the futures foundation
engaging all Australians in creating a better future...

Volume 22, No. 1, February 2022

FUTURE NEWS

TO CONNECT, TO INFORM AND TO INSPIRE

IN THIS EDITION

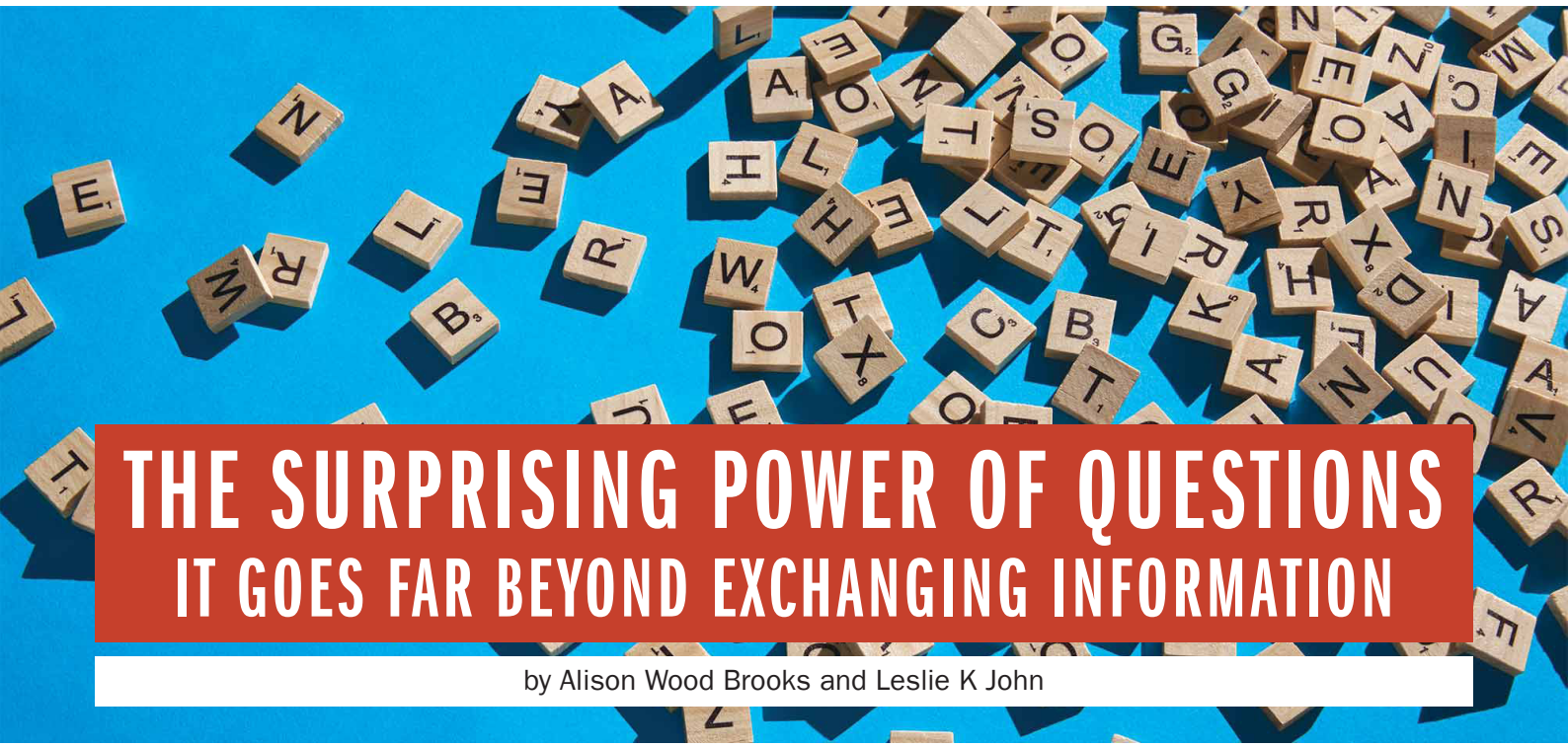
The Surprising Power of Questions
by Alison Wood Brooks and Leslie K John
(page 2)

BOOK REVIEW
Supertrends
50 Things You Need To Know About the Future
Reviewed by Alireza Hejazi
(page 10)

Futurists in Action
Certificate in Strategic Foresight
Anticipating the Future
by Dr Peter Bishop
(page 12)

Signals in the Noise
The 2022 Grey Swans
Fifteen Improbable, But High Impact Events for the Coming Year
by Rob Tyrie & Sean Moffitt
(page 22)

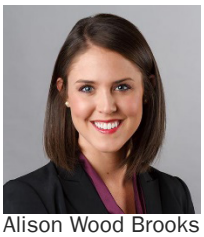
futures foundation Australia • Ross House, 247 Flinders Lane, Melbourne 3000 • Phone: 03 9029 5787



THE SURPRISING POWER OF QUESTIONS

IT GOES FAR BEYOND EXCHANGING INFORMATION

by Alison Wood Brooks and Leslie K John


Alison Wood Brooks


Leslie K. John

Much of an executive's workday is spent asking others for information—requesting status updates from a team leader, for example, or questioning a counterpart in a tense negotiation. Yet unlike professionals such as litigators, journalists, and doctors, who are taught how to ask questions as an essential part of their training, few executives think of questioning as a skill that can be honed—or consider how their own answers to questions could make conversations more productive.

That's a missed opportunity. Questioning is a uniquely powerful tool for unlocking value in organizations: It spurs learning and the exchange of ideas, it fuels innovation and performance improvement, it builds rapport and trust among team members. And it can mitigate business risk by uncovering unforeseen pitfalls and hazards.

For some people, questioning comes easily. Their natural inquisitiveness, emotional intelligence, and ability to read people put the ideal question on the tip of their tongue. But most of us don't ask enough questions, nor do we pose our inquiries in an optimal way.

The good news is that by asking questions, we naturally improve our emotional intelligence, which in turn makes us better questioners—a virtuous cycle. In this article, we draw on insights from behavioral science research to explore how the way we frame questions and choose to answer our counterparts can influence the outcome of conversations. We offer guidance for choosing the best type, tone, sequence, and framing of questions and for deciding what and how much information to share to reap the most benefit from our interactions, not just for ourselves but for our organizations.

DON'T ASK, DON'T GET

"Be a good listener," Dale Carnegie advised in his 1936 classic *How to Win Friends and Influence People.* "Ask questions the other person will enjoy answering." More than 80 years later, most people still fail to heed Carnegie's sage advice. When one of us (Alison) began studying conversations at Harvard Business School several years ago, she quickly arrived at a foundational insight: People don't ask enough questions. In fact, among the most common

complaints people make after having a conversation, such as an interview, a first date, or a work meeting, is "I wish [s/he] had asked me more questions" and "I can't believe [s/he] didn't ask me any questions."

Why do so many of us hold back? There are many reasons. People may be egocentric—eager to impress others with their own thoughts, stories, and ideas (and not even think to ask questions). Perhaps they are apathetic—they don't care enough to ask, or they anticipate being bored by the answers they'd hear. They may be overconfident in their own knowledge and think they already know the answers (which sometimes they do, but usually not). Or perhaps they worry that they'll ask the wrong question and be viewed as rude or incompetent. But the biggest inhibitor, in our opinion, is that most people just don't understand how beneficial good questioning can be. If they did, they would end far fewer sentences with a period—and more with a question mark.

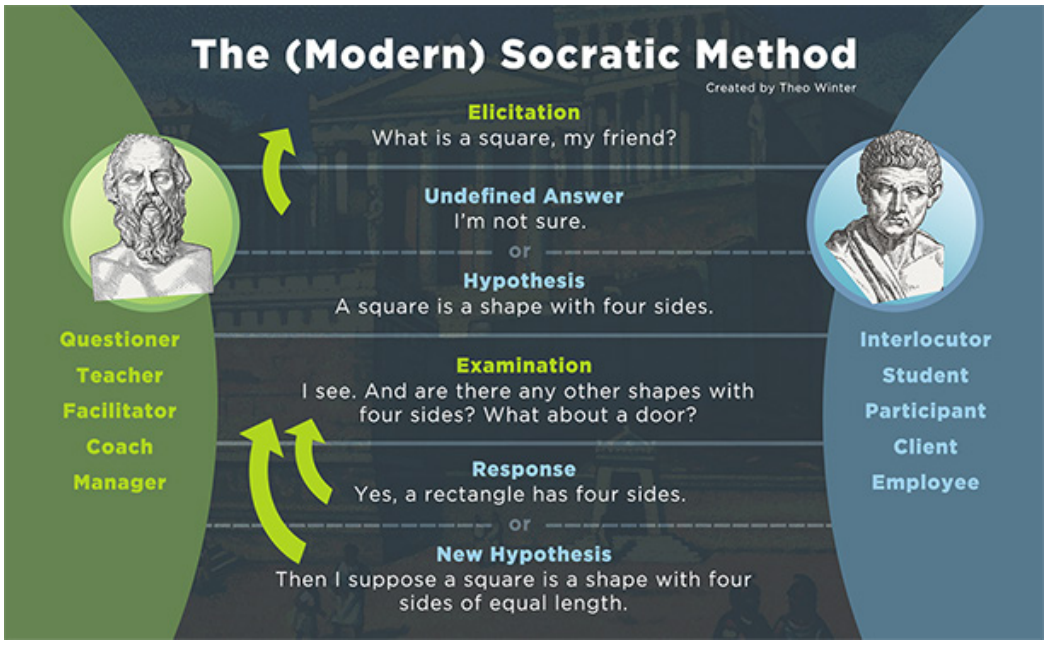
Dating back to the 1970s, research suggests that people have conversations to accomplish some combination of two major goals: information exchange (learning) and impression management (liking). Recent research shows that asking questions achieves both. Alison and Harvard colleagues Karen Huang, Michael Yeomans, Julia Minson, and Francesca Gino scrutinized thousands of natural conversations among participants who were getting to know each other, either in online chats or on in-person speed dates. The researchers told some people to ask many questions (at least nine in 15 minutes) and others to ask very few (no more than four in 15 minutes). In the online chats, the people who were randomly assigned to ask many questions were better liked by their conversation partners and learned more about their partners' interests. For example, when quizzed about their partners' preferences for activities such as reading, cooking, and exercising, high question askers were more likely to be able to guess correctly. Among the speed daters, people were more willing to go on a second date with partners who asked more questions. In fact, asking just one more question on each date meant that participants persuaded one additional person (over the course of 20 dates) to go out with them again.

ASKING A LOT OF QUESTIONS UNLOCKS LEARNING AND IMPROVES INTERPERSONAL BONDING.

Questions are such powerful tools that they can be beneficial—perhaps particularly so—in circumstances when question asking goes against social norms. For instance, prevailing norms tell us that job candidates are expected to answer questions during interviews. But research by Dan Cable, at the London Business School, and Virginia Kay, at the University of North Carolina, suggests that most people excessively self-promote during job interviews. And when interviewees focus on selling themselves, they are likely to forget to ask questions—about the interviewer, the organization, the work—that would make the interviewer feel more engaged and more apt to view the candidate favorably and could help the candidate predict whether the job would provide satisfying work. For job candidates, asking questions such as "What am I not asking you that I should?" can signal competence, build rapport, and unlock key pieces of information about the position.

Most people don't grasp that asking a lot of questions unlocks learning and improves interpersonal bonding. In Alison's studies, for example, though people could accurately recall how many questions had been asked in their conversations, they didn't intuit the link between questions and liking. Across four studies, in which participants were engaged in conversations themselves or read transcripts of others' conversations, people tended not to realize that question asking would influence—or had influenced—the level of amity between the conversationalists.

THE NEW SOCRATIC METHOD



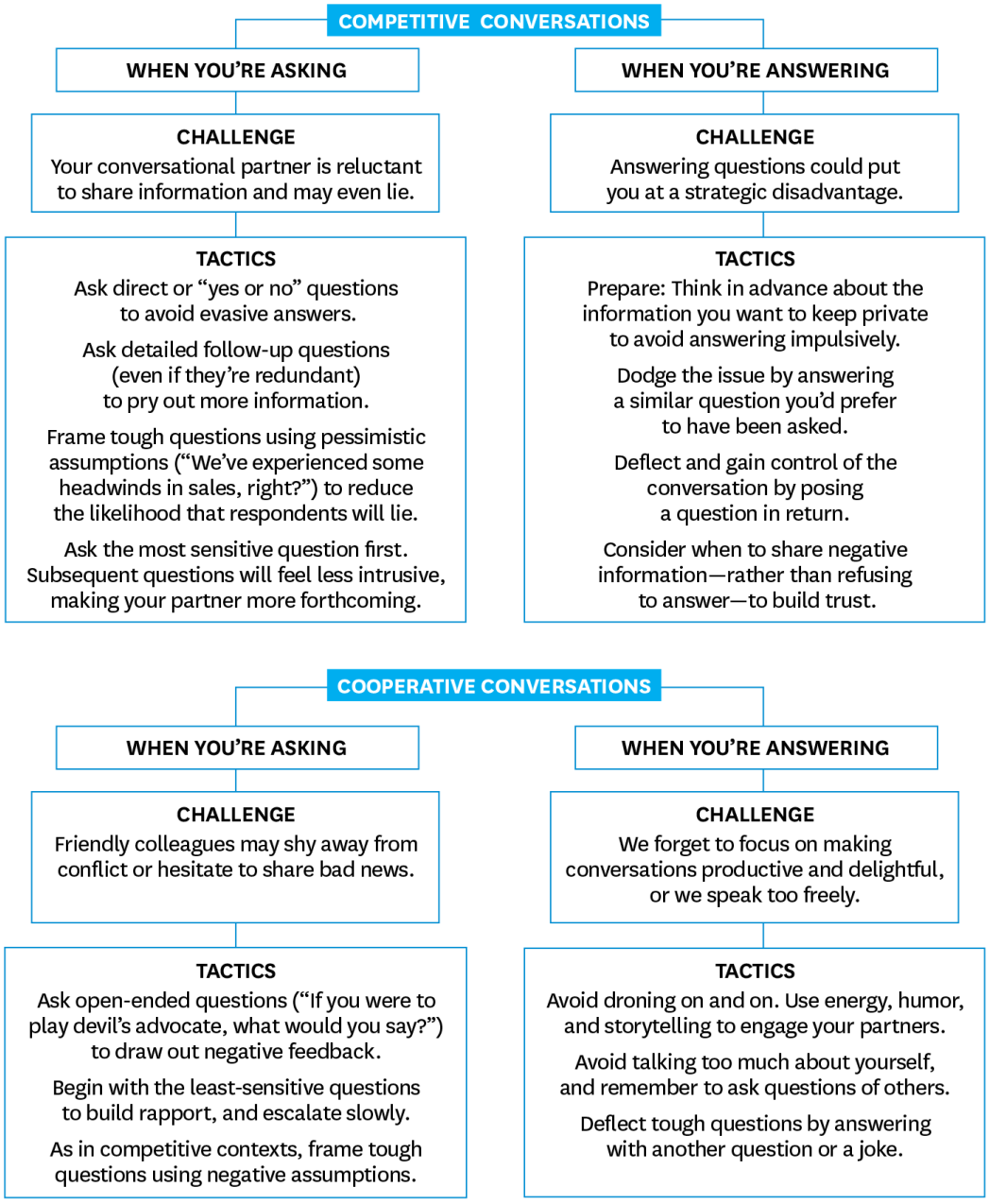
The first step in becoming a better questioner is simply to ask more questions. Of course, the sheer number of questions is not the only factor that influences the quality of a conversation: The type, tone, sequence, and framing also matter.

In our teaching at Harvard Business School, we run an exercise in which we instruct pairs of students to have a conversation. Some students are told to ask as few questions as possible, and some are instructed to ask as many as possible. Among the low-low pairs (both students ask a minimum of questions), participants generally report that the experience is a bit like children engaging in parallel play: They exchange statements but struggle to initiate an interactive, enjoyable, or productive dialogue. The high-high pairs find that too many questions can also create a stilted dynamic. However, the high-low pairs' experiences are mixed. Sometimes the question asker learns a lot about her partner, the answerer feels heard, and both come away feeling profoundly closer. Other times, one of the participants may feel uncomfortable in his role or unsure about how much to share, and the conversation can feel like an interrogation.

Our research suggests several approaches that can enhance the power and efficacy of queries. The best approach for a given situation depends on the goals of the conversationalists—specifically, whether the discussion is cooperative (for example, the duo is trying to build a relationship or accomplish a task together) or competitive (the parties seek to uncover sensitive information from each other or serve their own interests), or some combination of both. Consider the following tactics.

CONVERSATIONAL GOALS MATTER

Conversations fall along a continuum from purely competitive to purely cooperative. For example, discussions about the allocation of scarce resources tend to be competitive; those between friends and colleagues are generally cooperative; and others, such managers' check-ins with employees, are mixed—supportive but also providing feedback and communicating expectations. Here are some challenges that commonly arise when asking and answering questions and tactics for handling them.



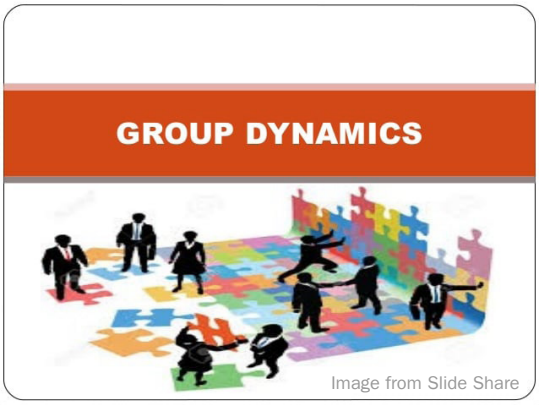
FROM "THE SURPRISING POWER OF QUESTIONS," BY ALISON WOOD BROOKS AND LESLIE K. JOHN, MAY–JUNE 2018

FAVOR FOLLOW-UP QUESTIONS.

Not all questions are created equal. Alison's research, using human coding and machine learning, revealed four types of questions: introductory questions ("How are you?"), mirror questions ("I'm fine. How are you?"), full-switch questions (ones that change the topic entirely), and follow-up questions (ones that solicit more information). Although each type is abundant in natural conversation, follow-up questions seem to have special power. They signal to your conversation partner that you are listening, care, and want to know more. People interacting with a partner who asks lots of follow-up questions tend to feel respected and heard.

An unexpected benefit of follow-up questions is that they don't require much thought or preparation—indeed, they seem to come naturally to interlocutors. In Alison's studies, the people who were told to ask more questions used more follow-up questions than any other type without being instructed to do so.

KNOW WHEN TO KEEP QUESTIONS OPEN-ENDED.



No one likes to feel interrogated—and some types of questions can force answerers into a yes-or-no corner. Open-ended questions can counteract that effect and thus can be particularly useful in uncovering information or learning something new. Indeed, they are wellsprings of innovation—which is often the result of finding the hidden, unexpected answer that no one has thought of before.

A wealth of research in survey design has shown the dangers of narrowing respondents' options. For example, "closed" questions can introduce bias and manipulation. In one study, in which parents were asked what they deemed "the most important thing for children to prepare them in life," about 60% of them chose "to think for themselves" from a list of response options. However, when the same question was asked in an open-ended format, only about 5% of parents spontaneously came up with an answer along those lines.

Of course, open-ended questions aren't always optimal. For example, if you are in a tense negotiation or are dealing with people who tend to keep their cards close to their chest, open-ended questions can leave too much wiggle room, inviting them to dodge or lie by omission. In such situations, closed questions work better, especially if they are framed correctly. For example, research by Julia Minson, the University of Utah's Eric VanEpps, Georgetown's Jeremy Yip, and Wharton's Maurice Schweitzer indicates that people are less likely to lie if questioners make pessimistic assumptions ("This business will need some new equipment soon, correct?") rather than optimistic ones ("The equipment is in good working order, right?").

Sometimes the information you wish to ascertain is so sensitive that direct questions won't work, no matter how thoughtfully they are framed. In these situations, a survey tactic can aid discovery. In research Leslie conducted with Alessandro Acquisti and George Loewenstein of Carnegie Mellon University, she found that people were more forthcoming when requests for sensitive information were couched within another task—in the study's case, rating the ethicality of antisocial behaviors such as cheating on one's tax return or letting a drunk friend drive home. Participants were asked to rate the ethicality using one scale if they had engaged in a particular behavior and another scale if they hadn't—thus revealing which antisocial acts they themselves had engaged in. Although this tactic may sometimes prove useful at an organizational level—we can imagine that managers might administer a survey rather than ask workers directly about sensitive information such as salary expectations—we counsel restraint in using it. If people feel that you are trying to trick them into revealing something, they may lose trust in you, decreasing the likelihood that they'll share information in the future and potentially eroding workplace relationships.

GET THE SEQUENCE RIGHT.

The optimal order of your questions depends on the circumstances. During tense encounters, asking tough questions first, even if it feels socially awkward to do so, can make your conversational partner more willing to open up. Leslie and her coauthors found that people are more willing to reveal sensitive information

when questions are asked in a decreasing order of intrusiveness. When a question asker begins with a highly sensitive question—such as "Have you ever had a fantasy of doing something terrible to someone?"—subsequent questions, such as "Have you ever called in sick to work when you were perfectly healthy?" feel, by comparison, less intrusive, and thus we tend to be more forthcoming. Of course, if the first question is *too* sensitive, you run the risk of offending your counterpart. So it's a delicate balance, to be sure.

THE POWER OF QUESTIONS IN SALES

There are few business settings in which asking questions is more important than sales.

If the goal is to build relationships, the opposite approach—opening with less sensitive questions and escalating slowly—seems to be most effective. In a classic set of studies (the results of which went viral following a write-up in the "Modern Love" column of the *New York Times*), psychologist Arthur Aron recruited strangers to come to the lab, paired them up, and gave them a list of questions. They were told to work their way through the list, starting with relatively shallow inquiries and progressing to more self-revelatory ones, such as "What is your biggest regret?" Pairs in the control group were asked simply to interact with each other. The pairs who followed the prescribed structure liked each other more than the control pairs. This effect is so strong that it has been formalized in a task called "the relationship closeness induction," a tool used by researchers to build a sense of connection among experiment participants.

ASKING TOUGH QUESTIONS FIRST CAN MAKE PEOPLE MORE WILLING TO OPEN UP.

Good interlocutors also understand that questions asked previously in a conversation can influence future queries. For example, Norbert Schwarz, of the University of Southern California, and his co-authors found that when the question "How satisfied are you with your life?" is followed by the question "How satisfied are you with your marriage?" the answers were highly correlated: Respondents who reported being satisfied with their life also said they were satisfied with their marriage. When asked the questions in this order, people implicitly interpreted that life satisfaction "ought to be" closely tied to marriage. However, when the same questions were asked in the opposite order, the answers were less closely correlated.

USE THE RIGHT TONE.

People are more forthcoming when you ask questions in a casual way, rather than in a buttoned-up, official tone. In one of Leslie's studies, participants were posed a series of sensitive questions in an online survey. For one group of participants, the website's user interface looked fun and frivolous; for another group, the site looked official. (The control group was presented with a neutral-looking site.) Participants were about twice as likely to reveal sensitive information on the casual-looking site than on the others.

People also tend to be more forthcoming when given an escape hatch or "out" in a conversation. For example, if they are told that they can change their answers at any point, they tend to open up more—even though they rarely end up making changes. This might explain why teams and groups find brainstorming sessions so productive. In a whiteboard setting, where anything can be erased and judgment is suspended, people are more likely to answer questions honestly and say things they otherwise might not. Of course, there will be times when an off-the-cuff approach is inappropriate. But in general, an overly formal tone is likely to inhibit people's willingness to share information.

PAY ATTENTION TO GROUP DYNAMICS.

Conversational dynamics can change profoundly depending on whether you're chatting one-on-one with someone or talking in a group. Not only is the willingness to answer questions affected simply by the presence of others, but members of a group tend to follow one another's lead. In one set of studies, Leslie and her coauthors asked participants a series of sensitive questions, including ones about finances ("Have you ever bounced a check?") and sex ("While an adult, have you ever felt sexual desire for a minor?"). Participants were told either that most others in the study were willing to reveal stigmatizing answers or that they were unwilling to do so. Participants who were told that others had been forthcoming were 27% likelier to reveal sensitive answers than those who were told that others had been reticent. In a meeting or group setting, it takes only a few closed-off people for questions to lose their probing power. The opposite is true, too. As soon as one person starts to open up, the rest of the group is likely to follow suit.

Group dynamics can also affect how a question asker is perceived. Alison's research reveals that participants in a conversation enjoy being asked questions and tend to like the people asking questions more than those who answer them. But when third-party observers watch the same conversation unfold, they prefer the person who answers questions. This makes sense: People who mostly ask questions tend to disclose very little about themselves or their thoughts. To those listening to a conversation, question askers may come across as defensive, evasive, or invisible, while those answering seem more fascinating, present, or memorable.

THE BEST RESPONSE

A conversation is a dance that requires partners to be in sync—it's a mutual push-and-pull that unfolds over time. Just as the way we ask questions can facilitate trust and the sharing of information—so, too, can the way we answer them.

Answering questions requires making a choice about where to fall on a continuum between privacy and transparency. Should we answer the question? If we answer, how forthcoming should we be? What should we do when asked a question that, if answered truthfully, might reveal a less-than-glamorous fact or put us in a disadvantaged strategic position? Each end of the spectrum—fully opaque and fully transparent—has benefits and pitfalls. Keeping information private can make us feel free to experiment and learn. In negotiations, withholding sensitive information (such as the fact that your alternatives are weak) can help you secure better outcomes. At the same time, transparency is an essential part of forging meaningful connections. Even in a negotiation context, transparency can lead to value-creating deals; by sharing information, participants can identify elements that are relatively unimportant to one party but important to the other—the foundation of a win-win outcome.

And keeping secrets has costs. Research by Julie Lane and Daniel Wegner, of the University of Virginia, suggests that concealing secrets during social interactions leads to the intrusive recurrence of secret thoughts, while research by Columbia's Michael Slepian, Jinseok Chun, and Malia Mason shows that keeping secrets—even outside of social interactions—depletes us cognitively, interferes with our ability to concentrate and remember things, and even harms long-term health and well-being.

In an organizational context, people too often err on the side of privacy—and underappreciate the benefits of transparency. How often do we realize that we could have truly bonded with a colleague only after he or she has moved on to a

new company? Why are better deals often uncovered after the ink has dried, the tension has broken, and negotiators begin to chat freely?

To maximize the benefits of answering questions—and minimize the risks—it's important to decide before a conversation begins what information you want to share and what you want to keep private.

DECIDING WHAT TO SHARE.

There is no rule of thumb for how much—or what type—of information you should disclose. Indeed, transparency is such a powerful bonding agent that sometimes it doesn't matter what is revealed—even information that reflects poorly on us can draw our conversational partners closer. In research Leslie conducted with HBS collaborators Kate Barasz and Michael Norton, she found that most people assume that it would be less damaging to refuse to answer a question that would reveal negative information—for example, "Have you ever been reprimanded at work?"—than to answer affirmatively. But this intuition is wrong. When they asked people to take the perspective of a recruiter and choose between two candidates (equivalent except for how they responded to this question), nearly 90% preferred the candidate who "came clean" and answered the question. Before a conversation takes place, think carefully about whether refusing to answer tough questions would do more harm than good.

DECIDING WHAT TO KEEP PRIVATE.

Of course, at times you and your organization would be better served by keeping your cards close to your chest. In our negotiation classes, we teach strategies for handling hard questions without lying. Dodging, or answering a question you *wish* you had been asked, can be effective not only in helping you protect information you'd rather keep private but also in building a good rapport with your conversational partner, especially if you speak eloquently. In a study led by Todd Rogers, of Harvard's Kennedy School, participants were shown clips of political candidates responding to questions by either answering them or dodging them. Eloquent dodgers were liked more than ineloquent answerers, but only when their dodges went undetected. Another effective strategy is deflecting, or answering a probing question with another question or a joke. Answerers can use this approach to lead the conversation in a different direction.

CONCLUSION

"Question everything," Albert Einstein famously said. Personal creativity and organizational innovation rely on a willingness to seek out novel information. Questions and thoughtful answers foster smoother and more-effective interactions, they strengthen rapport and trust, and lead groups toward discovery. All this we have documented in our research. But we believe questions and answers have a power that goes far beyond matters of performance. The wellspring of all questions is wonder and curiosity and a capacity for delight. We pose and respond to queries in the belief that the magic of a conversation will produce a whole that is greater than the sum of its parts. Sustained personal engagement and motivation—in our lives as well as our work—require that we are always mindful of the transformative joy of asking and answering questions.

A version of this article appeared in the *Harvard Business Review*.

Alison Wood Brooks is the O'Brien Associate Professor of Business Administration at Harvard Business School.

Leslie K. John is a professor of business administration at Harvard Business School.

Book Review

by Alireza Hejazi

Supertrends
50 things you need to know about the future
by Lars Tvede

CORE MESSAGE

Using the trends analysis method, this book examines the current and future implications of new technologies. Its main theme is that the world will be a far better place than the general public and even professionals realize. It summarizes the most important trends that point to the future. It considers the future in terms of demographics, economics, technologies, lifestyles, management practices, the environment, and other factors. Readers will discover what to expect in the future decades, as well as how businesses and governments should react to increasing change. This book is for anybody who wants to learn more about trends and their effects.

CONTENT ANALYSIS

Lars Tvede is a successful author and serial entrepreneur. He co-founded the start-up financing firm Nordic Eye, the think tank Futures Institute, and the crowdsourcing company Supertrends, which creates an interactive consensus timeline for the future.

He has produced an important work with the help of eight colleagues. His book analyzes underlying factors and repeating social patterns that aid in explaining and forecasting trends. Readers will learn about emerging and anticipated future technologies and lifestyles, as well as how they will be utilized in the following decades, by reading the book. They will comprehend how businesses and governments may become more future-proof by using new and creative management concepts.

The book has been divided into 12 chapters by Tvede and his collaborators. The first chapter separates people into feelers and thinkers based on their personality qualities to target the proper audience for the book. Feelers are sympathetic, concerned with maintaining a polite tone in the discussion, and seeking compromise, whereas thinkers are more inclined to make judgments based on technology, science, and reasoning. Then, in the style of Berlin's (2013) well-known book, it classifies people into hedgehogs and foxes. Hedgehogs see the world through the lens of a single, core notion, whereas foxes see it through the lens of a plethora of diverse ideas and observations.

The second chapter discusses the connection between demographics and wealth. It asserts that population growth is slowing. The third chapter is devoted to the evolution of biotechnology. It explores life in the context of computer technology. It contends that now that human DNA has been

decoded, the evolution of biology will follow the key trends in the development of computer technology. It appears that new genetically modified humans will be drastically altering the face of our globe.

Computers, software, and electronic networks are discussed in the fourth chapter. In certain sectors, it identifies an exponential rate of increase. According to Tvede, artificial intelligence (AI), virtual reality (VR), and augmented reality (AR) are three major trends that greatly increase intellect and facilitate computer-driven advances. The fifth chapter illustrates the way to infinite energy. It claims that the world's energy supply is experiencing an exponential shift from carbon to hydrogen, which will be completed by about 2150 if current trends continue.

The sixth chapter emphasizes the necessity of innovation in protecting resources and the environment. Tvede considers invention to be humanity's most valuable resource. He believes that the only way to get fresh resources is via creativity. Tvede's ideas on emerging networks and decentralized technologies are reflected in Chapter 7. It asserts that the capacity and opportunity to combine items in novel ways is critical to the production of innovation and, consequently, wealth. It highlights decentralized autonomous organizations as a developing trend that will have an impact on business in the future. It regards Blockchain as the value internet.

The eighth chapter focuses on future transportation, housing, and cities. It forecasts that demand for automobiles in new markets will be considerably larger than the marginal drop in big cities in the wealthiest nations as a result of the sharing economy. It asserts that modern economies encourage and facilitate self-service and automation of virtually any sort. Similarly, open and mobile societies generate social and economic network effects, resulting in self-perpetuating economic centers of excellence. Tvede's ideas regarding new lives, experiences, and self-realization are discussed in Chapter 9. He cites numerous examples that emphasize the experience economy, in which the entire world serves as a stage. E-sports will alter our physical and mental experiences in the future. Tvede predicts that the gig economy, microwork, and officeless work will drive this trend.

The topic of Chapter 10 is company management in a more dynamic environment. It contrasts conformist organizations with those that are successful, pluralistic, and evolutionary. The new information paradigm, according to Tvede, works through searching, perceiving, and sharing. Delegation, engagement, and inclusion are key components of new organizations. The political ramifications of tomorrow's technology are discussed in Chapter 11. The Karpman drama triangle, over-institutionalization, and the disintegration of norms, and moral degeneration are identified as three social standard patterns that frequently destroy civilizations. Finally, Chapter 12 tells readers of a hopeful future that the world will improve.

Overall, the book may be thought of as a trends report. Tvede has gathered a plethora of facts and information to enlighten his readers on what is to come in the coming decades. His study of the observed trends is useful, although in some cases it only skims the surface and does not delve further to uncover additional ramifications of each identified trend. His recognition of the synergies that may be moulded by many trends, on the other hand, is commendable. Technological advancement, economic expansion, health improvement, increasing mobility, environmental deterioration, and growing deculturation are all examples of super-trends. Many of the trends discussed in Tvede's book might be micro-trends rather than super-trends.

CONCLUSION

When comparing the population and innovation races, the book finds that, while people are frequently wary of innovation, when it succeeds, they tend to open their wallets. According to published world data mentioned in the book, the enormous rise in affluence continues. The book detects a significant geriatric boom and rural depopulation on a worldwide scale. It aspires to live in a more peaceful society. This book is a good read for investors, entrepreneurs, business executives, financial experts, and everyone interested in the future.

REFERENCES

Berlin, I. (2013). *The hedgehog and the fox: An essay on Tolstoy's view of history*. Princeton University Press.

Tvede, L. (2020). *Supertrends: 50 things you need to know about the future*. Wiley.

FUTURISTS IN ACTION

CERTIFICATE IN STRATEGIC FORESIGHT
ANTICIPATING THE FUTURE

by Dr Peter Bishop

INTRODUCTION

The future develops out of the combined influences of the world and of ourselves. Futurists deal with each of these sources of change in the two branches of their field – describing what might happen in the future (inbound change) and then influencing those outcomes toward more preferred futures (outbound change).

This first unit, describing the future, is entitled Anticipating the Future. Anticipation is a better word than describing or even forecasting because it's active. It carries the connotation of expectation, of leaning forward, of waiting for something. It's how a tennis player waits for the serve; how a child feels on Christmas morning; what a mother does in the last month of her pregnancy. Waiting (and wanting) for the future to come, oh so quickly.

PREDICTING THE FUTURE

When most people are asked to describe the future, the first thing they do is predict what is going to happen. Prediction is a well-known, scientific process. We learn it in school, mostly in science class. It has worked for centuries in everything from stars to sub-atomic particles; from rocks to species.

The problem comes when we throw people into the mix. Just like the physical sciences, the social sciences (sociology, anthropology, political science, economics and the rest) try to base their conclusions on observations (evidence). The big difference, however, is that the social sciences have no one unified theory of how the world works. Instead, they have many theories, too many perhaps, in a modern day Tower of Babel. So they do not agree on the fundamental influences on human behavior (free will or external conditions), on the motivations for action (selfishness or altruism), or even on the fundamental unit of analysis (the individual or the group). They even disagree about whether such an overall theory is possible (modernism vs postmodernism).

The role of observation in this cacophony of theories is frankly a minor one because different observers will draw different conclusions from the same observations depending on their fundamental theory. And not only will they offer different explanations for the same phenomena, more importantly for our purpose, they will make different predictions of how those phenomena will develop over time. No doubt – social science has made tremendous contributions to our understanding of human behavior, but let's face it – they are lousy at predictions.

Nevertheless, most social scientists believe that someday they will have such a theory; that they will be able to predict human behavior as well as we can predict the behavior of a planet or the ideal gas. That belief was illustrated dramatically in Isaac Asimov's classic *Foundation* trilogy many years ago, but of course that was fiction. Others disagree, and that debate will continue until such a theory is developed or until people give up trying because they find out why they can't.

For the time being, therefore, we are left with the fact that we cannot predict the future of human affairs with any degree of accuracy. Everyone knows this, but few know what to do with it. They acknowledge the fallibility of their predictions, but they go right on making them anyway. For the most part, they ignore even the grossest uncertainties, hoping that the uncertainties will not upset their predictions.

Futurists approach the future with a completely different attitude. First of all, they acknowledge that the future does emerge as the result of a causal chain of events, just like other social scientists do. So, if we knew the causal chain, we could predict what would happen fairly accurate. They differ, however, since they believe that we do not know those forces well enough to use scientific prediction as a guide to the future. The uncertainties involved in the long-term future are simply too overwhelming to disregard. In other words, they believe that what we do *not* know about the long-term future is larger and more important than what we do know.

Scientists in general focus on what is known, and their purpose is to move what they do not know into what they do know, to untangle the mysteries of the world, to make them clear and understandable. That is a noble and vital mission, and it has paid off handsomely. But that attitude can be an obstacle when the phenomena being studied are essentially unknowable. For instance, science makes no claim about supernatural phenomena because the *super*natural is by definition unknowable in a natural way.

At the same, social scientists continue to focus on prediction even when the uncertainties are part of the natural world. They believe, “We’ll figure this out someday if we keep trying.” Maybe. But that assumption treats uncertainty as something to be overcome rather than as a reality to be dealt with. The result is to continue to predict the future no matter how flawed our knowledge usually is. “We’ll figure this out someday.” The futurist’s alternative is to focus on how much we do not know and learn to deal with that rather than waiting for the day when prediction becomes useful. We might be able to predict the future some day, but for right now, we can’t, and that’s the world we live in. Deal with it!

So, let’s accept the fact that our uncertainty about the long-term future is larger and more important than what we know about it. What then? What are we to do with that uncertainty? We’re stuck because uncertainty in science is either something to be measured, as in statistical uncertainty, or overcome, as in mysteries and puzzles to be solved. But in order to deal with uncertainty, we have to overturn another fundamental assumption about the future—namely, how many futures are there? That seems like a silly question. The answer, of course, is one. All the uncertainties will be resolved when the future finally arrives; all the possibilities will collapse to one present.

But that was not the question. How many futures are there *before* it becomes the present? How many *possible* futures are there? Oh, that's a different story—very many, perhaps even an infinite number. Most people know that, too. Nevertheless, they believe that anticipating the future begins with discovering the *real* future, the one that will eventually become the present, and rejecting all the rest. Then the question becomes – is that a useful strategy? In other words, is there one real future, one that we can know today before it happens? The futurist answer is a definite "No." There might be a real future in some abstract, philosophical sense, but practically there is no way of knowing what it is before it occurs. In other words, it is impossible to predict the future. So looking for the one future that will become the present is a futile and useless exercise. "Don't waste your time," the futurist says. "There is a better way."

They recommend instead that we accept the fact that the future that we can know is really plural—i.e., the future(s), the set of all possible futures. That is a big assumption to accept, but once done, it offers enormous benefit . And it's been done before, by smarter people than ourselves. The founders of quantum mechanics (Bohr, Heisenberg, Schrödinger) had to come to accept that matter at the tiniest level was inherently unpredictable, that we could not know the position and velocity of a particle without observing and hence disturbing it. That fundamental assumption was so revolutionary that even Einstein could not accept it. He said, "God does not roll dice with the universe." Despite his resistance, almost all physicists today accept that probability and uncertainty are inherent characteristics of the universe.

Some have tried to draw a link between quantum uncertainty and the uncertainty in the macro world. There may well be such a link, but we don't have to depend on it to know that prediction is impossible and that uncertainty dominates our knowledge of the future, particularly in the long run.. We simply have to admit that we don't know how to predict the future today which, in turn, frees us from the tyranny of having to predict the future in order to know it. We are free to know *all* the futures as possibilities rather than having to argue over which one will become the present. We are free to examine them on how probable they may be, on what their implications would be, and which ones we prefer or don't prefer.

In fact, grammarians discovered that language, English and many others, has a way of expressing possibility. It is called the subjunctive mood, such as "If I were to go to the city,…" That's not a prediction; that's a possibility. The indicative mood is the mood of prediction, such as "I will go the city." In American culture, and I presume in most others as well, the indicative mood is the mood of certainty, strength and conviction. And that is too bad because the indicative mood in prediction is almost always wrong, but it usually wins the argument anyway because it sounds so certain. Would that we could all speak about the future in the subjunctive mood, leaving many possibilities on the table for a while at least.

"OK," someone says, "I admit that there are many possible futures. But aren't some more probable than others? And can't we take the most probable future as our prediction and reject the less probable ones?" Yes, that is, in fact, what most people do, but they shouldn't. That strategy is called "the best estimate" or the "most likely future." It is usually true that one of the many possible futures is more probable than any of the others, but should we focus on just that one?

Let's talk about a more familiar future – rolling dice. (Thanks, Einstein, for bringing it up!) A pair of dice produces 11 possible outcomes, from 2 to 12. And we know that one of those (7) is the most probable, more probable than any of the others. The dice can produce a 7 three ways (6-1, 5-2, 4-3) and only one or two ways for the other numbers. But do you know the actual chance of rolling a 7? It is exactly 1/6, which is more than any of the others but it is *un*likely in an absolute sense. Over the long run, a person will roll approximately one 7 in every six rolls. Would you therefore predict that a 7 will come up each and every time? You should if you have to pick one. You'll be right more than if you predicted any other number, but you will still be *wrong* 5 times of out 6! How good is that? Not very.

The problem is that we think we should pick just one outcome, one future from among all the possibilities. Dice are simple enough that we know that there are multiple outcomes, some more probable than others. We also know that it would foolish to predict just one of those outcomes each time because we would be wrong many times more than we would be right. But isn't that what we do when we ask for a single prediction of the future?

People who use forecasts, such as decision makers and policy makers, routinely ask, "What is your best estimate?" "What is most likely to occur?" "Just tell me what you think is *really* going to happen?" They would not ask for a single prediction at the dice table or the roulette wheel, but they make that mistake everyday in business and government. They forget the principle, variously attributed to Herman Kahn, that "the most likely future isn't." The most likely future isn't likely, or it is only rarely so. If the probability of a simple 7 is only 1 in 6, how less likely are the most likely outcomes in the marketplace, in the voting booth, even in our own families. So the futurist will say that it is better to know the many futures rather than just the most likely one because that one isn't very likely at all.

A much more scientific discipline that futures studies came to the same conclusion many years ago. In the 1950s, way back in the age of black and white television, TV weather forecasters predicted the weather over the next few days. "It's going to rain" or "It's not going to rain." They were usually right, but often wrong—wrong enough that they lost respect. People complained how little the forecaster knew about the weather. But then the profession came up with an ideal solution. It's called "the 20% chance of rain." Rather than predict rain or shine, they gave a probability of rain with an implied probability of shine. They forecast alternative futures; and given the precision of their discipline, they could even put a probability on it. And the complaints stopped because they could no longer be accused of being "wrong." Presumably they were keeping track so that it did rain 20% of the time when they said it would, but the public didn't know one way or other.

The purpose of this story is not that the weather forecasts silenced the complaints, though that's a nice thing, too. The point is that they were giving the public a more accurate description of the real future than just a single prediction, a description that included a set of futures (two in this case). They do the same for hurricane predictions. The expanding cone of the hurricane's track on the weather map provides a picture of the alternative futures of the hurricane's landfall. If a discipline as precise and sophisticated as weather forecaster found that alternative futures were the best way of describing the future, shouldn't we use that same logic when forecasting futures of even more complexity and importance?

So futurists don't predict the future, and you shouldn't either.

ANTICIPATING CHANGE

So we are convinced that we should not predict the future. Then what should we do? We are supposed to deal with the future as a set of alternatives, but how to do that? There is a trick, as there is with most skills, and this trick is to focus on what we do *not* know about the future in addition to what we do. Unfortunately, focusing on what we do not know is a surprisingly difficult in our society because we have been taught to talk only about what we know. "If you do not know, keep your mouth shut!" In other words, don't make a fool of yourself by showing your ignorance.

On the flip side, being clear and precise is a good way to persuade people that you are right; it's the way to win arguments, get people to listen to you, to assert power in a group. The language of certainty always trumps the language of possibility in our culture even those who are the most certain about things are also the ones who are most often wrong.

Grammarians distinguish between the language of fact (certainty) and the language of possibility (uncertainty) in the "mood" of the verb. "I will go to the city" is indicative mood; "I might go to the city" is the subjunctive. Notice the difference. One is strong, certain, factual; the other appears weak, uncertain, tentative. The indicative represents a strong commitment to do something, but the subjunctive might be more true, particularly about things that take a long time to occur and over which we have no control, such as the long-term future!

The etymology of these two words is also instructive. "Indicative" comes from the Latin word *dicare*, to proclaim. "Subjunctive" comes from *sub*, beneath, and *jungere,* to join. Taken together, it means to join beneath–in other words, to subordinate or "to treat as of less value or importance" (Merriam-Webster). Could anything be clearer? The indicative mood ("The war will end in two months, and the economy will recover.") is a proclamation for all to hear. The subjunctive form ("The war might end in two months, and the economy might recover.") is subordinated, treated as of lesser value. So we prefer the stronger language of fact, even about the future, to the weaker language of possibility. Bertrand de Jouvenel, one of the first futurists, said, "There no future facts." (*The Art of Conjecture,* 1967). Pretty obvious, even though most people speak about the future (using the indicative mood) as if there were and even when the "facts" they proclaim (predictions) are more often wrong than right.

We learn the rule about being certain first in school and then at work. So students are usually encouraged to ask questions in school. When they do, they are admitting that they do not know something. But when the teacher answers, they often get the feeling that should have known it, that it was a *stupid* question because the teacher always knows the answer (or at least appears to). Does the teacher ever not know? Of course not. Good teaching means that you know everything, right? Is that true or does it just appear that way? Does the teacher ,even the good ones, know everything about the subject? Probably not. But do they ever model what it's like to *not* know something, to not be sure, to be confused or even to be wrong. Hardly ever. So if good teachers are their model, students grow up with the belief that they must know everything (or at least appear to) to be successful.

The rule about certainty becomes even more important at work. When was the last time someone influential and well-respected said, "I don't know that." The reason they are influential and well-respected is that they seem to know everything. But is that possible? Or are they like the teacher, who knows a lot, but who puts up a good front when they don't.

We are not accusing anyone of doing anything wrong here. All the people you have been imagining in this discussion (teachers and colleagues) are good people. They are not consciously deceiving anyone. Rather they are playing the role that society asks them to play. We all play roles—parent-child, teacher-student, boss-employee, friend, spouse, customer, and so on.

Part of the role of being successful in our society then is to know for sure what is going to happen in the future. Even though knowing (predicting) the future is impossible, it's still part of the role so we do it anyway. We are not deceiving anyone. Usually we are not even aware that we are playing a role. We are just "being ourselves." We do not know that we are appearing to do something that is impossible. We really believe that we know the future, that we know what is going to happen.

We are sure of that knowledge because a part of the process of coming to that knowledge is hidden from us. Our knowledge of the future is always a conclusion (an inference) that we make based on our experience and other knowledge that we have (evidence). We cannot observe the future directly just like we cannot observe the inside of the sun, the behavior of an electron, or the lifestyle of a pre-historic tribe. In all those cases, we use things that we can observe (data) to know things we can't.

But there is a catch. No piece of data, no observation automatically leads to one and only one conclusion. There are always alternatives. Those alternatives are basis for novels and short stories "with a twist." The twist is that things are not always as they appear, that the "obvious" conclusion turns out to be wrong in the end. The guy with the gun in his hand is obviously the shooter. Well, maybe or maybe not. (Notice the subjunctive mood coming back!)

The skill of evaluating the evidence for a conclusion is called critical thinking. The details of critical thinking are contained in another essay. For the moment, we simply need to point out the hidden part of drawing conclusions–the reason that observations always support at least two conclusions and the reason that two people can draw different conclusions from the same observations. The hidden part of drawing conclusions are the assumptions we must make in order to draw the conclusion in the first place.

An assumption is a belief, usually about how the world works. It is not a fact, and it cannot be proven or disproven. Therefore, we are not forced to accept one assumption over another. Rather we are allowed to *choose* certain assumptions as true and others as false. So, for instance, we choose to believe that people are fundamentally good or not. We choose to believe that people are free and mostly responsible for their actions or they are constrained and conditioned by their environment. We choose to believe a democratic government generally does good for a society or not. And so on. Of course, reasonable (and good) people will disagree about these assumptions since they cannot be proven or disproven.

The problem is not that we have chosen these assumptions. The problem is that we have chosen them unconsciously. So we usually do not know our assumptions nor have we evaluated them in light of their alternatives to see which ones might be more reasonable. And that's too bad because assumptions play a crucial role in what we know about the world and its future.

It turns that when we are wrong, when we have made the wrong conclusion, it's usually the assumptions that are at fault. "I told the kids to turn off the water, and now the tub has overflowed!" Assumption: Kids do what they are told. Well, not always, even though they usually do. So the assumption is usually true, but not always. And not enough to be certain that it is true each and every time.

(Here we go with uncertainty again!)

Assumptions get a bad reputation since they are often wrong,. As a result some recommend that we should never make an assumption. "When you make assumptions, you make an…" You know the rest. In the early 20th century, a whole philosophical school, called Logical Positivism, was built on just that recommendation–that scientists make no assumptions, that they stick only to the facts (observations). Sounds good. But the problem was that if they did not make any assumptions, they could not make any conclusions either. So they could say only what they observed; they had to stop there. They could not say what it meant or what else they knew as a result. Pretty boring. So that philosophy is no longer with us!

Anything that we say about the future is necessarily a conclusion since we cannot observe the future directly. There are no future facts. And drawing a conclusion necessarily requires making assumption. Therefore, we have to make assumptions to say anything about the future. QED. But that's where we get into trouble. Since assumptions are beliefs, not facts or well supported conclusions, they are highly uncertain. That does not mean they are wrong, but they can be, much more often than those who make predictions claim. And since they are also hidden, from others, for sure, and often from the one making the prediction, they are the source of considerable and unrecognized uncertainty about the future.

Let's examine a prediction to see how this works. In June 2008, the U.S. Census Bureau projected that the world's population would reach 9 billion people in 2040 (http://www.census.gov/ipc/www/idb/worldpop.html). Now the Census Bureau forecasters are very good at what they do, and they would be the last ones to claim that population will be exactly that number at exactly that year. They have been wrong before, and they will probably be wrong again.

In fact, all the projections for the size of the world's population in the future have been too high.

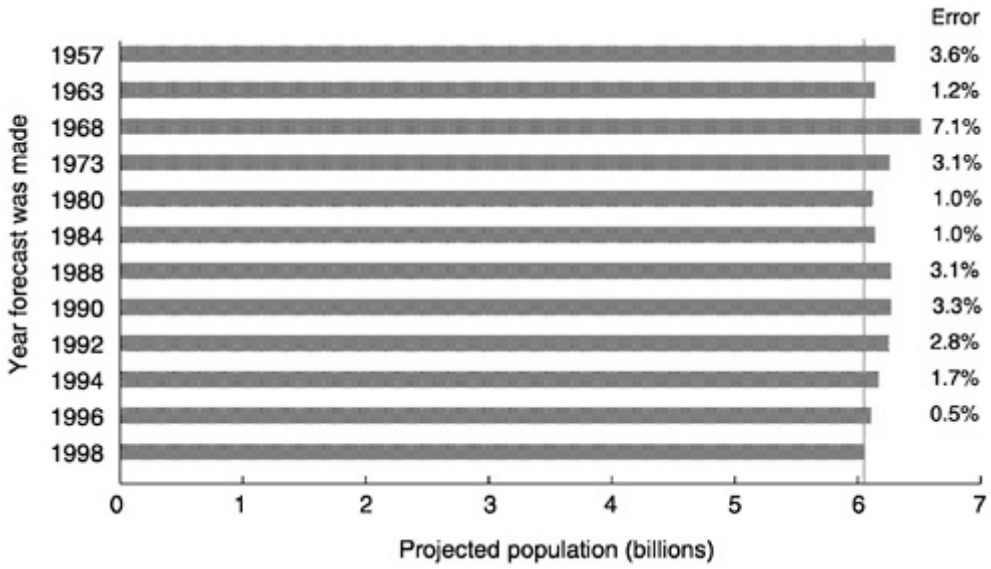


FIGURE XX

U.N. forecasts of world population in the year 2000 and their percentage error.

SOURCE: *Beyond Six Billion, National Research Council, 2000.*

And the reason for the consistent overestimate of the world's population? You guessed it – assumptions! The forecasters predicted that the world's population would grow more slowly in the future than it had right after World War II, and they were right. The reason for the slower growth was that countries were

getting richer, and richer countries had slower growth. So they projected how rich countries would be in 2000, and reduced the growth rate by that much. So far so good, except that did not reduce it enough.

Another assumption was that the only influence on the growth rate was how rich a country was, but that one was wrong. As it has turned out, whether a country develops or not, an equally important influence is the education that women receive in that country. If woman are educated, they have more say in the decision to have children or not, and they tend to want fewer children than men do. After all, they are the ones birthing and taking care of them!

Now the errors in these forecasts are not large, and no harm was apparently done because they were too high. But these forecasts are still an excellent example of how important assumptions are even in population forecasting, one of the most sophisticated forecasting topics. So just as with the past, the forecast that the world's population will reach 9 billion in 2040 also requires a number of assumptions, any of which could be wrong—a little or a lot. The Census Bureau forecasters discuss their assumptions explicitly, as any good forecaster should (http://www.census.gov/ipc/www/idb/estandproj.html#ASSUMP), and even discuss the uncertainties inherent in those assumptions. Would that we all dealt with the future with as much knowledge about what we are assuming, about how uncertain those assumptions might be and therefore what might happen instead if our assumptions turn out differently than we expect.

FORECASTING THE FUTURE; ALTERNATIVE FUTURES

Anticipation is a much richer word than prediction. Anticipation carries the connotation of expectation, of leaning forward, waiting for something. It's what a tennis player does when waiting for the serve; what a child does on Christmas morning; what a mother does in the last month of her pregnancy. Waiting (and wanting) for the future to come oh so quickly.

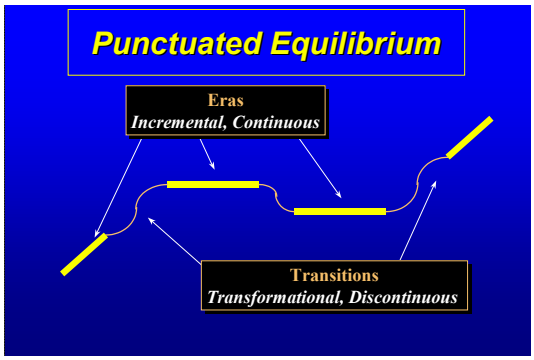
But anticipation is not a common attitude about the future. Confusion, or even dread, might be more frequent. That is because we have gotten this far, and for the most part successfully, so we don't want things to get all screwed up now. While Western culture generally believes in progress in the long run, for ourselves and for society in general, it also believes that things will probably get worse before they get better, that any short-term change will probably mess up the life we have made for ourselves. So we live in the paradoxical position of anticipating the long run future, but dreading the short-run.

Our lack of precise knowledge of the future is perhaps one of the reasons that we have not included futures studies in the regular curriculum. Accuracy and precision are valued in education above all else. Over time, we believe that we will get closer to true knowledge about ourselves and the world. Any subject that does not permit the accumulation of that knowledge over time must not be part of a scientific society, one that prepares its students to think logically and to base their claims on strong evidence.

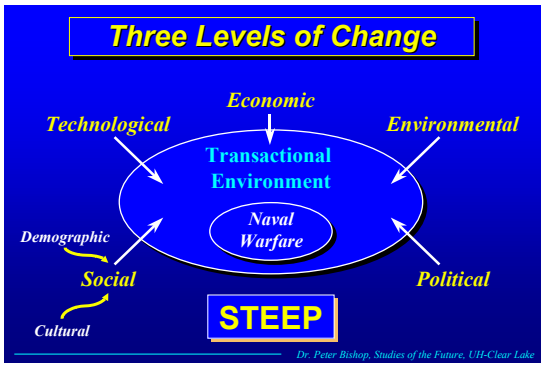
But futures studies is just such a subject. The future is endlessly new; it cannot be predicted with any accuracy

Continuous and discontinuous change alternate to form a pattern of punctuated equilibrium (taken from the theory of biological evolution). Punctuated equilibrium consists of eras, relatively long periods of stability and continuous change separated by shorter periods of instability and disruptive change. The change from one era to another is characterized by an S-curve with three periods–a run-up period in which change is slow and incremental, a period of

explosive growth in which change is unexpected and chaotic, and a maturation period in which change slows and the characteristics of the new era emerge



Predictability in the classic sense is only possible within an era, not between eras, because the assumptions required to predict the future change from one era to another. The best one can do to anticipate disruptive change is to imagine how the current era may end and what may follow it. Imaginative projections are rarely accurate since they can't predict when or how an era will change or what will follow, but they do place the present into its historical context in which all eras eventually and always come to an end.



The future changes at four levels: global, immediate, enterprise, individual. The global environment (sometimes called the STEEP environment) is the largest possible environment for change. It consists of six domains of change: demographic, ecological, technological, economic, political and cultural. The immediate environment is the environment that the enterprise is dealing with each day. For a business it consists of customers, shareholders, suppliers, competitors, technologies, regulations, etc. Other types of enterprise have similar immediate environments. The enterprise environment is the internal environment of the enterprise. It consists of people, facilities, processes, and resources. (If the enterprise is an individual, then there is no enterprise environment.) The individual, of course, can also change. The individual environment consists of experiences, skills, motivations, aspirations and inclinations.

In general, three drivers shape the future:

Trend–continuous change of some variable over time, often described by a mathematical function. Examples would the aging of society, economic growth, and increasing planetary temperature.

Event–a sudden change in some condition, usually closing one era and opening a new one. Examples would be the collapse of the Soviet Union, the introduction of HTML and the creation of the World Wide Web, and the terrorist attacks on September 11. (It is difficult if not impossible to say immediately how much change an event will create.)

Choice–decisions made by ourselves and others and the actions we take to implement those decisions. Examples would be Roosevelt's decision to create Social Security and set 65 as the retirement age, IBM's decision to use Bill Gates' MS-DOS operating system for the PC, the decision to ban CFCs to preserve the ozone layer.

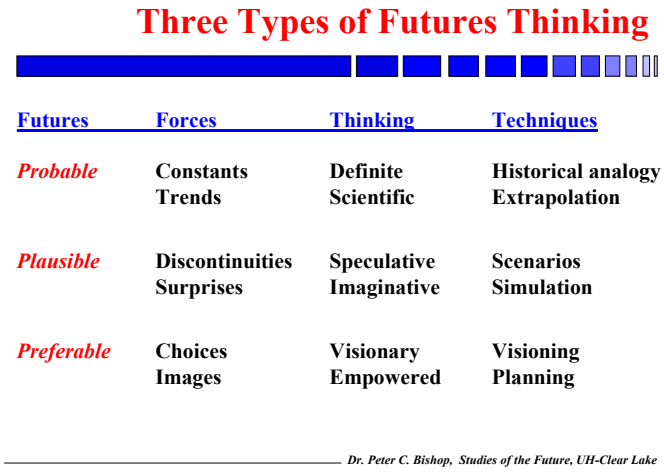
Each of the three drivers creates a different type of future with its own characteristics and tools.

Trends lead to the **probable or most likely future** (sometimes called the baseline future). The baseline future is expected and relatively predictable assuming

nothing surprising happens. Logical and quantitative analysis are preferred ways to understand the baseline future.

Events lead **to plausible futures**. Alternative future could happen instead of the baseline. Scenarios based on reasonable imagination and speculation are preferred ways to understand the plausible futures.

Choices lead to the **preferred future**. Individuals and groups strive for their preferred future. Visioning and planning are used to move in the direction of the preferred future.



The three drivers combine to create the cone of plausibility, an image of the future consisting of a cone expanding through time. The baseline future is center-line of the cone; the plausible futures are all the other regions of the cone, and the preferred future is one area of the cone selected as the vision or goal for an individual or a group. The purpose of traditional predictive forecasting is to establish the center of the cone; the purpose of scenario forecasting is to explore the other major regions of the cone (i.e., other plausible futures); the purpose of visioning and goal setting is to select a region to use as the guide for decision and action.

People can move toward their preferred future in two ways: outside-in, scanning and understanding their future and then deciding how to proceed through it; inside-out, establishing a vision or a goal and taking the best path to it. Each approach uses the same sets of tools, but in different orders. The inside-out approach begins with research and forecasting, then goes to visioning and goal setting and finally ends with planning and action. The outside-in approach begins with visioning and goal setting, then assesses the future environment through research and scanning, and finally ends with planning and action.

The processes are iterative because the future is always changing, requiring continuous scanning and learning which, in turn, may lead to different strategies and plans. By the same token, acting strongly on the future changes that future, requiring a re-analysis of implications and consequences. The future is therefore the result of a dynamic balance among trends, events and choices.

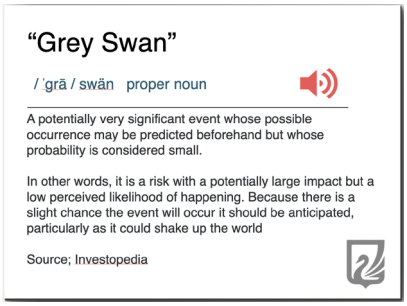
Each category of action contains a set of tools for working that category. The major tools for research and forecasting are systems thinking, information retrieval, environmental scanning, Delphi surveys, stakeholder analysis (including competitive intelligence), trend extrapolation (including sensitivity analysis), scenario development and critical thinking. The major tools for visioning and goal setting are appreciative inquiry, shared visioning, decision analysis, and strategy development. The major tools for planning and action are enterprise modeling, strategic planning, leadership, and change management.

Signals in the Noise

THE 2022 GREY SWANS

FOURTEEN IMPROBABLE, BUT HIGH IMPACT EVENTS FOR THE COMING YEAR

by Rob Tyrie & Sean Moffitt



Prediction machines are inherently flawed as the future is rarely if ever a straight line projection of the past. Alas, predicting is tough business for three big principal reasons:

A. No one gets to predict the future

— the best we can do is to proof against it. It's why casinos, insurance companies and business forecasters always make money. If you believe that you have domain over the future and is yet to be predetermined (as many of us in the Guild do), then the future is an inherently human, occasionally irrational and very volatile concept. Even more so in a connected world that fans the flames of big events, phenomena and metatrends widely and quickly.

The value in predicting is trapped in taking actions in the now as we prepare for a potentially much different future.

B. Some are on the right scent, but are way off on time

— people could (and did) predict a future pandemic, however did anybody happen to mention that it would happen January-March'20? and this one would bring us to our knees? *Ummm, no.*

I've been predicting electric automobiles for the last twenty years and have made some unwise investment decisions (file under Ballard Power Systems circa 2007). I was so right it turns out, just fifteen years wrong. As we have seen with countless companies (e.g. Sony could have owned social media/music streaming, GM could have been, and is madly transforming to catch up to be, Tesla), waiting until the last minute of certainty is frequently too late.

Predicting and envisioning different plausible futures can bring the clock and action forward for countries, companies and individuals.

C. Consultancies, media firms, researchers, thought leaders and experts hate being wrong

— we have just chewed through 100+ end of the year research reports from the Mckinseys, The Economists and the Fast Companies of the world. many of them really are the off-the-shelf trend cough syrups. Most have a horrible aftertaste, generic in purpose, inherently actionless and perhaps deal with a few symptoms of change but not the causal and systemic factors,. They are a poor prescription, maybe not snake oil but certainly not prophetic panaceas.

If we read one more well-moneyed pontificator surmise that the future of work has changed forever (with no accompanying implication), someone please put us out of our misery. One of the big reasons they are so inert — if pundits don't stick their neck out on predictions, how can they possibly be accused of being wrong?

The startups and savvy Incs. are the ones constantly battling inertia and acting against conventional thinking, In the short run, many people like to cover their ass. In the long run, fortune indeed rewards the bold predictors, not the safe ones.

Our "Grey Swans" Criteria:

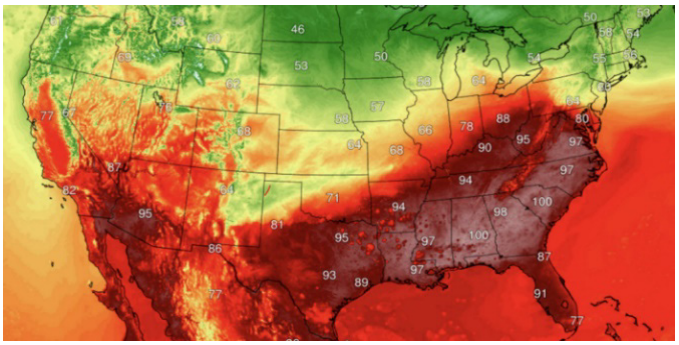
With our list of twenty-one prospective Grey Swans below, we have purposely dismissed the *status quo thought-stream* and focused on a full blackjack of solutions that have three uniquely different characteristics:

- **They candidly have less than 25% of happening** — at least on the timing we have claimed
- **If they did happen, they would have big** societal, planetary, industrial, cultural and ethical **implications**
- They have a chance of **happening, starting or accelerating in 2022**

We are more than willing to revisit many of these in 365 days and with the benefit of hindsight tell you why some of these didn't happen and maybe humble brag a little about the ones that did.

Signals in the Noise

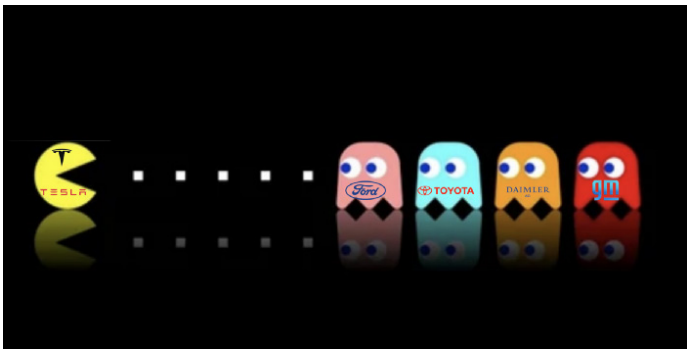
FIFTEEN IMPROBABLE, BUT HIGH IMPACT EVENTS FOR THE COMING YEAR



1. A Major Southern USA Climate Disaster Digs Deep into the Environmental Conscience. We have been playing a game of environmental roulette but very soon, perhaps this year, we will be faced with the climate urgency up close and personal. Choose your big population center poison:

- Miami will run out of drinking water and the Florida Keys will be under threat due to rising waters and stronger hurricanes
- New Orleans will be breached again as rising seas, sinking earth levees and year-over-year hurricane battering seep in, this time questioning rebuilds ever again
- Higher temperature, drought and lower river water levels will affect agriculture, ranching, health and tourism in the South-West (Texas, New Mexico and Arizona) with trickle down effects felt in Mexico
- Los Angeles, San Diego and San Jose will be affected by continued heat waves and resulting drinking water issiues, forest fires, air pollution and interstate and intrastate political issues over water.

Beyond the enormous economic, natural and people stresses, will this provide the U.S. impetus to take real action on the climate agenda not just virtue signalling? We hope the former doesn't have to happen for the latter to occur.



2. Large Failure and/or Major Acquisition of a Top Four Major Automaker Involving Tesla. Massive retooling of the auto industry is occurring to become more electric, more data-savvy and more autonomous. Why — the market demands it, and the combined successes of Musk's company have made Tesla stock a powerful currency.

With a business model that Wall Street buys and hefty price-earnings valuations, Tesla is valued higher than it's top 5 automative rivals COMBINED (these include Toyota, Volkswagen, Daimler AG, General Motiors and Nio — *China's version of Tesla*). Combine that with Tesla's market breakthroughs (e.g. Hertz just ordered 100,000 Tesla cars for its fleet), soft passenger car industry overall, and Tesla's operational challenges in pushing out supply , it all makes Tesla acquisition power plays come into full view.

Tesla can buy a big brand, merge with one or wipe one out in a span of a weekend. Being based in Texas will change Musk's thinking yet again. Three Texas sayings he will inculcate — Everything in Texas is Big. Keeping it Weird is Austin pride… and The Yellow Rose State is known by Texans as the "Promised Land".

Signals in the Noise

FIFTEEN IMPROBABLE, BUT HIGH IMPACT EVENTS FOR THE COMING YEAR

3. Housing Market Slumps and Starts a Chain Reaction. Okay yes, most urban real estate markets did quite handsomely over our worst global health challenge over the last century and yes, global housing stock remains precariously low in supply, driving up value and shutting people out of markets but follow us here…

Real estate is only as strong as the ground that it is built on. Inflation is up in every country around the world ex. Japan. What calms inflation — higher interest rates. What kills real estate markets and speculative real estate —high interest rates. Think about interest rates being 5% and above. Not possible? Remember, in May 1981, the US federal funds rate peaked at an unthinkable 19 per cent but has slid to a barely over 0% now.

With US inflation hitting a 13-year high of 5.4 per cent, the brakes may be screeching on. Combine that with imbalances of housing equity and it may mean an accompanying rise in: communal living concepts, tiny homes, mass 3D building of low income homes and repurposing retail and commercial real estate to residential needs.

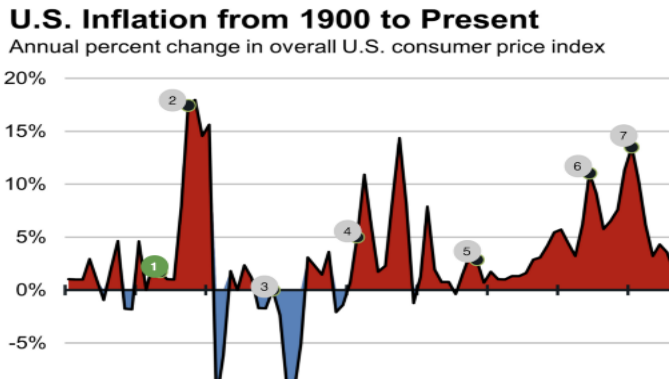
4. A Gunfight in the Pacific, involving China and spin that wheel …some major country with 90% likelihood …click, tick, click…Taiwan. With rising global ambitions, nationalist sentiments, confidence in its government and historical acrimony, China is feeling a little belligerent. And Taiwan? — well, it's because of the island being so close and all, that submarine nuclear platform too and … well what are you going to do with all those new jets you finally got operational? Oh … and those new aircraft carriers too. Not much of this armament is actually built for civil war in China. Plus, China believes Taiwan is a breakaway province heading toward declaring independence. It would rather stop that chess move ahead of time.

A Pentagon report last month said the Chinese navy was the world's biggest maritime force, with 355 vessels. It said China was expected to expand the fleet to 420 ships in the next four years, and to 460 by 2030. Taiwan freely admits China could launch an effective full scale invasion by 2025 and invites military accident by flying into their air space routinely.

Unfortunately for Taiwan and other nations in the region, the U.S. simply can't match this reach. Nor given U.S. isolationist sentiments over the last decade will they have the political mettle and standup to a showdown in the East. And if Taiwan falls, could Korea be far behind?

Signals in the Noise

FIFTEEN IMPROBABLE, BUT HIGH IMPACT EVENTS FOR THE COMING YEAR



5. Inflation in double digits is setting in like rot. Supply chain challenges are structural. Energy prices are surging and can't be addressed by sustainable capacity … at least not yet. Environmental challenges are stressing grocery baskets and commodities. Labour markets are tight. Government support programs are providing purchasing power for less and less goods. Consider the minor pandemic rebounds of things like travel and lack of slack in industries overall. And it means inflation for the long term. Now will it be 4% or 24%.

Remember on the other side of our last pandemic, inflation in the U.S. surged to an all-time high of 23.7% in June of 1920. Will we have a repeat?

6. Quantum becomes the new Bitcoin, but much realer. You hear bits and pieces about *quantum computing* in tech circles and it has some of the impressive resonance and allure that people conjure up when they say "artificial intelligence". But essentially it has been part of geek world.

According to Google Trends, AI dwarfs it as a 13X more popular search team.No blockbuster movies have had quantum as its central theme. No activists worry about the ethics of quantum. And not many Silicon Valley-ers are banging the quantum drum. Perhaps only thousands around the world know how it really works. 2022 changes that.

Without getting geeky, quantum computing is an emerging technology that leads to a remarkable increase in processing efficiency and computation time saved that supercomputers can't get close to achieving. Massive advances in quantum computing and measurement can impact all industries, and will start to kill off weak members not able to adopt it soon enough. The next pandemic may be prematurely stopped and next breakthrough vaccines may be developed via quantum. Nearly half of companies believe quantum will have a big effect on their industries over the next 3–5 years. The early players will start seeing the benefits in 2022.

New material development, new drugs, new fertilizers, new energy-efficient batteries, new display sources, new bio-friendly plastics, new financial models, new supply chain ecosystems, finding life in space, detecting mental health issues before they happen, spotting crime, they are all on the table for quantum application, and many more. We are entering an era where the true innovation of our times can't be seen anymore, but certainly can be felt.

Signals in the Noise

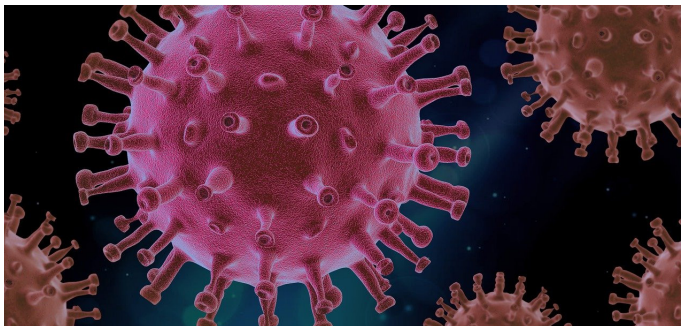
FIFTEEN IMPROBABLE, BUT HIGH IMPACT EVENTS FOR THE COMING YEAR

7. A massive terror attack with 4,000+ civilians killed in a G20 country. We have seen a levelling out of terrorism and conflict around the world over the last two decades. Twenty years removed from 9/11, we have fortunately not seen a similar scale of terror attack in G20 countries. We should not take that for granted.

With Afghanistan in Taliban hands (and communication to the world of swift American retreat), 27 military conflicts going on around the world, South American and Mexican political instability and cartels, and a rise of in cels, anything could literally go boom.

Terrorism affects people directly, rhe psyche of a country, its systems & institutions, and destabilizes multiple Industries and the GDP of the country. Yeah. Essentially terrorism *really really sucks*.

Now with the countless number of soft targets, the ability to organize sleeper cells, the impact even crudely developed weapons can now make and the polarized hatred that exists across religious, cultural and political divides, a number of nations and causes could support a terrorist group doing dirty bombs against a country aligned with or close to US, Russia or China. On this one, we fervently hope we are wrong.



8. COVID morphs again, this time more deadly and extending us three years into the future. Think about a pandemic worse than COVID-19's first variant. Never mind our already stretched patience and willingness to sit through another quarantine. What about a novel virus that kills young humans and or makes them sick for a long time?

To contain most contagious viruses like measles, we need population vaccination rates of about 95%. Currently, only 60% of the world is partially vaccinated and just over 50% are fully vaccinated with many parts of Africa below 20%. With global travel and movement, we have already seen viruses be able to adapt and become more contagious, with the recent Omicron variant as evidence. It's not unthinkable to think this virus morphs, particularly in a non-vaccinated person, in a different and potentially more fatal or furtive direction.

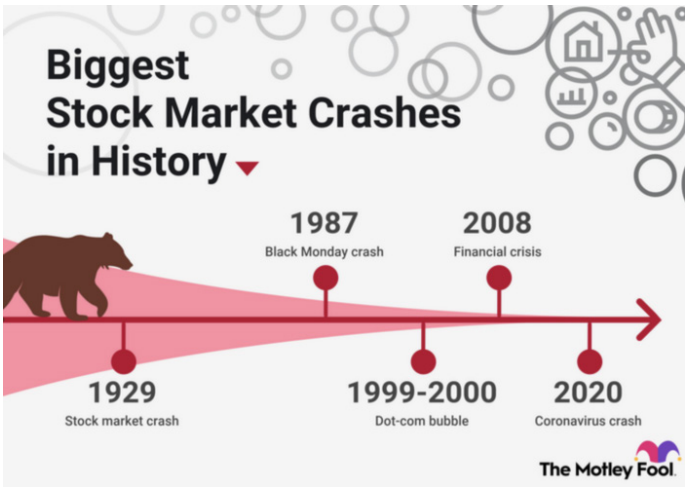
Beyond the indeterminate human costs, this level of fear may cause us to :

- Lose our societal patience altogether
- Lead to deep rifts along vaccinated and non-vaccinated lines
- Generate enormous new government expenditures
- Change in wealth again, but this time 3 or 5x more transfer of wealth, some unintended and some ethically questionable.

Hopefully we don't need this to happen to have more equitable world governance standards in place. The UN has been messaging that there needs to be interventions coming to balance vaccine global strategy better than what's happened in 2020–21.

Signals in the Noise

FIFTEEN IMPROBABLE, BUT HIGH IMPACT EVENTS FOR THE COMING YEAR



9. A full-blown Stock Market crash due to a set of overlapping events, exacerbated by cryptocurrency and state-sponsored and private cybercrime. Nobody wants to consider it until it actually happens. This one is a real one. Some seem to agree, If a small group of people on Reddit can cause ripples that circled through the markets, and particularly stock holders of Build-a-Bear, Game Stop and AMC, something with bigger origins could create an even larger wave.

The perfect storm could lead to a depression or recession that would include multiple versions of the following:

- We've been suggesting a huge state-led cybersecurity attack on critical infrastructure and financial markets for years, it happens in 2022 in a big way, leading to life impacts and systemic mistrust
- A quickly spreading social phenomenon of short selling based on some real or perceived grievance of values
- A weather (or terrorism) event along the lines of "hurricane andrew" (described above in grey swan #1)
- A cryptocurrency bug that eliminates wealth, creates unregulated loopholes or influences wild fluctuations in value.

Choose two of the above and you have double digit losses in the markets sustained over 4–8 quarters.

10. Young Political Leaders Emerge. Joe Biden — 79 years old. Vladimir Putin — 69. Cyril Ramaphosa — 69. Xi Jinping — 68. Jair Bolsonairo — 66. Fumia Kishida — 64. Olf Scholz — 63. Boris Johnson — 57. Anybody see some commonalities here? Pstttt, our leaders are old.

Meanwhile in smaller countries, Jacinda Ardern — 41 (New Zealand).Nayib Bukele— 40 (El Salvador). Sanna Marin — 38 (Finland). Former Austrian Chancellor Sebastian Kurz served two terms starting at 33. Hehhh …they're young.

But big countries will never elect inexperienced leaders you say — ohhhh really, let's return back to world leaders in the mid-90s shall we — Bill Clinton 45, Tony Blair -44.

Given the current feeling of decay in government, the technology issues and value shifts interwoven into politics, and the rising voting tide of Gen Y/Z that make up more than half of the world's population and are more educated than any generation before them, expect change and soon. (Editor's Note: we were hopeful for a young fresh voice with new policies like Andrew Yang back in 2020).

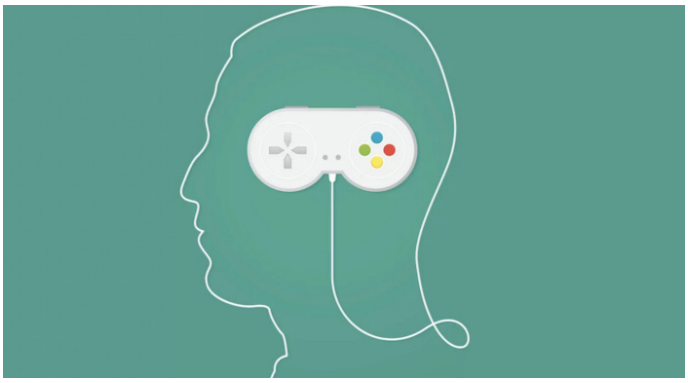
With US mid-term elections and China's 20th Party Congress, expect some young wild cards to break through as contenders to the big seat in the future.

Signals in the Noise

FIFTEEN IMPROBABLE, BUT HIGH IMPACT EVENTS FOR THE COMING YEAR

11. A massive drought-fuelled continental firestorm occurs, affecting a major city. While British Columbia had its third worst forest fire season on record in 2021, increasingly these fires are blazing through towns and property. The towns of Lytton, Vernon and White Rock Lake were set ablaze. Tragic. Horrible. Combined population just over 50,000. One province over in Fort MacMurray, the same fate five years earlier. Population 65,000, Cost — $9.9 billion..

Now imagine the scope of peril if these cities were bigger. Think Denver. Think LA. Think Melbourne. Think Lisbon. If 500 homes can burn to the ground in Boulder…as just happened days ago IN December, then it's possible, even in this coming year. Hit the right elements around urban settings, and it would change regulations, laws, insurance, forest and land management in the United States forever.



12. Video Game and Internet addiction will be policed. Citing it as a public health crisis, government and self-regulated attempts will begin to set standards and reign in the more pernicious aspects of video game play and escape. As many as 1% of the Amercian population have a gaming disorder and 4% of the population may be addicted and 5–10% suffer from internet addiction. In 2018, the World Health Organization declared "gaming disorders" as a real disease.

With the onset and expansion of new technologies (enhanced AR, MR, VR) and by new companies (Facebook — Metaverse), the benefits and perils of "too much" of a good thing becomes apparent to stakeholders in power.

Revelations & stories of addiction change public policy and game manufacturing after high profile "big-tobacco-esque" investigations take place this summer. China-style limits are placed on 18 and under in the US and Europe, wiping billions off the balance sheets of gaming companies, and not relaxed until they retool for good.

Signals in the Noise

FIFTEEN IMPROBABLE, BUT HIGH IMPACT EVENTS FOR THE COMING YEAR

13. The singularity occurs, it dawns on us in 2022. No one is sure when it happened exactly in the last decade, but this is the first year that humans realize it — *singularity is here* — the march to technological growth becomes uncontrollable and irreversible.

In 2022, we may realize it more prominently this year in three scenarios:

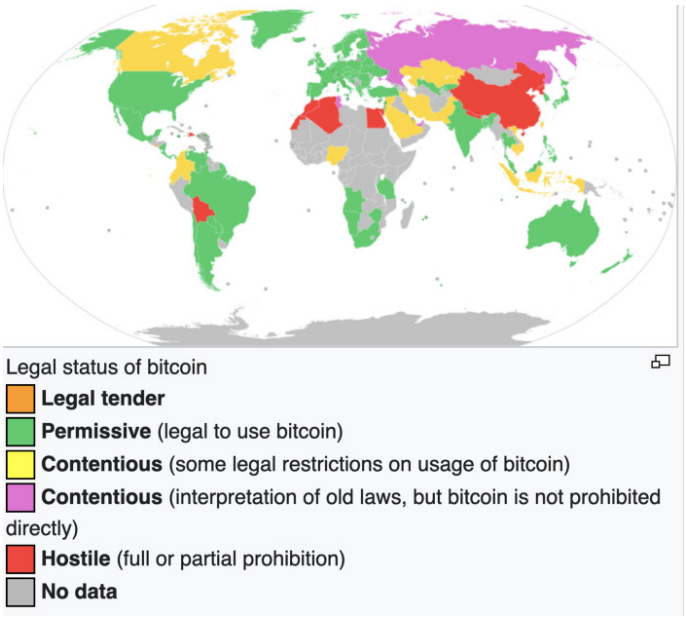
- A global cybersecurity bug takes all of our technology down for hours, maybe days and we realize our dependence on it, remember when facebook went down for hours in 2021
- A solar flare or some climate disaster does the same thing as above

biotech, gene editing, cloning or advancements in artificial super intelligence bring us closer to the edge of creating new versions of ourselves

In these rapidly evolving scenarios, rebalancing of the stock markets occurs and governments fall. Anarchy is a possible option but it is short-lived. Both choice and destiny are satisfied in the near term.

As the world saw with the pandemic, about 40% of the population in most Western countries refuse to believe this has happened and they live their lives as if it has not happened. And, in the end, that doesn't make a difference.

Forecasting further out, there is a rash of suicides and deep mental health issues in a small percentage of the population that know that the singularity has happened. They have psychotic breaks in trying to shut it down or inform the broader population to realize that the majority of systems and governance is being operated by interconnected computing systems. Wealth inequity is reduced by 20% a year and zero population growth is attained as the world population reaches 10B. The Matrix begins in 2022.



14. Twenty-five countries adopt cryptocurrencies in their backing as national currencies. Right now, El Salvador stands alone in anointing Bitcoin as its national legal tender. As of November 2021, 103 countries regulate and allow bitcoin in their countries legally. Somewhere between those two realities is where we'll be sitting at the end of 2022.

The same reasons why El Salvador introduced Bitcoin as a formal national currency is the same reason why others will too:

- Savings on commissions for remittances (20% of el salvador's gdp)
- Financial services to the unbanked
- Digitization of currency, leading to potentially other services with more uses
- Leading its regional financial and digital innovation
- The prospect of instant, frictionless transactions

Many of the larger countries and European Union are already planning fiat digital currencies, so El Salvador's move may not be so radical after all.

If progress is shown and Bitcoin valuations continue to skyrocket, expect to see many other Latin & South American, some Caribbean & African nations and a smattering of Eastern European countries and other nations who already peg their currency to other more dominant currencies to join in. Expect crypto's environmental consequences to also be mitigated somewhat in 2022, by chip efficiencies and processing time and in El Salvador's case, powering crypto by a volcano of all things.

15. Massive retail bankruptcies and 100+ Detroit-level city bankruptcies loom ahead around the world.

Global debt in 2020 reached $226 trillion dollars. I'll repeat that $226 TRILLION. That's 256% of the world's economy. Record levels are being set across public debt, business debt and household debt thresholds. We are essentially riding the planetary credit card.

Back to our earlier points about housing markets and rising interest rates, financing conditions are starting to tighten, building a noose that leaves governments with less and less wiggle room to sustain COVID recovery programs. And when that carpet starts to be taken away this Spring when pandemic numbers settle, it may look scary, particularly for people who live in inner cities, and the businesses that support them.

Let's tie a few things together:

- Trips to downtowns rest between 25–50% of pre-pandemic levels, a lot of that may be structural now, affecting major pockets of retail traffic
- Retailers continue to be under stress, about half of retail CFOs are still considering the idea of restructuring and bankruptcy given major debt, low patronage, shifting business models and murky pandemic futures
- With sales and property taxes providing as much as 70% of state and local revenues, lower sales and vacant retail properties create a challenge to local tax bases
- If Federal funding pulls back, expect to see it having a big trickle down effect to local areas

At the break of the pandemic, there were cities across North America, Europe and Asia clamoring to be saved from bankruptcy. The headlines have gone with federal debt funding, but they could easily return in 2022.