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Intuition in strategic decision making: Friend or foe in the fast-paced 21st century?

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Executive Overview

Many executives and managers embrace intuition as an effective approach to important decisions. Indeed, recent surveys and business press articles indicate broad support for the use of intuition when making strategic decisions. The need for quick decisions, the need to cope with demands created by complex market forces, and the assumed benefits of applying deeply held knowledge combine to create strong perceived value for the intuitive approach. Intuition, however, has not been subjected to sufficient review, particularly in a forum for executives and other managers. This article responds to the need for critical evaluation. Utilizing holistic hunch and automated expertise as two fundamental definitions, our review evaluates intuition's costs and benefits in light of an organization's goals. Drawing evidence from the fields of behavioral decision making, strategic decision making, and mental modeling, our conclusions suggest intuition is a troublesome decision tool. To contribute to effective managerial practice, we offer tactics that decision makers can use to make intuitive judgments and choices less troublesome.

"The really valuable thing is intuition."

Albert Einstein

In the 1950s, a previously insignificant moped and motorcycle company named Honda exploded onto the Japanese scene using effective production technologies and offering customers aesthetically pleasing designs. By the decade's end, after having captured the hearts and minds of the Japanese with its small 50cc motorcycle, Honda had moved past its toughest competitors to capture the largest share of the domestic market. With a strong domestic base as the foundation, Honda's leadership turned the firm's attention to the U. S. market. Two emissaries were dispatched to investigate:

> *We dropped in on motorcycle dealers who treated us discourteously and in addition gave the general impression of being motorcycle enthusiasts who, secondarily, were in business. There were only 3,000 motorcycle dealers in the United States at the time and only 1,000 of them were open five days a week. The remainder were open on nights and weekends. Inventory was poor, manufacturers sold motorcycles to dealers on consignment, the retailers provided consumer financing; after-sales service was poor. It was discouraging. . . . My other impression was that everyone in the United States drove an automobile – making it doubtful that motorcycles could ever do very well in the market.*[1]

From the perspective of the business fundamentals associated with successful market entries, what Honda's advance scouts found was discouraging. In spite of this, the scouts believed that Honda could achieve success. Ignoring the competitive obstacles that were discovered in the U.S. market, ignoring the fact that success in Japan had been built largely on small cycles while Americans demanded large cycles, ignoring Toyota's recent failure in the U.S. market, and ignoring biting skepticism from key government officials and others, the leader of the Japanese discovery team pushed forward:

I reported my impressions to Fujisawa [co-head of Honda] — including the seat-of-the-pants target of trying, over several years, to attain a 10 percent share of U.S. imports. He didn't probe that target quantitatively. We did not discuss profits or deadlines or breakeven. Fujisawa told me if anyone could succeed, I could and authorized $1 million for the venture.[2]

In the minds of many, this well-known tale of Honda's entry into the U.S. motorcycle market illustrates intuition's power in strategic decision making. Honda's scouts saw a discouraging picture but felt they and their firm could be successful in spite of the odds. The discouraging analyses from government officials didn't sway them from feeling they had the resolve and capabilities required to achieve competitive success. They felt that risking some of Honda's precious resources to pursue "success against all odds" made sense. In hindsight, with knowledge of the story's resolution, it's easy to construct rational arguments for why Honda should have moved forward. At the time, however, the course of action the firm should have followed wasn't as clear.

Additional examples of intuition in strategic decision making are all around us. Ignoring recommendations from advisors, Ray Kroc purchased the McDonalds brand from the McDonald brothers: "I'm not a gambler and I didn't have that kind of money, but my funny bone instinct kept urging me on." Ignoring numerous naysayers and a lack of supporting market research, Bob Lutz, former president of Chrysler, made the Dodge Viper a reality: "It was this subconscious, visceral feeling. And it just felt right." Ignoring the fact that 24 publishing houses had rejected the book and her own publishing house was opposed, Eleanor Friede gambled on a "little nothing book," called *Jonathan Livingston Seagull*: "I felt there were truths in this simple story that would make it an international classic."[3]

Consistent with these stories, many academic researchers, business writers, executives, and managers champion intuition as a key part of strategic decision-making effectiveness. One noted intuition researcher,[4] for example, assembled an edited volume filled with testimonials supporting intuition. A set of business authors[5] highlighted the faith that Herb Kelleher, the legendary founder and former CEO of Southwest Airlines, placed on intuition, originality, and creativity. Kathleen Eisenhardt,[6] a well-known strategy researcher, argued that collective intuition among members of a management team contributes to the group's ability to quickly recognize strategic issues such as evolving environmental opportunities and threats. Leonard and Sensiper,[7] also well-known strategy researchers, suggested that intuition plays a role in a firm's efforts to innovate. This is significant, in that innovation is a potential source of an important competitive advantage for companies across industries as they compete in the increasingly complex global economy. Finally, a chronologist of what some perceive to be history's greatest management decisions argued that intuition played a key role in each instance (e.g., Akito Morita's decision to develop the Sony Walkman in spite of internal opposition, Johnson & Johnson's rapid decision to pull Tylenol from store shelves at a cost of $100 million).[8]

With success stories readily available, and with common sense suggesting intuition's necessity in times of change, intuitively dominated decisions are likely to increase in the fast-paced 21st century. Indeed, recent commentaries in the business press and in the applied academic literature support this assertion, as do many surveys of executives and managers.[9] In a recent survey of executives, search-firm Christian and Timbers found that almost half of corporate executives use intuition more than formal analysis to run their companies.[10]

On the face of it, greater reliance on intuitively dominated decisions would seem to be a good thing. But is it? Are the popular stories of intuition representative of all or even the majority of such stories? Are the common-sense arguments and the limited systematic empirical data supporting intuition's use in the face of change as sound as they seem? Importantly, intuitive decision makers cannot explain why they feel the way they do or why they make the choices they make. Through recent interviews in several major U.S. companies, Hayashi,[11] for example, showed that executives could not articulate how they made decisions that defied logical analysis. As noted by Leonard and Sensiper,[12] the common element of "knowing" that results from tacit knowledge and intuition "is the inability of the knower to totally articulate all that he or she knows." In sum, at the core of intuition is a set of insights and understandings that is not known fully to its owner.

Given the conditions surrounding intuitive decisions, can we conclude confidently that sound thought processes are at work? Beyond this, what is the significance, if any, of the deficiencies that are ascribed to some intuitively derived decisions (e.g., impatience, rapid decision closure, and failure to solidly consider all relevant decision situation facts)?[13] As some argue, is the value of decisions put at risk when they are made on the basis of intuition? If so, should intuition be pulled more

selectively and less frequently from the manager's tool kit to make decisions, especially those with strategic implications? Research in fields such as behavioral decision making, strategic decision making, experimental economics, and mental modeling suggest caution.[14]

Our purpose in this article is to offer decision makers a critical review of intuition in the context of strategic decisions. Decisions involving significant allocations of resources that require time to implement and affect the firm's chosen competitive space are examples of ones commonly thought to have important strategic implications. We believe this review's contents have the potential to contribute to improvements in managerial practice in terms of the making of effective decisions. This review should be timely because intuition has attracted increased attention in practitioner-oriented articles over the past several years, but with a decidedly positive bias.

Our analysis carefully frames basic questions about intuition's structure, process, and effectiveness. First, we present two fundamental definitions of intuition. This is a crucial first step, because intuition has been defined in different ways. Many authors and managers, however, either use a generic definition or mix very different definitions together, making it difficult to generate usable insights about any particular type of intuition. Next, we examine intuition's value to strategic decision makers as they (1) attempt to explore for new technologies and strategies, and (2) attempt to further exploit their organization's existing technologies and strategies. By using the explore-exploit framework from the field of organizational learning, we explicitly take into account what an organization is trying to accomplish in its decision-making processes. Combining two leading definitions of intuition with this framework provides a useful lens through which to view intuition. Finally, we offer managerial tactics to address the pitfalls of intuition that were identified through our critical analysis.

What Is Intuition?

Neither the opposite of rationality nor a random process of guessing, intuition corresponds to thoughts, conclusions, or choices produced largely or in part through subconscious mental processes.[15] Although informative, this description belies intuition's richness—as a concept and as a mental tool that is separate from explicit logic and judgment.

At a minimum, intuition can be conceptualized in two distinct ways: as holistic hunch and as automated expertise.[16] Perhaps the most popular conception of the term, intuition as holistic hunch corresponds to judgment or choice made through a subconscious synthesis of information drawn from diverse experiences.[17] Here, information stored in memory is subconsciously combined in complex ways to produce judgment or choice that feels right. Novel approaches, changes in directions, and/or actions that run counter to prevailing thinking or data are often involved. "Gut feeling" is often used to describe the final choice. In the Honda story presented earlier, the advance U.S. scout team had just this type of feeling. Similarly, Ray Kroc when purchasing the McDonald's name and Bob Lutz when pursuing the Viper felt they were right and that they would be successful, despite evidence and opinion to the contrary.

The subconscious process involved in holistic hunch is not well understood. Roy Rowan,[18] a noted intuition researcher, described the process as:

> *Intuition is knowledge gained without rational thought. And since it comes from some stratum of awareness just below the conscious level, it is slippery and elusive, to say the least. . . . New ideas spring from a mind that organizes experiences, facts, and relationships to discern a [mental] path that has not been taken before.*

Intuition as automated expertise is less mystical, corresponding to recognition of a familiar situation and the straightforward but partially subconscious application of previous learning related to that situation. This form of intuition develops over time as relevant experience is accumulated in a particular domain (e.g., investment banking where a number of situations become familiar over time). Early on, explicit analysis is used to identify and process key factors, but as experience increases over time, such analysis becomes more rudimentary while subconscious processing of the details emerges as a larger component. Learning to ride a bicycle, drive a car, and manage an investment portfolio can all exhibit this progression. Essentially, accumulated expertise leads to some steps in the analysis being dropped while others are completed in a rapid, subconscious fashion.[19] When, for example, a veteran firefighter approaches a burning building, she/he will typically recognize a pattern and select an approach to fighting the fire that fits the pattern. In selecting the approach, expertise is brought to bear but without a full-blown explicit analysis of the situation. Much of the mental work occurs subconsciously, as becomes clear when veteran firefighters are asked to explain their thought processes.

They simply cannot do so without a great deal of probing and prompting by a researcher, reporter, or other interested party.[20]

Overall, the key to automated expertise lies in a person's quick identification of a familiar situation, and subsequent automatic access and application of stored knowledge related to the situation. Unlike holistic hunch, novel insights, new syntheses of information, and inspired conclusions are not major parts of the story. In his famous example of chess grandmasters, Herbert Simon,[21] a Nobel Laureate, put it this way:

> *Recognizing the pattern [on the chess board] brings to the grandmaster's mind at once moves that may be appropriate to the situation. It is this recognition that enables the professional to play very strong chess at a rapid rate. Previous learning that has stored the patterns and information associated with them in memory makes this performance possible. This, then, is the secret of the grandmaster's intuition.*

Table 1 summarizes our descriptions of the two types of intuition.

What Is Intuition's Value?

For many, intuition is intrinsically appealing. After all, it characterizes the heroic gambler in the case of intuition as holistic hunch and the well-traveled expert in the case of automated expertise. With respect to the use of intuition to make strategic decisions, though, the reality is more complex. Below, we explore the value of holistic hunch and automated expertise in situations where an organization is focused on exploring the environment for new technologies and strategies. We then examine the value of these two forms of intuition in situations where an organization is focused on exploiting existing ways of doing things. Our analysis suggests that holistic hunch, if handled properly, can be valuable for exploration while automated expertise can be valuable as a starting point for exploitation but must be made explicit for decision-making success.

Exploring for New Technologies and Strategies

In the glow of increasing returns to experience, an organization may overemphasize its current technology and strategy while failing to prepare for alternative futures. This is the old problem of adapting to current circumstances while failing to maintain a reasonable amount of ongoing flexibility for the future. One way to avoid the problem of overemphasizing current technology and strategy is for the firm to commit significant resources to a goal of exploration, which involves "search, variation, risk-taking, experimentation, play, flexibility, discovery, [and] innovation."[22] More generally, exploration involves searching for and trying new ways of doing things. Although organizations may go too far, thereby risking too much experimentation, exploration is important in coping with possible and actual dramatic change in the environment.

Nypro, a world class plastic injection molding company, is a good example of an organization with a history of periodic exploration. To compete effectively, Nypro has experimented with cleanroom technology, advanced technology for molding multiple types of plastic in a single molding operation, and a strategy for economically extending its work into the low volume segment of the industry.[23] In many instances, Nypro's actions have been novel to the industry, and have been created to cope with, stay ahead of, or perhaps even shape an industry's changing dynamics in ways that are highly beneficial to its own competitive success.

Intuition as Holistic Hunch When Exploring

Intuition as holistic hunch could play a supportive role when an organization has adopted exploration as a goal. Playing hunches often involves actions consistent with exploration: 1) risk-taking; 2)

Table 1
Types of Intuition

Type of Intuition	Definition	Example
Holistic Hunch	Judgment or choice made through a subconscious process involving: a) synthesis of diverse experiences, b) novel combinations of information, and c) strong feelings of being right	Chrysler's decision to develop an automobile very different from others at the company – the Dodge Viper
Automated Expertise	Judgment or choice made through a partially subconscious process involving a) steps borne of past situation-specific experiences, b) a replay of past learning, and c) a feeling of familiarity	Chevy Chase Bank making routine commercial loan decisions for existing large customers

experimentation with novel approaches; and/or 3) variation in an organization's experiences through departures from current practice. Indeed, of the four circumstances we examine (hunch in situations of exploration and exploitation and automated expertise in situations of exploration and exploitation), intuition as holistic hunch in combination with an exploration goal would seem to provide the best opportunity for positive outcomes of intuitively driven decisions. In spite of this optimistic observation and subsequent expectation, obstacles do exist.

As the stories we used in the opening of this article suggest, hunches can pay off in substantial ways. Research on the Mann Gulch fire jumper disaster further illustrates the point,[24] and connects hunches more explicitly to exploration. In the 1949 Mann Gulch disaster, a smoke-jumping crew parachuted to a remote, western U.S. fire believed to be relatively small. Following the collection of their dispersed tools and a quick meal, they began to move in the direction of the fire. About 30 minutes later, the leader of the group, a man named Dodge, realized the fire had jumped from one side of the gulch to the other and was moving towards the group at a rapid rate. After ordering his men to turn and work their way up the side of the gulch, Dodge sensed the severity of the situation and the need for a novel approach. He then acted on gut feel. Rather than continue to try to move away from the fire, now advancing through the tall grasses at approximately 600 feet per minute with 30-foot high flames, Dodge told his crew to drop their tools and join him in an area he had just set on fire. His tactic of burning grasses to reduce combustible fuel, and lying in the burned area while the primary fire passed, was not part of fire training at the time, nor had Dodge had any prior experience with it. Dodge needed to take a risk, create variance from plan, and experiment with a new direction. His hunch, based on past experience with fire but not a straightforward replay of past learning, proved wise.

The Mann Gulch story, however, also points up the danger of untested gut instinct in exploration. Dodge saved his life by acting on intuition, but none of his crew followed his lead. Instead, they ignored his instructions and ran for the ridge at the top of the gulch. Most of them perished. Because individuals acting on or attempting to sell hunches to other involved parties are often unable to say exactly why the hunch makes sense, commitment to the hunch by others may be problematic, certainly in the short run.

A second problem, infrequently discussed in articles written for executives and managers, is that hunches are often flawed. Although generally positive on intuition, the author of a recent article[25] did point out that "[Executives] ... will be the first to admit that their instincts are often plain wrong." In another article, this one taking an overall negative stance, the author summed up the state of the world very accurately: "We remember the examples of hunches that pay off but conveniently forget all the ones that turn out badly."[26] Examples include FedEx's Fred Smith launching ZapMail and America Online's Pittman believing that advertising revenue rather than subscriptions would be the key to success.

A high rate of failure, though, is not necessarily bad for exploration. Failure, and learning from it, is part of the exploratory approach, because not all experiments can be expected to yield positive results. With a great deal at stake, however, and with an outcome distribution that seems to have many substantial failures, some substantial successes, and not much in the middle, decision makers must seek ways to maximize decision success as a vital component of minimizing the firm's downside risk. We return to this point below.

Intuition as Automated Expertise When Exploring

Exploration finds firms seeking new technologies and strategies. Because automated expertise involves the application of previous experiences and approaches in familiar ways and places, it would seem to fall short in providing the raw material for exploration. It is simply the wrong tool from the toolbox. This is not to say that firms consistently avoid over-reliance on automated expertise when exploration is called for. Clearly, U.S. Steel in the face of mini-mill technology and General Motors in the face of Japanese innovations used automated expertise in many areas of their firms, including upper-echelon management, when they held onto outdated technologies and strategies for too long. In such cases, business executives often fail to see that familiar situations have fundamentally changed, creating a need for novel decisions and actions.

Suggested Managerial Actions

Exploration is critical for organizational success. For some companies, a substantial amount of exploration is required to remain viable in the face of an environment that changes dramatically on a frequent basis. Firms competing in fast-cycle markets, where it is extremely difficult to sustain competitive advantages, are examples of such companies. For other firms, less exploration is required. In both cases, nurturing effective exploration is difficult. Intuition as hunch can play an important role in the process, but it must be managed carefully. Intuition as automated expertise is not likely

to be helpful in promoting exploration.

To make acting on hunches as useful as possible, the problem of limited commitment among those affected by the decision and the problem of high failure rate must be directly confronted. To handle low commitment, inspirational stories and an organizational culture supporting risk taking and failure are two promising tactics. Story telling is a key tool of persuasion and influence, because good stories capture the imagination and trigger emotional responses.[27] Importantly, good stories often follow a simple formula that executives and managers can easily master. A typical story begins with a central character or organization that is basically doing well. Next, a key event occurs that threatens success. From this point, the story is about efforts to understand and effectively confront the forces opposing the individual's or organization's success. In the words of Robert McKee, a world renowned screenwriting coach, a good story "describes what it is like to deal with these opposing forces, calling on the protagonist to dig deeper, work with scarce resources, make difficult decisions, take action despite risks, and ultimately discover the truth."[28] Thus, in the context of selling a choice based on hunch, the key would be to craft a story describing threatening forces that are forcing bold action. McKee has found emotional engagement and commitment to be highest when a story involves threatening forces and the possibility of a better future after overcoming those forces.

Beyond telling an inspirational story to help sell a strategic decision made on the basis of hunch, upper-echelon executives could develop an organizational culture supportive of risk taking and failure. Such a culture promotes the idea that winners take risks and sometimes fail. This type of culture may make it easier to gain commitment for hunch-driven experiments at all levels of the organization, since viewing experimentation positively would be commonplace. To create the appropriate culture, top leaders can openly and consistently support individuals who have played a hunch and lost, and they can ensure career mobility for those people.[29]

Importantly, the culture described above does not value thoughtless playing of hunches. Peter Drucker, the noted management thinker, put it this way: "I believe in intuition only if you discipline it. The 'hunch' artists, the ones who make a diagnosis but don't check it out with facts, with what they observe, are the ones ... who kill businesses."[30] Individuals who thoughtfully play hunches are not ignorant of available data and other facts. They simply have made the judgment that data and facts are incomplete, somehow misleading, or otherwise fail to provide effective, clear guidance.

Several academic frameworks suggest intuition as hunch is important in situations calling for exploratory behaviors, and in most cases these frameworks call for careful consideration of the hunches prior to their being acted upon. A framework focused on organizational interpretative styles,[31] for example, suggests using trial and error driven by "intuition and hunch" if an active approach to an unanalyzable environment is desired. A framework focused on strategic planning suggests intuition as hunch is important when planning for ambiguous futures.[32] An important framework focused on self-designing organizations implies that intuition as hunch is important for organizations attempting to promote risk-taking and adaptability.[33] In all of these frameworks, conversations among key individuals and collective understandings are important. Unexamined intuition is not valued.

Turning from the commitment problem to the problem of failure rate, ensuring action independence and combining fast feedback with slow learning are two meaningful tactics.[34] Action independence simply means an experiment that fails will not burn the house down. In other words, the possible negative effects of a hunch-based decision should be manageable. Betting the entire firm on a hunch is not wise. Using "probes" to test a market and to assess competitors' reactions to hunch-based decisions can positively inform the wisdom of various future decision possibilities. In the stories used to open this article, failure would not have brought disastrous effects. Honda, for example, probably would have survived as a company if its foray into the U.S. motorcycle market had failed. The firm would have been wounded, and the costs would not have been trivial, but Honda likely would have survived. Toyota survived after having this type of U.S. failure in the late 1950s.

Combining fast feedback with slow learning simply means that executives and managers should closely monitor the results of a hunch-based decision (fast feedback) but should not be quick to reverse the decision even if initial results are not as positive as hoped for (slow learning). A fact of organizational life is that new approaches, changes in direction, and so on have significant learning curves. Allowing events to unfold, especially under the protection of action independence, has the potential to yield substantial dividends.

For a summary of our arguments and advice related to intuition as a tool for exploration, see the first column of Figure 1. Next, we examine intuition in situations where exploitation is the goal.

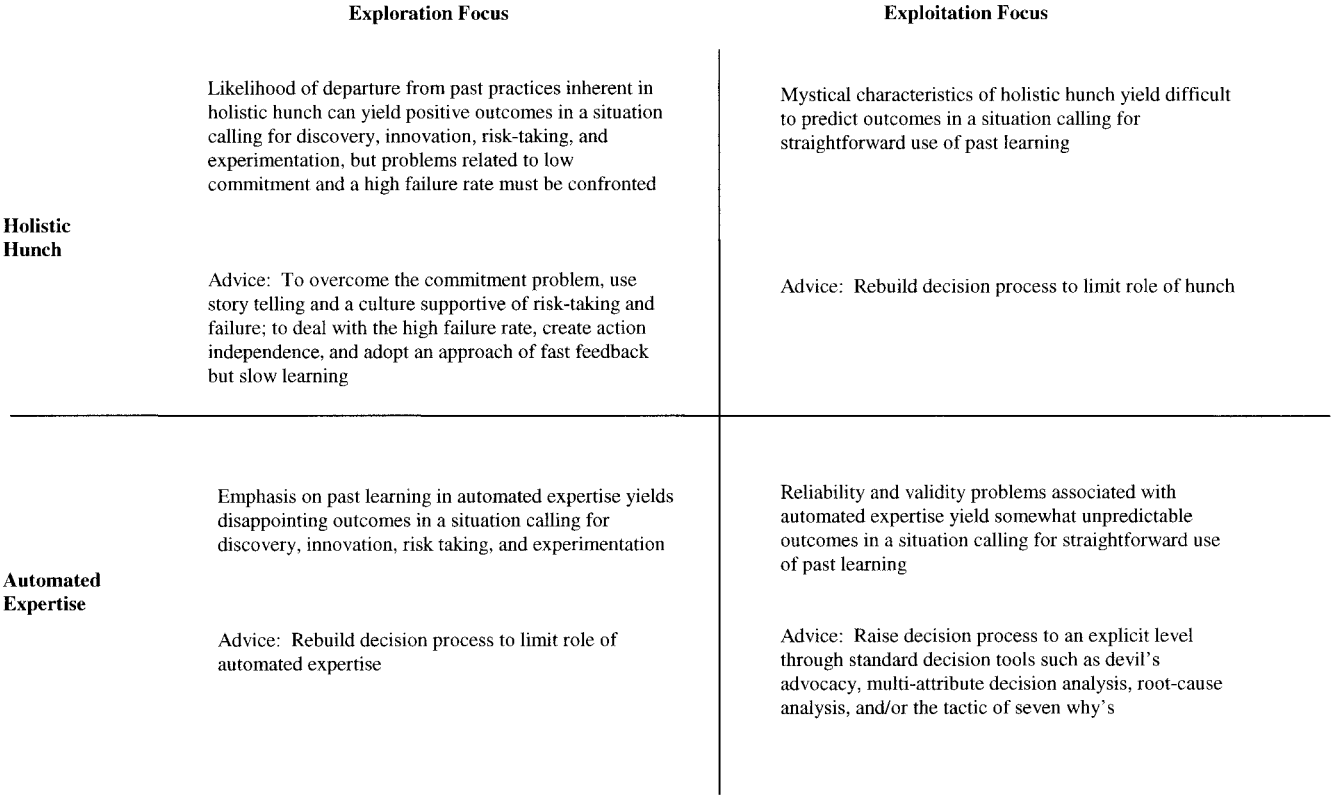

FIGURE 1
Intuition in Organizations

Exploiting Existing Technologies and Strategies

Over time, investments in existing technologies and strategies tend to accumulate as organizations seek to leverage past decisions and outcomes. Essentially, organizations exhibit increasing returns to experience, promoting sustaining rather than dramatic changes in current ways of doing things, or what economists call path dependence. With prior decisions and investments being leveraged, exploitation of current capabilities can be positive, at least in the immediate and possibly the intermediate future.[35] Exploiting existing capabilities involves working in familiar terrain, where events and outcomes can be evaluated against a backdrop of substantial prior learning.

Intuition as Automated Expertise When Exploiting

As an adaptive process, exploitation finds organizations and their decision makers focusing on issues related primarily to execution and building on past investments. Efficiency improvements in organizational routines, refinements to how key tasks are performed, and incremental market responses and initiatives are the emphases as organizations seek success by exploiting existing capabilities. Given this, the first take might be that intuition as automated expertise complements the exploitation of current capabilities. Use of automated expertise in decision making involves the application of previous learning in a straightforward, albeit partially subconscious, fashion. Patterns and situations where previous learning applies are recognized and the learning is used without the individual(s) being fully aware of the underlying mental work. Breaking away in radically new directions is not part of the story. Such characteristics of automated expertise seem perfectly matched to situations where the organization's goal is to exploit existing capabilities. Several problems exist, however, for organizations relying on this form of intuition in strategic and more general decision making.

Reliability, which corresponds in this context to the consistency with which a decision maker uses past learning over time, is one problem for intuition as automated expertise. Memory failures, fatigue, information overload, and distractions can create inconsistencies in how a manager or executive uses prior learning when that learning and its application are not raised to an explicit level.[36] Such inconsistency creates judgment errors.

Although not directly focused on strategic deci-

sion making, the long-standing research tradition focused on unaided expert judgment illustrates the problem. In this research tradition, experts are asked to evaluate cases that are representative of those found in their daily work. Because these experts are asked to evaluate a number of cases and to use their experience, some subconscious processing likely takes place (i.e., automated expertise is used). In one study, for example, radiologists judged the extent of malignancy in gastric ulcers.[37] With the same X-rays being presented to the same individuals for a second evaluation after one week, the typical radiologist's consistency was only .59 on a zero to one scale.[38] Thus, initial diagnoses of potential cancers were changed frequently. In another study, tax accountants judged the degree of legality for various capital-gain treatments.[39] With the same tax cases being presented for a second evaluation after a month or two, the typical accountant's consistency was .77. In a third study, auditors judged degree of financial control.[40] With the same audit cases being presented for a second evaluation after only a few minutes, the typical auditor's consistency was .59.

Summarizing research on the reliability of unaided professional judgment, a recent study[41] reported average consistency of only .61 across medical, meteorological, human-resource, and business decision making. This lack of reliability could be costly as the implied errors cause deaths, criminal fines, billions of dollars in business losses, and so on.

Validity is a second problem for automated expertise. Beyond random inconsistencies in the application of past learning (the reliability issue), fundamental difficulty in fully understanding key cause-effect relationships causes poor judgments/choices for managers and executives who do not raise issues to an explicit level.[42] Again, research on unaided expert judgment illustrates the issue.

In a study of stock market returns, security analysts exhibited predictive validity of only .23,[43] meaning the correlation between the typical analyst's predictions of market returns and actual market returns was only .23. Statistically removing the analysts' random inconsistencies (the reliability problem) yielded a slightly improved validity of .29. A formal mathematical model that was independent of the analysts, however, had a predictive validity of .80. The difference between .29 and .80 represents systematic error in the analysts' judgments of the companies under examination. In a study of the number of annual advertising pages in a magazine, executives involved in forecasting ads and ad revenue exhibited predictive validity of .74.[44] Statistically removing the executives' random inconsistencies yielded a slightly improved validity of .82. A mathematical model that was independent of the executives had a predictive validity of .94. Although the difference between .82 and .94 may seem somewhat small, it corresponds to a difference in error-rate of 320 pages per year on a base of only 2800 annual advertising pages (approximate). This discrepancy in predictions from automated expertise vs. an explicit model has large effects because predicted ad pages determine writer staffing plans, production plans, and other plans.

Medical doctors determining life expectancy of terminal cancer patients, loan officers determining which firms will become bankrupt, and agency managers evaluating the probable success of insurance agents provide additional examples of unaided judgment falling short in contests with more explicitly derived solutions.[45]

An analysis of the old *Saturday Evening Post* provides additional insights into the validity problem. Confronted with profitability issues, executives at the Curtis Publishing Company implemented a number of changes in promotional expenditures and advertising rates. These changes, however, did not prevent ultimate failure. In fact, many of the actions made the situation worse.

Essentially, the executives appear to have failed to comprehend the complex relationships that linked promotional expenditures and advertising rates to profitability.[46] Lack of explicit discussion and analysis of deeply held assumptions did not help in better understanding cause-effect relationships that had existed for years. As promotional expenditures were increased to attract new readers and improve profitability, ad rates were increased to help pay for the additional expense. The various increases in promotional expenditures had the desired effect of increasing trial readers. The various increases in ad rates, however, had complex and to some degree unexpected effects. These ad-rate increases had the desired effect of enhancing ad revenue, but they also had the effect of reducing the absolute number of ad pages and this led management to repeatedly cut the number of article pages, based on longstanding and standard industry policy. Cuts in article pages resulted in fewer trial readers becoming regular readers (who paid full subscription price) and more regular readers failing to renew their subscriptions. Thus, more and more money had to be spent on promotion in an effort to gain and retain readers. Over the last 12 years of the magazine's life, promotional expenditures increased 130 percent (in constant dollars) while the number of readers increased only 62 percent.

The increased cost of promotion for a magazine that was becoming smaller and smaller, and there-

fore less and less attractive, took its toll on profitability. In the words of an organizational researcher who studied these issues:[47]

> *The policy elite of the old Saturday Evening Post seemed oblivious to the recursive relationships that tightly coupled readers, advertising sales, and magazine pages. It resulted in an unstable system. Whether readership of the magazine increased or decreased, the same result was obtained—profits dropped.*

Bringing the story to a close:

> *It is a perceptual enigma that a complex organization (like the Curtis Publishing Company) can coordinate such a rich array of highly specialized activities (from editing to printing) and yet formulate its major policy decisions on out-of-date maps of causality containing untested beliefs and the simplest of arguments.*

The executives at the Curtis Publishing Company could have benefited from an explicit review of their cause-effect beliefs.

Intuition as Holistic Hunch When Exploiting

Organizations exploiting existing technologies and strategies are unlikely to derive substantial benefits from an emphasis on intuition as holistic hunch. Intuition as hunch is simply the wrong tool from the toolbox. As noted earlier, exploitation operates in the context of familiar terrain with known and relatively predictable problems and challenges. This means that uncertainty reduction rather than ambiguity elimination is the key.[48] In situations characterized by uncertainty as opposed to ambiguity, managers and executives know what the issues are, know what questions to ask, and know what data to collect and analyze. Raising thoughts, arguments, issues, and data to an explicit level tends to pay dividends under these conditions; relying upon hunches does not.[49] A recent study provided evidence consistent with this conclusion: project teams engaged in exploitation learned and performed more effectively with clear structure in place.[50]

Suggested Managerial Actions

Organizations can successfully emphasize exploitation of existing technologies and strategies in industries that are relatively stable, assuming their competitive advantages continue to create value for customers. Even in industries characterized by significant change over time, organizations may be able to emphasize exploitation in some time periods and for some strategic decisions. In both cases, however, intuition defined in any fashion appears to work against effective exploitation of current capabilities. Based on logic and evidence, we reject the common sense notion that intuition as automated expertise supports exploitation while intuition as hunch does not. Instead, we believe that both types of intuition are problematic. Automated expertise, however, can play a positive role as a starting position if it is subsequently raised to an explicit level for updating and review. Below, we offer more specific advice.

Automated expertise should be treated with caution in an organization emphasizing exploitation of its current capabilities. As illustrated above, the potential pitfalls of subconscious processing are many. To avoid the pitfalls, we suggest the following steps. First, executives should assess the emphasis placed on automated expertise in strategic decision making. In undertaking this assessment, a simple question can be used: To what extent are key decision makers able to describe the factors that have led to particular positions on issues and to particular preferences for courses of action? If an individual involved in a decision can *quickly* and *easily* discuss a rich web of relevant explanatory factors, particularly when no warning of the question is given, then automated expertise is probably not the key driver. If such factors are available in, or easily returned to, the conscious mind of an individual, then intuition is probably not the key driver for that person. If key decision makers have difficulty discussing explanatory factors, but can do so after prompting and probing, then automated expertise may be involved, and is probably involved if the decision context has an exploitation focus, such as when decision makers are considering investments in the next incremental innovation for existing technology or are handling the latest supply disruption for a key but scarce raw material. Because these types of decisions cover familiar territory and well-worn issues, automated expertise could very easily come into play.

If a determination is made that automated expertise is being emphasized to a substantial degree, managers can adopt tactics designed to generate a more explicit process. A host of standard decision tools can be usefully employed to surface unarticulated knowledge and beliefs. Devil's advocacy and multi-attribute decision analysis are general examples, while root-cause analysis and the tactic of seven whys are examples from the TQM movement. In general, these tools force decision makers to be explicit about their beliefs and ideas. Beyond these standard tools, simple conversation might be useful. Talking about beliefs and ideas

can help surface knowledge that has not been explicit. Techniques focused on surfacing cognitive maps might also be useful.[51]

In the context of advice to make knowledge explicit, it is important to contrast automated expertise and tacit knowledge. Automated expertise generally refers to subconscious knowledge and processing that was once part of conscious thought. Over time, conscious thought has become less necessary in applying this knowledge. Tacit knowledge, as we define the term, involves knowledge that has never been held in the conscious mind. Here, the decision maker has never consciously known all that s/he knows. Unlike automated expertise, which develops through explicit learning, tacit knowledge develops through implicit learning that bypasses the conscious mind altogether.[52] Further, surfacing what was once held at a conscious level would seem to be much easier than surfacing knowledge that has never been consciously processed. Indirect methods, however, may be helpful in accessing and surfacing tacit knowledge, including the use of visuals and symbols.[53]

Although the use of visuals and symbols may seem distant from sound business practice, it has a long history of success, and is worth a few comments here. Leonardo da Vinci, Thomas Edison, and Albert Einstein used drawings, diagrams, and graphs as crucial aids in capturing and expressing their understandings. Richard Feynman, Nobel laureate in physics, preferred to think visually and changed the path of quantum electrodynamics by emphasizing diagrams rather than the more typical written formulae.[54] The process design for the Nissan Infiniti J-30 provides a concrete business example. Japanese designers had been more sensitive to the front-end of this car than their American counterparts. They had had difficulty, however, communicating their reasons and their ideas, partly because of language issues, but partly because of preferences based on collective tacit knowledge that probably had never been explicit.[55] This tacit knowledge had been built up over several years and had not been tested within the Japanese group itself, and when the knowledge had to be communicated to another group of people, difficulties ensued. Predominantly through sketching exercises, the Japanese were ultimately able to surface and make their knowledge explicit enough to communicate to the Americans. After a great deal of time and effort, the Americans understood that a slightly turned-down grill combined with narrow headlights led to a sour look and lower level of cultural intelligence in the eyes of the Japanese designers. Without the use of sketches, surfacing and communicating the tacit knowledge may not have occurred.

For a summary of our arguments and advice related to intuition as a tool for exploitation, see the second column in Figure 1.

Conclusions

Although intuition has been defined in many different ways, two definitions capture what is fundamental. When conceptualized as holistic hunch, intuition is capable of providing benefits but only when firms are emphasizing exploration. Even in this case, there are many pitfalls. When conceptualized as automated expertise, intuition left at a subconscious level does not appear to provide unequivocal benefits to firms.

If intuition brings many risks and problems, why do managers use it in strategic decision making? The answer is simple–intuition has a certain allure. As discussed earlier, holistic hunch brings to mind the heroic gambler while automated expertise brings to mind the well-traveled expert. Adding to the allure, folk tales in the media and elsewhere continue to suggest power, elegance, and at least occasional success in intuitive decisions. Further, intuition can speed up decision making, which can be important in a complex, changing world. Finally, and perhaps most importantly, intuition may be the only possible approach when resources are constrained, resources such as managerial time and funds for decision support.

Given the evidence and analysis presented as part of our efforts, we hope that executives and managers will use intuition selectively and cautiously, especially when making strategic decisions. However, the practicalities of the situation are that intuition's allure is strong. We also realize that intuition has a legitimate role to play in some decision circumstances. For example, managers should consider playing hunches when exploration for new strategies and technologies is the goal, and when the costs of failure, both personal and organizational, can be absorbed without significantly affecting the firm's financial viability. Even under these circumstances, tactics such as inspirational story telling, action independence, and slow learning coupled with fast feedback are crucial. Further, playing hunches should not be the only technique used to promote exploration, because the likelihood of success is too low. Other techniques that could be used include structured creativity exercises designed to explicitly promote novel combinations of diverse concepts, ideas, and thoughts.[56] Organizations with strategic-level managers who tend to avoid this type of alterna-

tive technique while overemphasizing hunches could benefit from the addition of colleagues who are more analytical.

Managers should consider using automated expertise only when two conditions are met: 1) exploitation of existing strategies and technologies is the goal; and 2) time or other resource constraints clearly prevent raising knowledge to an explicit level. Only in this very limited set of circumstances would automated expertise seem reasonable for strategic decision making. With a great deal at stake, surfacing existing knowledge for thorough examination is crucial. Standard decision tools such as devil's advocacy and the tactic of seven whys are appropriate techniques to use to surface knowledge.

Returning to the paper's opening, we can ask if intuition is the "really valuable thing" as Albert Einstein proposed. Our analysis suggests that despite the increasing interest and the generally positive evaluations in articles written for executives and managers, intuition presents itself as a troubling tool. By utilizing two important definitions of intuition and explicitly considering an organization's goals, intuition's pitfalls become clear. We hope the ideas offered in this article represent another useful step in the path of assessing intuition's ability to facilitate effective strategic decision making.

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Endnotes

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