as the aeroplane emergency described at the start of this article, or for firefighters. That is not so, but instead it is more useful generally for experts. For example, expert golfers made more accurate putts when they had only up to three seconds rather than an unlimited period of time. It is also not limited to sports. One study found that senior executives deciding on which projects to invest in made equally good decisions using heuristics as when using slower analytical methods.[6] And firms making faster strategic decisions often are more profitable and grow more quickly.[7]

Unfortunately, many companies have a defensive decision-making culture, where making decisions slowly is used to signal carefulness and quality. However, just because a decision is made slowly does not mean it is good. In fact, fluency heuristic research shows that when managers replace their intuitive decisions with the results of subsequent analyses, the consequences may be worse. Even when managers eventually go with their first option, much time and effort would have been wasted producing analyses, presentations, and reports only to justify a decision that had been reached on the basis of intuition. A negative-error culture makes matters worse, instilling a fear of making decisions that cannot be justified by large amounts of data and detailed analyses.

Smart heuristics are frugal

Less can be more, especially in an uncertain environment. The frugality of heuristics exemplifies this principle. Consider the task of predicting the rate of flu-related visits to the doctor for the coming week. To develop a big data algorithm called Google Flu Trends (GFT), Google engineers analysed about 50 million search terms and tested hundreds of millions of prediction models, constantly refining the model.[8] However, when the swine flu arrived out of season in March 2009 and peaked in October of the same year, GFT failed to forecast the outbreak accurately.[9] It consistently underestimated the spread of the flu, having "learnt" from the data collected in the years before that infection numbers tended to be high in winter and low in summer, so it was slow to adjust to the unexpected swine flu outbreak.

Instead, the *recency heuristic*, a very frugal heuristic that uses only a single data point, fared better at predicting the rate of doctor visits for the coming week. It uses the following strategy: *Predict that next week's rate of flu-related doctor visits will be the same as the most recent rate*. Because it relies solely on the most recent data point, the recency heuristic quickly adapts to unexpected events. The recency heuristic predicted flu outbreaks more accurately and consistently for

the eight years that GFT was tested, and it also outperformed all revisions of the big data algorithm.[10] A key reason for this is that frugal heuristics tend to be more robust in the sense that they are less likely to overfit their model to noise in the data.

Similar results have been observed in a business context. One good example is the *hiatus heuristic*, which can be described thus: *If a customer has not made a purchase within x months, the customer should be classified as inactive*. Studies on 24 companies showed that this heuristic predicted future purchases better than much more complex algorithms, including machine-learning techniques, such as random forest.[11]

Smart heuristics are transparent

Societies and organisations are increasingly becoming aware of the downsides and sometimes outright dangers of black-box algorithms that spit out predictions and decisions without anyone–not even the algorithms' creators–knowing how they arrived at their outputs. These decision-making strategies are not transparent. There are good reasons to value transparency in decision-making rules. Transparent rules are more easily communicated, memorised, taught, learnt, and understood with less chance for misunderstanding.

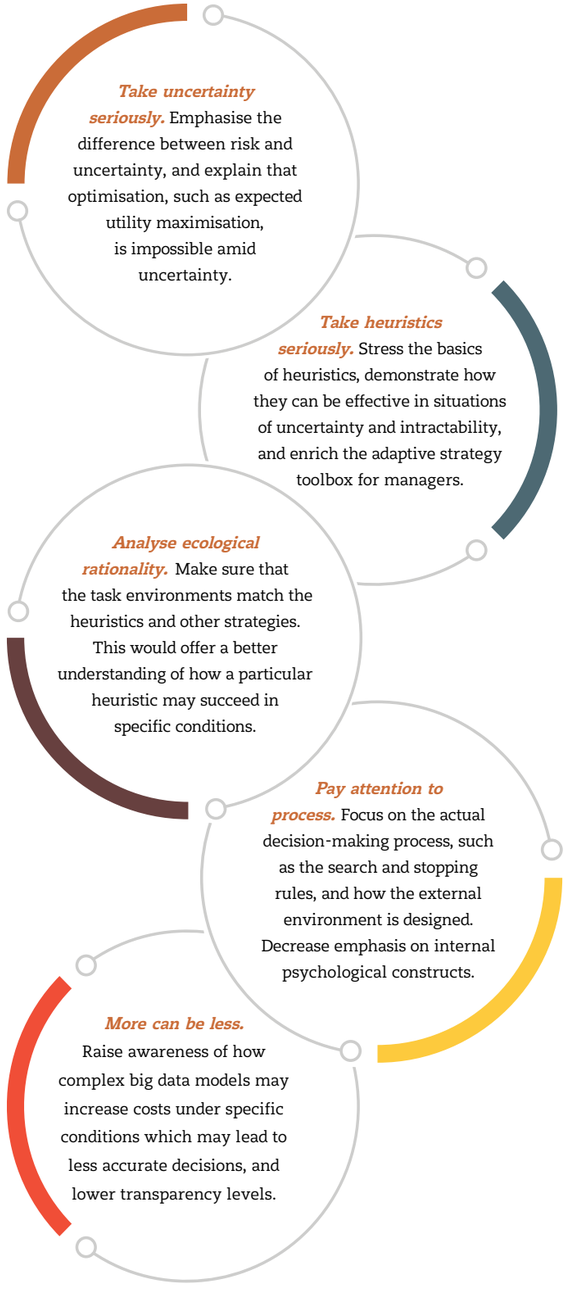
The hiatus heuristic is transparent–a manager can easily understand, communicate, and apply it. In contrast, a complex machine learning technique is not understood by the managers using it. Proponents of big data Artificial Intelligence (AI) algorithms sometimes claim that a lack of transparency is a minor 'evil' that organisations and societies have to accept for the superior accuracy of these black-box algorithms. But as we have seen from the results of pitting the recency heuristic against GFT, accuracy does not have to come at the cost of transparency. It is also easier to identify where a decision-making strategy has gone wrong or if it discriminates against, for example, minority groups, something of increasing concern for AI algorithms, when there is transparency.[12]

TAKING HEURISTICS SERIOUSLY

Unfortunately, few schools currently teach the science and art of heuristic decision-making. Instead, heuristics have been linked to systematic decision-making errors. What is needed is a paradigm shift in how schools and organisations approach heuristics. This shift should produce an approach that does not discourage managers from using heuristics (something they do anyway!), but rather one that guides them in developing their adaptive toolbox of decision strategies and the ability to select the appropriate heuristic for the task at hand.

The general approach we recommend to organisations, leaders, and business schools is: *Don't avoid heuristics–learn how to use them.*

This can be broken down into the following five principles.[13]



By following these five principles, leaders and their organisations can create what we call a smart decision-making culture. In this culture, organisations embrace the following: they operate mostly in large worlds of irreducible uncertainty, rather than small worlds of calculable risk; errors are unavoidable and can be a source of learning; and less is often better in situations of uncertainty. AMI

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This article is based on our upcoming book, "Smart Management: How Heuristics Help Leaders Make Good Decisions in an Uncertain World" by Jochen Reb, Shenghua Luan, and Gerd Gigerenzer, forthcoming from MIT Press.

Endnotes

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