

Professional Practice in Governance  
and Public Organizations

Randolph H. Pherson  
Ole Donner  
Oliver Gnad

# Clear Thinking

Structured Analytic Techniques  
and Strategic Foresight Analysis  
for Decisionmakers



Springer



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Randolph H. Pherson • Ole Donner •  
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# INVESTIGADOR\_Z

*Shortly after completing this book, our co-author Randolph Pherson passed away. Until a few days before his unexpected death, he had completed the final improvements to this publication. Randy was a thought leader in the field of Structured Analytic Techniques, a mentor to generations of analysts, and his legacy will shape the work of many intelligence communities around the world for decades to come.*

*We owe Randy so much and will miss him terribly. Without him, this book would not exist. Thank you Randy and rest in peace, friend.*

*Bardowick, Frankfurt am Main, in  
January 2024*

*Ole Donner, Oliver Gnad*

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## Preface

Dear Readers,

What the German-Swiss comedian Curt Goetz once so smugly put in a nutshell has become a structural problem of information-saturated societies: “Everyone is allowed to think, many are spared it.”

Every day we are inundated by a flood of information, bits, and bytes. Clarity of thought thus becomes an almost impossible undertaking. How do we distinguish “true” from “false” information? How do we distinguish perception from truth? What is a strong signal, what is just background noise? Can we trust what has been generated by ChatGPT? Can we even make decisions in the face of uncertainty about what information is relevant, hidden, or just plain wrong? And then we also have to deal with the paradox of the “Unknown Unknowns” – the things we do not even know exist.

But thinking clearly is also an art because we cannot rely only on our intuition or our experience. This is because our brain constantly misleads us: it leads us to select information that fits our assumptions, to perceptions that reinforce patterns we already know, and it pushes us to make judgments that match our preconceptions. All of these cognitive biases happen unconsciously and yet shape most of our everyday decisions.

As if all this did not create enough uncertainty, we also have to deal with constant change – and it is too often disruptive. Whether it is the attack on New York’s World Trade Center (2001), the global financial crisis (2008), the Arab Spring (2010/2011), the refugee drama in the Mediterranean (2015/2016), the Corona pandemic (2020/2022), Russia’s war of aggression against Ukraine (2022–2024), or Hamas’ invasion of Israel (2023). These disruptive path changes shape our lives much more than we like or realize. And they make us painfully aware of the limitations of our analytical and prognostic abilities.

So, what can we do? The answer is provided by cognitive scientist Daniel Kahneman: We must learn to think slowly again. This is the only way we can escape the vicious circle of rash judgments, confirmation cultures, and echo chambers that prevent us from arriving at fully informed decisions and considered judgments in times of accelerated change.

With our volume, *Clear Thinking: Structured Analytic Techniques and Strategic Foresight Analysis for Decisionmakers*, we want to contribute to the establishment of a new culture of clear thinking. In doing so, we draw, among other things, on a

toolkit that the Central Intelligence Agency (CIA) had developed before 9/11 and that has been continuously refined since then. Such toolkits are used in intelligence and military analysis, by law enforcement agencies, and in the context of strategic policy formulation.

This toolkit is filled with “Structured Analytic Techniques” (SATs), which we divide into five families according to their performance cores: (1) Exploration Techniques, (2) Diagnostic Techniques, (3) Reframing Techniques, (4) Foresight Techniques, and (5) Decision Support Techniques. And because even the best analysis will miss its target audience if it is not presented in a pointed way, you will also find a chapter on effective writing in this compendium.

The authors thought for a long time about whether analysts needed another methods manual. It is like cookbooks: They inspire you and whet your appetite. But you learn to cook by doing it, not by reading books about it. It is the same with good analysis.

That is why this book is a hybrid – half method manual and half simulation cockpit. Using case studies taken from three disciplines – law enforcement, cyber, and national security, we demonstrate the interplay of the method families and their performance. We use the assassination of Swedish Prime Minister Olof Palme as a criminological case to expose analytical pitfalls and fallacies. The case study “Blackout in Berlin” explores a (supposed) cyberattack on critical infrastructure. What the future of the Arctic might look like in the face of rapidly advancing climate change and geopolitical rivalry is the subject of a simulated exercise in strategic foresight and scenario planning – a method that is increasingly being used by companies and the public sector alike to manage risk and develop options for action.

In a world characterized by fragmentation, smoldering conflicts of interests and goals, and increasing uncertainty, clear thinking not only provides a competitive advantage, but becomes an existential necessity.

Reston, VA, USA  
Bardowick, Germany  
Frankfurt am Main, Germany

Randolph H. Pherson  
Ole Donner  
Oliver Gnad

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## Acknowledgments

This book owes its creation to the support of many. In particular, we would like to thank co-authors Anne Vargas (Blackout in Berlin), Christoph Rosa (Olof Palme and Arctic Case Studies), and Dr. Volker Raddatz (translation). The authors also are indebted to Mary O’Sullivan who reviewed the manuscript, making many excellent suggestions for organizational and editorial revisions as well as proofreading the English version of the book. We also are pleased to acknowledge the thoughtful work done by Friederike Bauer who proofread the German version. In addition, Adriana Gonzalez demonstrated great creativity as well as patience in generating over 120 graphics for both the German and English versions.

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## About the Authors



**Randolph H. Pherson** Co-founder and Managing Director of Pherson Associates, LLC and CEO of Globalytica, LLC, has taught advanced analytic techniques and critical thinking skills to analysts in most US Intelligence Community agencies, in ten Fortune 100 companies, and in many countries around the world including the UK, Italy, Norway, Denmark, Spain, Romania, Australia, Saudi Arabia, and Hong Kong. He authored the *Handbook of Analytic Tools and Techniques*, 5th ed. (2019) and *How to Get the Right Diagnosis: 16 Tips for Navigating the Medical System* (2020). He co-authored *Structured Analytic Techniques for Intelligence Analysis*, 3rd ed. (2021); *Critical Thinking for Strategic Intelligence*, 3rd ed. (2021); *Cases in Intelligence Analysis: Structured Analytic Techniques in Action*, 2nd ed. (2015); *Analyst's Guide to Indicators* (2018); *Analytic Briefing Guide* (2018); *Analytic Production Guide* (2016); and *Intelligence Communication in the Digital Era: Transforming Security, Defence, and Business* (2015).

Mr. Pherson completed a 28-year career in the US Intelligence Community in 2000, last serving as National Intelligence Officer (NIO) for Latin America. Previously, at the Central Intelligence Agency (CIA), he managed the production of intelligence analysis on topics ranging from global instability to Latin America, served on the Inspector General's staff, and was Chief of the CIA's Strategic Planning and Management Staff. He is the recipient of the Distinguished Intelligence Medal for his service as NIO and the Distinguished Career Intelligence Medal. Mr. Pherson received his B.A. from Dartmouth College and an M.A. in International Relations from Yale University.



**Oliver Gnad** is the Co-founder and Managing Director of the "Bureau fuer Zeitgeschehen" (Bureau of Current Affairs), a Frankfurt-based think-and-do-tank specializing in strategic foresight and scenario planning. He is a Senior Non-Resident Fellow of the German Marshall Fund of the United States and a Certified Senior Instructor of Globalytica LLC, a Washington-based thought leader in building analytic cultures. Since 2015, he has been an adjunct faculty member of the Hertie School in Berlin. From 2008 to 2016, he served as Director of GIZ AgenZ, an in-house consultancy of "Deutsche Gesellschaft fuer Internationale Zusammenarbeit" (GIZ, German Development Cooperation). Between 2003 and 2007, he was the Director for International

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**Ole Donner** is the Founder of Strukturierte Analyse Deutschland ([intelligence-analysis.de](http://intelligence-analysis.de)) where he acts as trainer and consultant for government institutions such as the Criminal Police, intergovernmental organizations such as NATO, and national and international business enterprises to increase their intelligence and analysis capabilities. Mr. Donner has 13 years of service as an all-source intelligence analyst, manager, and lecturer with the Federal Armed Forces of Germany. He redesigned the analytic training of the German Armed Forces, focusing on competency-based teaching of Structured Analytic Techniques (SATs). He also contributed to the development of executive training in the field of “Intelligence Leadership” at the Military Academy of the German Armed Forces in Hamburg.

Mr. Donner is the author of the first German-language website on analysis and Structured Analytic Techniques ([strukturierte-analyse.de](http://strukturierte-analyse.de)) and initiator of the German Intelligence Community Conference (GICC). He is a Research Fellow at the Institute for Intelligence and Security Management (I2SM) at the NBS Northern Business School Hamburg. He received a Bachelor's degree in Political Science and a Master's degree in International Relations from the University of the Armed Forces in Hamburg. Mr. Donner was awarded the Böttcher Prize as best in his graduating class.

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## Abbreviations

A5 (Arctic Five)	Canada, Denmark (Greenland), Norway, Russia, United States
A8 (Arctic Eight)	Canada, Denmark (Greenland), Finland, Iceland, Norway, Russia, Sweden, United States
AC	Arctic Council
ACH	Analysis of Competing Hypotheses
AEP	American Electric Power
AI	Artificial Intelligence
ALCOM	Alaska Command
ANC	African National Congress
ATM	Automated Teller Machine
BEAC	Barents Euro-Arctic Council
Blaster	<a href="#">Computer worm</a> that spread on computers running <a href="#">operating systems Windows XP</a> and <a href="#">Windows 2000</a>
BNetzA	Federal Network Agency (German Bundesnetzagentur)
ChatGPT	Natural language processing tool driven by AI technology
CIA	Central Intelligence Agency
CLCS	Commission on the Limits of the Continental Shelf
EAP	European Workers Party
EEZ	Exclusive Economic Zone
E. ON	German Energy Company
ERC	Electric Reliability Corporation
EU	European Union
EVE	Evaluation of the Evidence
FBI	Federal Bureau of Investigation
Five Eyes	Australia, Canada, New Zealand, United States, and United Kingdom
Five W's and H	Who, What, When, Where, Why, and How
GIZ	German Development Cooperation
IC	Intelligence Community
IMO	International Maritime Organization
ISIS	Islamic State in Iraq and Syria
ISOs	Independent System Operators
IT	Information Technology
KAC	Key Assumptions Check

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KIQ	Key Intelligence Question
MECE	Mutually Exclusive and Comprehensively Exhaustive
MHG	Multiple Hypothesis Generation
MISO	Midwest Independent System Operator
MIT	Massachusetts Institute of Technology
MOM	Motive, Opportunity, and Means
MOSES	Manipulability of Sources
MSG	Multiple Scenarios Generation
NATO	North Atlantic Treaty Organization
NIO	National Intelligence Officer
NORAD	North American Aerospace Defense Command
NORTHCOM	US Regional Command for North America
NSR	Northern Sea Route
NWP	Northwest Passage
OFA	Operative Case Analysis (Operative Fallanalyse)
OPEC	Organization of the Petroleum Exporting Countries
PII	Personally Identifiable Information
PKK	Kurdistan Workers' Party
POP	Past Opposition Practices
RAF	Red Army Faction
SAPÖ	Sweden's domestic intelligence service
SATs	Structured Analytic Techniques
SCADA	Supervisory Control and Data Acquisition
STEMPLES+	Social, Technical, Economic, Military, Political, Legal, Environmental, Security PLUS Demographic, Psychological, Reputational
SWOT	Strengths, Weaknesses, Opportunities, and Threats
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
US	United States
VOIP	Voice Over Internet Protocol
WMD	Weapons of Mass Destruction
WYSIATI	What you see is all there is

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# Setting the Stage

1

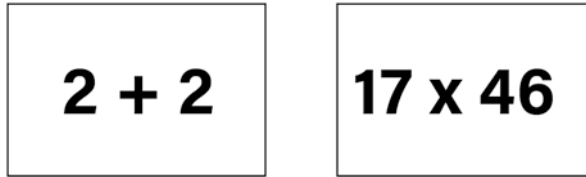
## Abstract

Today's world, with its ever-increasing range of information and decision options, makes thinking, judging, and decision making more difficult. Unfortunately, mere knowledge of errors in thinking and judgment does not protect us from avoiding them: structured techniques provide the basic materials for effective decision making in all analytic domains – private, business, and government – and at all levels – tactical, operational, and strategic. Because SATs are designed to improve thinking and judgment – both of which are needed anytime and anywhere – this book is for every single “thinker.” Whether you are an experienced analyst or just starting out in the field, we hope this book will provide you with the knowledge and techniques you need to effectively tackle complex problems.

Did you notice something when reading the two combinations in Fig. 1.1? When you saw the first combination, the solution “four” probably came to you quickly and intuitively, even though you were not asked to calculate it. The solution came to you automatically, almost effortlessly. We are talking about *thinking fast* here. Few of you would have come to a solution in the same effortless way when you looked at the second combination. Those who decided to calculate a solution to combination two had to make a cognitive effort to do so. You had to visualize the rules of multiplication, keep intermediate results in mind, and then calculate the number 782. The experience you had with the second combination, unlike the first case, was an active vs. passive experience. Here we speak of *thinking slow* or analytical thinking.

When everything flows and seems to run by itself, *fast thinking* is at work; when something is not quite right or does not “square” with our experiences or immediate conclusions, *slow thinking* is necessary.





The image shows two square boxes side-by-side. The left box contains the equation  $2 + 2$  in a large, bold, black font. The right box contains the equation  $17 \times 46$  in a large, bold, black font.

**Fig. 1.1** Calculating fast and slow. (Source: Copyright 2024 Pherson. All Rights Reserved)

**Fast Versus Slow** Most people would almost automatically gravitate to a way of thinking that produces results quickly, but analysts and their supervisors have ignored the challenge that results from fast thinking. With fast thinking, we are more susceptible to systematic errors in thinking and judgment: so-called cognitive biases, misapplied heuristics, and intuitive traps.

How does this play out in real life?

- A father buys a car supposedly because of its technical equipment. In fact, he unconsciously was motivated to buy it because he likes the brand. If he had stopped to do a careful analysis, he might have been able to buy a better car for less money.<sup>1</sup>
- A criminal investigator assumes that a new case is exactly like a previous case even though only a few striking parallels are present. By instinctively assuming that the cases are the same, the investigator is likely to miss important evidence.<sup>2</sup>
- A political analyst predicts a certain election because the polls point to it, and the polls have been accurate in the past. If the analyst has ignored numerous pieces of information that contradict the clearly predicted outcome, he or she may have been alert to the possibility of a different outcome rather than being greatly surprised by the result.<sup>3</sup>

Today's world, dominated by social media, facilitates such mistakes because of the vast amount of information available and our limited capacity to process all of it. Algorithms used by social networks create echo chambers that reinforce what we already believe to represent the truth. Fake news almost always has a greater reach than accurately sourced news, and its corrections are typically ignored.

---

<sup>1</sup>Here we are dealing with the affect heuristic: "Affect heuristics refer to certain decision strategies in which the decision primarily follows the feelings that arise in the person in view of the available options." Stangl, W. (2021). Keyword: 'Affect heuristics – Online Encyclopedia of Psychology and Education'. Online Encyclopedia of Psychology and Education, online: <https://lexikon.stangl.eu/7619/affektheuristik> [Accessed: 09.03.2021].

<sup>2</sup>Projecting Past Experiences: Assuming the same dynamic is in play when something appears to be in accord with an analyst's past experiences.

<sup>3</sup>Ignoring Inconsistent Evidence: Discarding or ignoring information that is inconsistent with what one expects to see and **Rejecting Evidence**: Continuing to hold to a judgment when confronted with a mounting list of contradictory evidence.

Today's world, with its ever-increasing range of information and decision options, makes thinking, judging, and decision making more difficult. Unfortunately, mere knowledge of errors in thinking and judgment does not protect us from them: "Like optical illusions, cognitive biases remain compelling even after we become aware of them."<sup>4</sup>

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## 1.1 Overview of Chapters

The book has three introductory chapters describing analytic thinking and the role of Structured Analytic Techniques (SATs); three case studies illustrating the use of SATs; and a concluding chapter for optimizing the impact of your analytic product. There are also three appendices, a glossary of commonly used terms, and a list of recommended readings.

- Chapter 1 introduces the concept of thinking fast and slow. Because fast thinking often causes us to tumble to the most obvious – but not always correct – answer, Structured Analytic Techniques can help compensate for our tendency to grasp the “immediate” or intuitive answer.
- Chapter 2 provides an overview of Daniel Kahneman’s influential work in the field of psychology, including his concept of System 1 and System 2 thinking and the biases and heuristics that influence our judgments and decisions. By understanding these biases and heuristics, we can learn to recognize whether our judgments are being influenced by these mental shortcuts and strive to make more informed and objective decisions.
- Chapter 3 focuses on several fundamentals for conceptualizing your topic, including distinguishing between data-driven and concept-driven products, identifying essential and building-block questions, and assessing the credibility of your sources.
- Chapters 4, 5, and 6 contain three real-world case studies that show how Structured Analytic Techniques can be used in practice. The first case study examines the causes of a power blackout in Europe, the second case study analyzes the assassination of former Swedish Premier Olof Palme, and the third case study looks at the strategic future of the Arctic. These case studies illustrate how Structured Analytic Techniques can be applied to real-world problems and help analysts develop conclusions and recommendations based on their findings.
- Chapter 7 deals with writing analytical products and presenting results – including visual illustrations – in a clear and concise manner. We explore the power of knowing the AIMs (Audience, Issue or Intelligence question, Message, and Storyline) of your product and applying a framework to guide your drafting and refine your draft.

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<sup>4</sup>See Heuer, Jr., Richards J: *Psychology of Intelligence Analysis*, Reston, VA: Pherson Associates (2007), p. 162.

- Appendix A provides descriptions and examples of cognitive biases, misapplied heuristics, and intuitive traps to which analysts are most likely to fall victim.
- Appendix B introduces five families of Structured Analytic Techniques. These techniques are designed to help analysts break down complex problems into smaller, more manageable pieces and think through them in a structured and systematic way. The Appendix provides an overview of each of the five families of techniques, highlights the key features and benefits of each, and describes how they are executed.
- Appendix C is referenced in the case study Blackout in Berlin! It is a statement by the US Director of National Intelligence summarizing the increasing use of cyber capabilities – including cyber espionage, attack, and influence – used by adversaries and strategic competitors to seek political, economic, and military advantage over the United States, its allies, and its partners.

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## 1.2 The Role of Structured Analytic Techniques

Analytical thinking is a skill that, like carpentry or riding a bicycle, must be learned by doing. Fortunately, techniques exist that each of us can use to avoid or at least mitigate the impact of systematic errors in thinking and judgment. These approaches – called Structured Analytic Techniques – help us incorporate slow and analytical thinking.

Structured Analytic Techniques (SATs) are useful because they externalize the analytic process and help us get thinking out of our heads and onto paper. SATs often make our analysis more objective, more transparent, and more amenable to constructive criticism.

Structured techniques also stimulate collaborative thinking by bringing the analytic process out of the analyst's office and into a collaborative knowledge enterprise. In this way, they help companies, government institutions, and ultimately every individual lay the foundations for reliable information superiority and, ultimately, decision advantage.

In the end, structured techniques provide the basic materials for effective decision making in all analytic domains – private, business, and government – and at all levels – tactical, operational, and strategic. Because SATs are designed to improve thinking and judgment – both of which are needed anytime and anywhere – this book is for every single “thinker.”

Whether you are an experienced analyst or just starting out in the field, we hope this book will provide you with the knowledge and practical skills you need to effectively tackle complex problems. We wish you much success in gaining the insights and instilling the habits of thinking discussed in this book. Analysis can do more!

# Understanding How We Think: System 1 and System 2

# 2

## Abstract

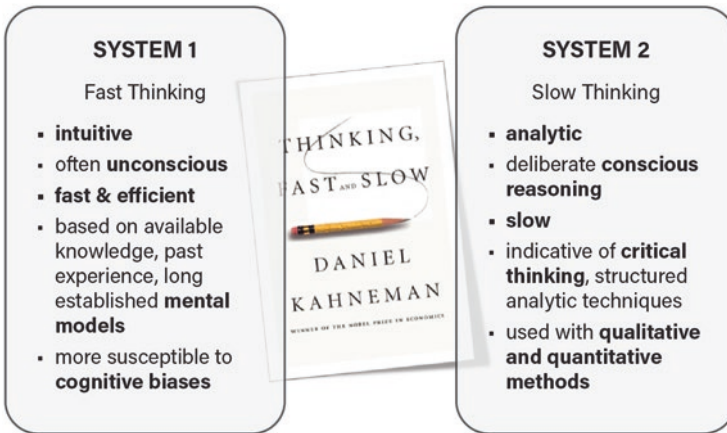
System 1 thinking enables us to reach a judgment quickly and effortlessly based on incomplete and even contradictory information. This ability has developed during evolution and contributed to the survival of our species, especially at the beginning of human development. System 2 “kicks in” when we encounter a complex calculation or a complex analysis problem and must think deliberately about what to do. System 1 thinking is more susceptible to cognitive biases which are unconscious errors of reasoning caused by our simplistic information processing strategies. Heuristics can be helpful and profitable but can also lead to misperceptions and incorrect judgments and conclusions. Intuitive traps generally lead to perceptual errors and make an accurate perception of reality more difficult. In contrast, heuristics can be helpful and profitable but can also lead to misperceptions and incorrect judgments and conclusions. Intuitive stumbling blocks are practical manifestations of both cognitive biases and misapplied heuristics and can affect the analyst’s day-to-day work.

In contrast to System 1 thinking, which is perceived as a passive experience, Nobel Laureate in Economics Dr. Daniel Kahneman<sup>1</sup> distinguishes between two types of thinking which he calls System 1 and System 2 (see Fig. 2.1):

*System 1 operates automatically and quickly, with little or no effort and no sense of voluntary control.*<sup>2</sup>

<sup>1</sup>“Daniel Kahneman [...] is a professor of psychology at Princeton University and one of the world’s most influential cognitive psychologists. He was awarded the 2002 Nobel Prize in Economics for his work.” Kahneman, op. cit.

<sup>2</sup>Kahneman, Daniel, *Thinking Fast and Slow* (New York: Farrar, Straus, and Giroux, 2011) p. 20.



**Fig. 2.1** Thinking fast and slow. (Source: Copyright Pherson. All Rights Reserved)

*System 2 allocates attention to the effortful mental activities that demand it, including complex computations. The operations of System 2 operations are often associated with the subjective experience of agency, choice, and concentration.*<sup>3</sup>

According to Kahneman, “everything that happens to us inwardly and unconsciously has been generated by System 1; our impressions, feelings, inclinations, and our perception of reality.”<sup>4</sup> We perceive the processes and results of System 1 as a **passive** experience not subject to our volitional control.<sup>5</sup> In this regard, Richards Heuer notes<sup>6</sup>:

*A basic finding of cognitive psychology is that people have no conscious experience of most of what happens in the human mind. Many functions associated with perception, memory, and information processing are conducted prior to and independently of any conscious direction. What appears spontaneously in consciousness is the result of thinking, not the process of thinking.*<sup>7</sup>

Simple examples Daniel Kahneman gives of System 1 functions are calculating  $2 + 2$ , reading a word in one’s native language on a screen, or driving on an empty

<sup>3</sup> Kahneman, *ibid.*, p. 21.

<sup>4</sup> Cf. Kahneman, *ibid.*, p. 136.

<sup>5</sup> Cf. the remarks of Dr. Daniel Kahneman in: Daniel Kahneman: “Thinking, Fast and Slow” | Talks at Google, online: <https://www.youtube.com/watch?v=CjVQJdIrDJ0&t=905s> [Accessed 02 Sep. 2019].

<sup>6</sup> Richards J. Heuer Jr. worked for the Central Intelligence Agency (CIA) for nearly 45 years. In addition to several prominent positions within the CIA, he held lectureships and received several awards for his service. Cf. Heuer, *op. cit.* p. 185.

<sup>7</sup> Heuer Jr., Richards (2): Limits of Intelligence Analysis, *Orbis*, quarterly journal of the Foreign Policy Research Institute, Winter 2005, p. 4.

road. However, System 1 also retrieves skills that we have built up over time through learning and practice:

*Knowledge is stored in memory and is retrieved without intention or effort.*<sup>8</sup>

For knowledge to be retrieved quickly, it must have been stored in long-term memory and be easily accessible. Since the information stored in long-term memory has left the superficial consciousness, this knowledge must be retrieved indirectly.

To understand how this works, we need to be aware of how the brain works. Heuer has written what he calls a simplified account in this context, but it is very useful. In Heuer's words: The human brain contains millions of neurons, interconnected by synapses. The neurons, comparable to memory chips, store information. Synapses (or axons and dendrites) connect neurons to each other; they transmit signals between neurons to access information. When we learn something – or more generally – perceive it, the connections between neurons rearrange themselves. New synapses are formed between the neurons or existing synapses are strengthened. Thus, the structure of our brain physically changes (keyword: neuronal plasticity<sup>9</sup>). The more frequently the same neurons are activated via the same synapses, the stronger the connection between the neurons becomes, and the faster we can access the information stored in the neurons.

In this context, an initial learning process can be described as a tramping path between neurons. The more often this path is used, the wider it becomes. If we use a certain neuronal connection very often, the paths can become highways.<sup>10</sup> If we think about a thing, an event, or a process in a certain way, we also physically establish a specially shaped path within the memory. It is this path that we will then follow in similar subsequent situations.

In this context, Kahneman speaks of intuition being nothing more than a form of recognition: "*Intuition is Recognition.*"<sup>11</sup> We unconsciously shape the way we file and, more importantly, retrieve information! After we have established a train of thought or a certain solution strategy, it is difficult to access the information stored in this train of thought in other ways. So, we always think about similar issues in a similar way.

When neurons are strongly connected with each other and the stored information in such a way that this set of neurons (information) can be retrieved and used as a unit, Heuer labels this a schema.<sup>12</sup> Every human being has innumerable schemas

<sup>8</sup> Kahneman, op. cit. p. 34.

<sup>9</sup> "Neuronal plasticity is the peculiarity of synapses, neurons, or even entire brain areas to change in their anatomy and function for the purpose of optimizing ongoing processes." Source: Wikipedia: Neuronal plasticity, online: [https://de.wikipedia.org/wiki/Neuronale\\_Plastizit%C3%A4t](https://de.wikipedia.org/wiki/Neuronale_Plastizit%C3%A4t), [Accessed 14 Aug. 2019].

<sup>10</sup> f. Heuer, loc. Cit. p. 20 f.

<sup>11</sup> See Kahneman, Daniel: "The End of Intuition: Daniel Kahneman Speaks at 14th-Annual Lynford Lecture," Online: <https://engineering.nyu.edu/news/end-intuition-daniel-kahneman-speaks-14th-annual-lynford-lecture>, [Accessed 16 Aug. 2019].

<sup>12</sup> Cf. Heuer, op. cit. p. 22.

available in his long-term memory. These can be banal: a schema for breakfast might contain associations about appropriate breakfast foods, times, and places to eat a morning meal.

There are more complex schemas. A schema for the functional characteristics of different political systems might contain information or associations about democracy to autocracy to dictatorship. Schemas could also exist for writing an intelligence report or national intelligence estimate.<sup>13</sup>

*Each point in memory will be associated with many overlapping schemas. This system is highly complex and has not yet been fully explored.*<sup>14</sup>

The schemas also store emotions that have to do with the encountered phenomenon. The rapid access to information by System 1 is achieved by resorting to different, partly overlapping schemas that organize our knowledge in our long-term memory. The model of our reality created in this way and maintained and updated by System 1 is described by Kahneman as follows:

*The main function of System 1 is to maintain and update a model of our personal world in which is represented what is normal in our world. The model is built on associations that link ideas to situations, events, actions, and outcomes that occur together with some regularity, either simultaneously or within a relatively short time span. As these links form and strengthen, a network of associative ideas emerges that represents the structure of events in our lives, and it determines our interpretation of the present as well as our expectations for the future.*<sup>15</sup>

System 1 thus consistently provides an interpretation of reality, and it is through System 1 that we perceive our environment.

Another characteristic of System 1 is that it enables us to reach a judgment quickly and effortlessly based on incomplete and even contradictory information. This ability has developed during evolution and contributed to the survival of our species, especially at the beginning of human development.<sup>16</sup> Consider what might have happened when a saber-toothed tiger appeared in front of two cave dwellers. The cave dweller who reacted in milliseconds and fled probably survived. The cave dweller who took time to judge what the appearance of this fascinating creature meant likely died. Thus, System 1 has ensured the survival of humanity for thousands of years.

Kahneman labels what he calls slow thinking System 2. System 2 “kicks in” when we do not automatically have an answer to a problem and are aware that we do not. When we encounter a complex calculation or a complex analysis problem, we must think and willfully choose to do so. In contrast to System 1 thinking, which is perceived as a passive experience, System 2 thinking creates the impression of an

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<sup>13</sup> Cf. Heuer, *ibid.*, p. 22 ff.

<sup>14</sup> Heuer, *ibid.*, p. 22, own translation.

<sup>15</sup> Kahneman, *op. cit.* p. 96.

<sup>16</sup> Cf. Kahneman, *ibid.*, p. 50.

**active** process.<sup>17</sup> For example, when we are asked to calculate  $17 \times 24$  in our head,<sup>18</sup> we expend mental resources to get the answer. This is conscious thinking, what Kahneman means by System 2, is active for only a fraction of the day.<sup>19</sup>

## 2.1 System 1 as a Source of Systemic Errors

What do the existence of the two systems and their interaction mean for the work of analysts? System 1 is the source of most of the things we get right, but it is often the source of systematic errors in our intuitions.<sup>20</sup> And, System 2 does not always notice and correct System 1 errors. In this regard, Kahneman notes:

*It would be unbearably tedious to constantly second-guess your own thinking, and System 2 is far too slow and inefficient to act as a substitute for System 1 in routine decision-making.*<sup>21</sup>

The analyst's work consists largely of forming judgments and drawing conclusions based on incomplete and contradictory information. System 1 is proficient in noticing patterns and similarities based on past experience. However, it tends to jump to conclusions prematurely. On this, Kahneman writes:

*Jumping to conclusions is efficient when they have a high probability of being true, when the cost of an occasional mistake is acceptable, and when they save a lot of time and effort. In contrast, jumping to conclusions is risky when the situation is unknown, the stakes are high, and there is no time to gather more information. In such circumstances, intuitive errors are likely, but they can be prevented by deliberate intervention by System 2.*<sup>22</sup>

Below is an example Kahneman uses to illustrate different systematic errors. In this case, the illustration can show how easily System 1 causes the viewer to jump to conclusions:



<sup>17</sup> Cf. the remarks of Dr. Daniel Kahneman in: Daniel Kahneman: “Thinking, Fast and Slow” | Talks at Google, online: <https://www.youtube.com/watch?v=CjVQJdIrDJ0&t=905s> [Accessed 02 Sep. 2019].

<sup>18</sup> Cf. Kahneman, op. cit. p. 32 ff.

<sup>19</sup> Cf. Kahneman, ibid., p. 33 ff.

<sup>20</sup> Cf. Kahneman, ibid., p. 79.

<sup>21</sup> Kahneman, ibid., p. 42.

<sup>22</sup> Kahneman, ibid., p. 105.



The most important feature of the above example is that it is ambiguous. In both groups, the middle symbol is the same. However, in the first row, most viewers would say the middle digits represent 13; in contrast, the middle symbol in the second group appears to be the letter B. It is interesting that very few readers are aware of the ambiguity of the symbol. Because contextualization is a System 1 function, most readers used System 1 to interpret the middle symbols in the two groups and were unaware of the choices available, the rejected alternatives, and the inherent ambiguity of the illustration.<sup>23</sup>

*System 1 does not log the alternatives it rejects, or even the fact that there were alternatives. Conscious doubt is not part of System 1's repertoire; to do so would require thinking simultaneously of mutually incompatible interpretations, which would require mental effort. Uncertainty and doubt are the domain of system 2.*<sup>24</sup>

In addition, deliberate doubts and ambiguities would be detrimental to a coherent story, and the great strength of System 1 is the creation of coherent stories. These stories are the result of activated ideas in our associative memory, and System 1 only works with activated ideas. It does not notice that information might be missing and simply works exclusively with what is available.

Kahneman coined a separate rule for this circumstance, the WYSIATI rule (*What you see is all there is*). It is interesting that the less information is available, the easier it is for System 1 to generate a coherent story. More information, particularly contradictory information, lowers the coherence of the story. When only coherent ideas are activated in our associative memory, we (or System 2) allow System 1 to generate a good story for us from these ideas.<sup>25</sup>

Analysts who rely too much on System 1 thinking can jump to unsupportable conclusions and inaccurate judgments. If System 1 is regularly in the driver's seat, the risk of erroneous analyses is high.

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## 2.2 How We Get It Wrong: Biases, Heuristics, and Traps

Cognitive biases, misapplied heuristics or “rules of thumb,” and intuitive traps are mental shortcuts based on the mechanisms of our System 1 thinking and the limited associative capacities of System 1. Biases generally lead to perceptual errors and make an accurate perception of reality more difficult. In contrast, heuristics can be helpful and profitable but can also lead to misperceptions and incorrect judgments and conclusions. Intuitive stumbling blocks are practical manifestations of both cognitive biases and misapplied heuristics and can affect the analyst's day-to-day work.

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<sup>23</sup> Cf. Kahneman, op. cit. p. 106.

<sup>24</sup> Kahneman, *ibid.*, p. 106.

<sup>25</sup> Cf. Kahneman, *ibid.*, p. 112 ff.

***Cognitive biases** are unconscious errors of reasoning caused by our simplistic information processing strategies. They prevent the analyst from accurately understanding reality, even when all the information necessary for an accurate understanding is available.<sup>26</sup>*

*Biases therefore fundamentally distort perception, making it difficult to understand reality accurately. A more detailed description of these selected biases and examples of how they function can be found in Appendix A.*

#### **Common Cognitive Biases Experienced by Analysts**

**Confirmation Bias.** The phenomenon of processing only information that is consistent with the preferred hypothesis, judgment, or conclusion.

**Vividness Bias.** The phenomenon that information that is vivid, concrete, and pictorial is absorbed, processed, stored, and remembered significantly better than abstract information.

**Hindsight Bias.** The assessment that key information, events, drivers, actors, or factors that caused or influenced a future development could have been easily identified and accounted for.

**Mirror Imaging.** The assumption that others would act in the same way as we do under the same circumstances.

In contrast, applied correctly, **heuristics**, such as the judgment heuristic, are shortcuts that help us find adequate, though often imperfect, answers to difficult questions.<sup>27</sup>

Judgment heuristics represent a form of System 1 thinking and are thus used unconsciously. They can help us reach approximately good conclusions in situations where we:

- Have too little information available for a rationally balanced judgment.
- Are unwilling to reach a rationally balanced judgment for motivational reasons.
- Are unable to reach a balanced judgment due to lack of sleep or concentration and resource problems.

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<sup>26</sup> This definition is a hybrid of the definitions and explanations of Richards Heuer and Randolph Pherson. See Heuer, op. cit. p. 111: "Cognitive biases are mental errors, caused by our simplified information processing strategies." and Globalytica: Glossary of Cognitive Biases and Inappropriately Used Heuristics, © 2017 Globalytica, LLC: "They prevent an analyst from accurately understanding reality even when all the needed data and evidence that would form an accurate view is in hand!"

<sup>27</sup> Kahneman, op. cit. p. 127.

### Common Misapplied Heuristics Experienced by Analysts

**Affect Heuristic.** The phenomenon that judgments and decisions are made on the basis of emotions about the object in question.

**Availability Heuristic.** When the estimation of the frequency or probability of an event or category is unconsciously made dependent on how easy it is to retrieve corresponding outcomes or categories from memory.

**Anchoring Effect.** The tendency to anchor one's analysis to the first or earliest piece of information that was consciously or unconsciously perceived as important. As a consequence, later adjustments of the initially completed conclusion are insufficiently adjusted and therefore remain too close to the original anchor

**Groupthink.** A usually subliminal preference for in-group consensus.

**Satisficing.** The tendency to pick the first answer that seems "good enough."

**Premature Closure.** The tendency to stop the search for a cause or explanation as soon as a reasonably satisfactory answer has been found and before sufficient information has been collected and analyzed.

In situations where a rational and balanced judgment is not possible, heuristics can be useful. However, relying on heuristics is not advisable in all situations. When judgments, inferences, and decisions based on heuristics have a high probability of being correct, then sporadic errors are tolerable and the (unconscious) recourse to heuristics is efficient. When errors would lead to high costs, resorting to heuristics is risky and should be avoided. In ambiguous situations, analysts should attempt to apply System 2 thinking to avoid (unconscious) recourse to heuristics (as System 1 functions).<sup>28</sup> A more detailed description of these selected heuristics and examples of how they function can be found in Appendix A.

Another potential disadvantage of heuristics is their conservative nature. Robert S. Sinclair<sup>29</sup> describes it as follows:

*Heuristics are inherently conservative; they follow the tried-and-true method of building on what has already happened. When the approach is confronted with the oddball situation or when someone asks what is out there in the rest of the problem space, heuristics begin to flounder. Yet we resist using other approaches, partly because we simply find them much less congenial, and partly because the record allows plausible argument about their effectiveness when dealing with an indefinitely large set of possibilities.*<sup>30</sup>

<sup>28</sup> Cf. Kahneman, *ibid.*, p. 105.

<sup>29</sup> Sinclair worked for 37 years at the Central Intelligence Agency and subsequently worked as a consultant in the field of analysis. See Sinclair, Robert S.: *Thinking and Writing: Cognitive Science and Intelligence Analysis*, Center for the Study of Intelligence, Washington, DC: February 2010 (Originally published in January 1984).

<sup>30</sup> Sinclair, *op. cit.*, p. 9.

Sinclair describes the heuristic approach as follows: "The heuristic approach is a form of intelligent trial-and-error, in which we use experience and inference to clarify, narrow, or otherwise refine a problem to make it workable." Sinclair, *ibid.*, p. 9.

The conservative nature of heuristics can pose difficulties for analysts as they usually deal with current and often novel developments. In addition, according to Sinclair's reading, heuristics disregard disruptive developments, such as technological leaps and are thus not suitable for capturing the complex environment that analysts generally have to deal with.

Finally, intuitive traps are concrete manifestations of recognized cognitive biases and heuristics that can negatively influence an analyst's daily practical work.<sup>31</sup> A list of commonly encountered intuitive traps can be found in Appendix A.

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## 2.3 How Structured Techniques Can Mitigate These Cognitive Pitfalls

It has become clear that cognitive pitfalls are outflows of System 1 thinking. The question now is how individuals and organizations can best address these cognitive challenges. Is mere knowledge of the mental shortcuts we take sufficient to protect us from their negative effects? Unfortunately, the short answer is no. Mere knowledge does not protect us. To this end, Heuer writes:

*Like optical illusions, cognitive biases remain compelling even after we become aware of them.*<sup>32</sup>

This finding also applies to heuristics and intuitive stumbling blocks. The good news is that used correctly SATs can help analysts protect themselves against the negative effects of mental shortcuts. SATs force an analyst to think systematically about problem situations and direct the focus to partial aspects that might have been overlooked or rationalized away. SATs shed light on questions under discussion or investigation and often stimulate counter-questions.

Few people have an innate ability to systematically and explicitly deal with problems. Analysts have to challenge themselves to work beyond what comes spontaneously and intuitively. As Kahneman points out: "Your thoughts and behavior may be influenced by stimuli of which you are completely unaware. . . more than we know or want by the environment of the moment."<sup>33</sup> Even if you are aware of these influences or biases, you probably do not know how they guide, frame, or constrain your thinking.

Sensitizing yourself to the problem does not solve the problem. What is required is the activation of System 2 thinking.<sup>34</sup> Pherson and Heuer in *Structured Analytic Techniques for Intelligence Analysis*, 3rd ed.<sup>35</sup> argue that Structured Analytic Techniques are a form of conscious System 2 thinking,<sup>36</sup> and, if done correctly, help

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<sup>31</sup> Cf. Pherson, Randolph / Heuer, Jr., Richards J.: *Structured Analytic Techniques for Intelligence Analysis*, third Edition, CQ Press, California: 2021, p. 23.

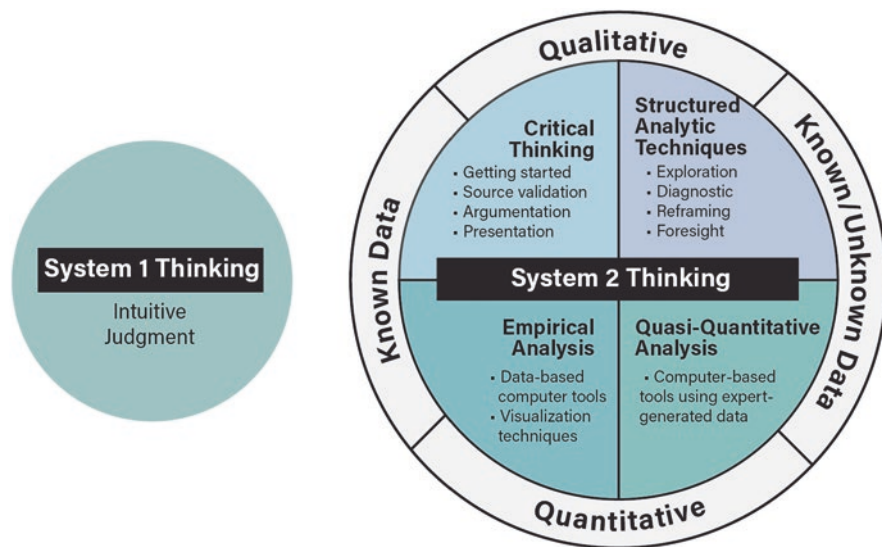
<sup>32</sup> Heuer, *ibid.*, p. 162.

<sup>33</sup> Cf. Kahneman, *op. cit.* p. 128

<sup>34</sup> Cf. Kahneman, *op. cit.* p. 36.

<sup>35</sup> Cf. Heuer/Pherson, *op. cit.*

<sup>36</sup> Cf. Heuer / Pherson, *ibid.*, p. 19 ff.



**Fig. 2.2** Types of analytic approaches. (Source: Copyright Pherson. All Rights Reserved)

overcome an analyst's tendency to rely too heavily on past experience and System 1 thinking.

Figure 2.2 shows how Structured Analytic Techniques relate to System 1 and System 2 thinking. Although this book focuses on the field of structured analysis, it is appropriate to identify some initial categorization of all the methods to see where structured analysis fits.

Of these four methods, structured analysis is the “new kid on the block,” so it is useful to consider how it relates to System 1 thinking. System 1 thinking combines subject-matter expertise and intuitive judgment in an activity that takes place largely in an analyst's head. Although the analyst may gain input from others, the analytic product is frequently perceived as the product of a single analyst, and the analyst tends to feel “ownership” of his or her analytic product. The work of a single analyst is particularly susceptible to the wide range of cognitive pitfalls, such as those described in *Psychology of Intelligence Analysis*, *Critical Thinking for Strategic Intelligence*, and throughout this book.<sup>37</sup>

The System 2 taxonomy described in Fig. 2.2 posits four functionally distinct methodological approaches to intelligence analysis. These approaches are distinguished by the nature of the analytic methods used, the type of quantification if any, and the type of data that is available. Although each method is distinct, the borders between them can be blurry.

<sup>37</sup> Richards J. Heuer Jr., *Psychology of Intelligence Analysis* (Washington, DC: CIA Center for the Study of Intelligence, 1999; reprinted by Pherson Associates, 2007).

**Critical Thinking** Critical thinking, as defined by longtime intelligence methodologist and practitioner Jack Davis, is the application of the processes and values of scientific inquiry to the special circumstances of strategic intelligence.<sup>38</sup> Good critical thinkers will stop and reflect on who is the client, what is the question, where can they find the best information, how can they make a compelling case, and what is required to convey their message effectively. They recognize that this process requires checking key assumptions, looking for disconfirming data, and entertaining multiple explanations.

**Structured Analysis** Structured Analytic Techniques involve a step-by-step process that externalizes the analyst's thinking in a manner that makes it readily apparent to others, thereby enabling it to be reviewed, discussed, and critiqued piece by piece. For this reason, structured analysis usually becomes a collaborative effort in which the transparency of the analytic process exposes participating analysts to divergent or conflicting perspectives. We believe this type of analysis helps to mitigate some of the adverse effects of a single analyst's cognitive limitations, an ingrained mindset, and the entire range of cognitive biases, misapplied heuristics, and intuitive traps.

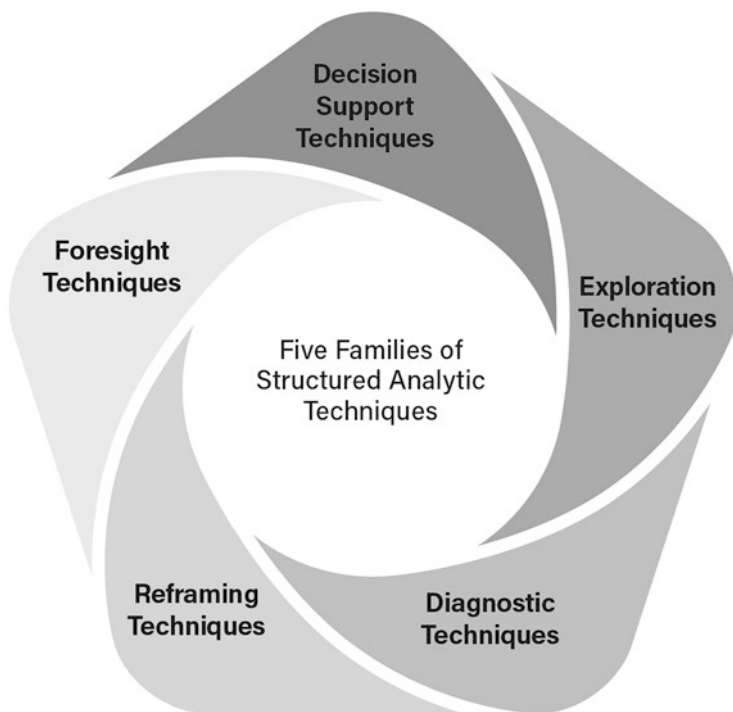
**Empirical Analysis** When large stores of quantitative data or social media reporting are available, analysts can engage quantitative methods to study the available information or "Big Data." Quantifiable empirical data are so different from expert-generated data that the methods and types of problems the data are used to analyze are quite different. Econometric modeling is a common example of this method. With the mushrooming of data obtainable from social media providers and the internet of things, sophisticated algorithms can identify trends and test hypotheses.

**Quasi-Quantitative Analysis** When analysts lack the empirical data needed to analyze an intelligence problem, one strategy is to fill the gaps using expert-generated data. Many methods rely on experts to rate key variables as High, Medium, Low, or Not Present, or by assigning a subjective probability judgment. Experts use special procedures to elicit these judgments, and the ratings usually are integrated into a larger model that describes a phenomenon, such as the vulnerability of a civilian leader to a military coup, the level of political instability, or the likely outcome of a legislative debate.

Not one of these four methods is better or more effective than another. All are needed in various circumstances to optimize the odds of finding the right answer. The use of multiple methods over the course of a single analytic project should be the norm, not the exception. For example, even a highly quantitative technical analysis may entail assumptions about motivation, intent, or capability that are best

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<sup>38</sup>See Katherine Hibbs Pherson and Randolph H. Pherson, *Critical Thinking for Strategic Intelligence*, 2nd ed. (Washington, DC: CQ Press, 2017), xxii.



**Fig. 2.3** Five families of structured techniques. (Source: Copyright Pherson. All Rights Reserved)

handled with critical thinking approaches and/or structured analysis. A brainstorming technique might be used to identify the variables to include in a dynamic model that uses expert-generated data to quantify these variables.

The use of these techniques, however, entails another essential concomitant. This arises from what Daniel Kahneman calls the “symmetry of associative links.” For this he states:

*[We experience] a high strain on our cognitive performance when the strenuous operations of System 2 are going on. On the other hand, high cognitive strain, **regardless of its cause**, tends to mobilize System 2, with the result that [...] it switches to a focused, analytical mode [of problem solving].*<sup>39</sup>

So how can Structured Analytic Techniques help analysts in concrete terms? Depending on how analysts organize their tasks, different techniques serve different purposes. Pherson and Heuer organize the techniques into families (see Fig. 2.3). Structured Analytic Techniques force analysts to get their thoughts out of their head and onto paper in a structured way. SATs decompose and externalize the analytic problem, reducing the negative effects of the natural limitations of the human mind.

<sup>39</sup> Kahneman, op. cit. p. 88, own emphasis.



Such decomposition allows analysts to force themselves to consider all the facts and not just those that are currently dominant for.

In addition, structured techniques encourage and require collaboration among analysts. The result of an analysis done by a team will always be of a higher quality in terms of the breadth of perspectives taken into account than an analyst done by a singleton alone at his or her desk. This finding is particularly true when the team has members from different specializations, cultures, and backgrounds working on a complex analytic problem.

**Exploration Techniques** such as Cluster Brainstorming help generate new ideas or rearrange existing knowledge. These techniques are particularly effective at suppressing the natural impulse to continuously generate answers to complicated questions (Mental Shotgun) and select the first answer that seems “good enough” (Satisficing – melding of the terms satisfy and suffice).

Closely interwoven with Exploration Techniques are **Diagnostic Techniques** that can be used to generate and test a wide range of hypotheses. These techniques are designed to falsify hypotheses rather than verify them. They help limit the negative effects, for example, of Confirmation Bias, Ignoring Inconsistent Information, and improperly Projecting Past experience. Diagnostic Techniques also help address the major challenge of working reflectively with assumptions and testing them.<sup>40</sup>

The results of one’s own analyses and the mental models on which they are based can also be questioned by using **Reframing Techniques**. Critically questioning existing mental models helps to protect against Mirror Imaging, the Anchoring Effect, and the assumption that the future will only change marginally.<sup>41</sup>

**Foresight Techniques** and **Indicators** help look into the future.<sup>42</sup> They are used to generate a set of plausible, mind-stretching stories or trajectories that do justice to the complex world in which we live. Decision makers can thus be made aware of developments for which they should prepare either to minimize potential risks or to take advantage of emerging opportunities. Working with Foresight Techniques helps mitigate the effects of biases and heuristics such as Groupthink, Premature Closure, and the Anchoring Effect.<sup>43</sup>

Finally, **Decision Support Techniques** enable the recipients of analyses to make informed decisions based on as complete a picture of the situation as possible. The same techniques can help analysts model decision situations focusing on hostile actors or competitors to better anticipate their actions. The techniques minimize the mistakes caused by Premature Closure, Groupthink, and Mirror Imaging.<sup>44</sup>

In sum, SATs are thinking tools that help analysts conduct System 2 analysis and manage the cognitive challenges they face every day.

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<sup>40</sup> Cf. Pherson/Heuer, *ibid.*, p. 128 ff.

<sup>41</sup> Cf. Pherson/Heuer, *ibid.*, p. 182 ff.

<sup>42</sup> Cf. Pherson, Randolph / Heuer, Jr., Richards J.: *Structured Analytic Techniques for Intelligence Analysis*, 3rd Edition, CQ Press, California: 2020, p. 90 f.

<sup>43</sup> Cf. Pherson/Heuer, *ibid.*, p. 250 ff.

<sup>44</sup> Cf. Pherson/Heuer, *ibid.*, p. 306 ff.



Structured Analytic Techniques are not a panacea despite being tools useful in activating System 2 thinking. They do not ignore common sense, nor do they magically deliver results that are beyond reproach.<sup>45</sup> At present, structured techniques provide analysts with a type of analytic toolbox that will help meet the cognitive challenges that analysts encounter. By enabling System 2 thinking, SATs help analysts become more conscientious and professional in the pursuit of their craft.

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## 2.4 Five Habits of the Master Thinker

The most common criticism of Structured Analytic Techniques is “I do not have enough time to use them.” The experience of most analysts – and particularly managers of analysts – is that this criticism is not justified. In fact, if analysts stop to consider the time it takes to research an issue, draft an analysis, coordinate the analysis, and walk the paper through the editing process, they will usually discover that the use of structured techniques almost always speeds the process.

Same day, quick turn-around items may be the exception to the conclusion above as one can credibly argue that it is not possible to take the time to use structured techniques in such circumstances. The best response to this observation is to encourage analysts to practice using core structured techniques when deadlines are less pressing. In so doing, they engrain new habits of thinking critically. If they, and their colleagues, practice how to apply the concepts embedded in the structured techniques when they have time, they will likely apply these critical thinking skills instinctively when under pressure.

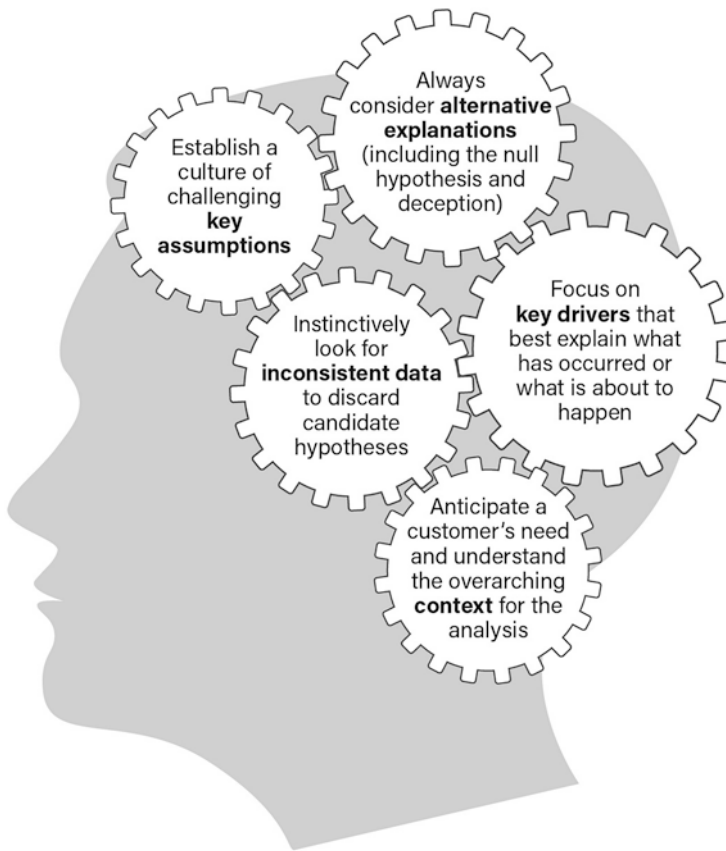
The Five Habits of the Master Thinker was inspired by a discussion the author had with analysts in the UK Cabinet Office who asked the author: “If I have only two hours to write a paper for the Minister for Defence, how can I afford to take time to use a structured technique?”

The Five Habits of the Master Thinker are (see Fig. 2.4):

- Challenging **key assumptions**. If you ask your colleagues to challenge your key assumptions on a regular basis, you will become more sensitive to them yourself and will increasingly question if your assumptions are well-founded.
- Developing **alternative hypotheses** when confronted with a new development. Although new alternatives may appear initially unlikely, over time as new evidence surfaces, one may evolve into the lead hypothesis.
- Looking for **inconsistent data**. This is the hardest habit of the five to master, but the one that can reap the most benefits in terms of time saved when investigating or researching an issue.

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<sup>45</sup> For a critical reflection on the empirical demonstrability of the benefits of structured analytic techniques, see: Artner, op. cit. and Heuer/Pherson, op. cit., p. 345 ff.



**Fig. 2.4** The five habits of the master thinker. (Source: Copyright 2024 Pherson. All Rights Reserved)

- Asking at the outset what **key drivers** best explain what has occurred or will foretell what is about to happen. If analysts quickly identify key drivers, the chance of surprise will be diminished.
- Learning to stop and reflect on the **overarching context** for the analysis. Analysts must resist the tendency to plunge in as soon as a task comes their way; forging ahead without reflecting usually results in bad analysis and wastes research time.

Learning how to internalize the five habits requires a determined effort. Applying each core technique to three to five real problems should implant the basic concepts firmly in any analyst's mind. With every repetition, the habits will become more engrained and, over time, will become instinctive. Few analysts can wish for more: if they master the habits, they will both increase their impact and save themselves time.

# Conceptualizing Your Topic

# 3

## Abstract

As you begin your project, the first question to ask is how best can I support my client or policymaker. The Analytic Spectrum (see Figure 3.1) describes the various categories of analysis they are seeking. A second question to address is: What are the **essential questions** I must understand and answer and what are the building-block questions that underlie the reason for interest in my topic. When formulating the essential and fundamental questions that you should address, think about what differentiates one question from another. A good question should be relevant, timely, precisely worded, actionable, and answerable in more than one way. In the world of intelligence analysis, far more energy is devoted to assessing the credibility of testimonial information, which is defined as reporting derived from human sources, informants, or assets. The traditional use of two criteria to establish the quality of human source reporting – access and reliability – is far too simplistic and can often be misleading.

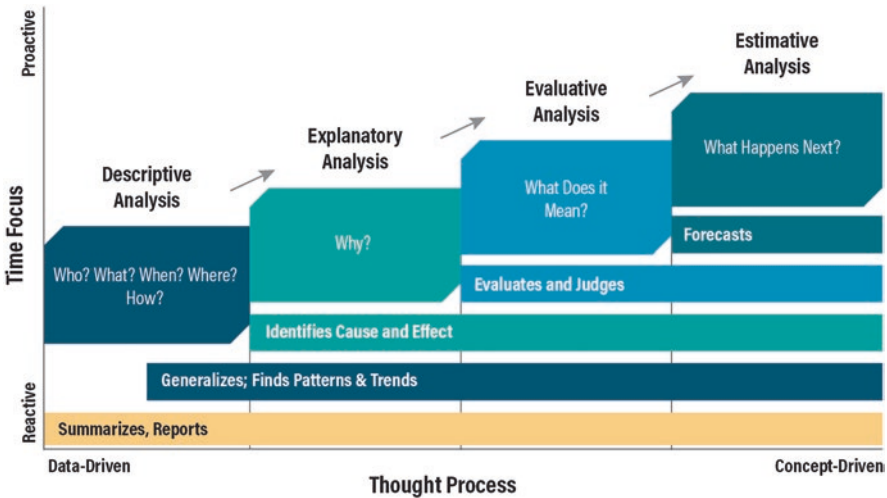
As you think about your topic or your account, the first questions to ask yourself are: What questions do I need to answer to serve my client or policymaker? What issues are they dealing with? How will the various audiences for my work use it?

The Analytic Spectrum (see Fig. 3.1) describes the various types of analytic arguments, what types of questions each type of argument might answer, and how the arguments relate to each other.<sup>1</sup>

The Spectrum is based on an amalgamation of hierarchies and conceptual categories from knowledge management, intelligence, cognitive psychology, and

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<sup>1</sup>A more detailed discussion of the categories of analytic products that comprise The Analytic Spectrum can be found in Pherson and Pherson, *Critical Thinking for Strategic Intelligence*, 3rd ed. (2021), Chapter 5: What is My Analytic Approach, p. 55.



**Fig. 3.1** The analytic spectrum. (Source: Copyright 2024 Pherson. All Rights Reserved)

rhetoric and argumentation. It graphically displays the range of analytic endeavor (from law enforcement to homeland security to national security) by arraying the required skills along one axis depicting time value (reactive to proactive) and one depicting complexity (data-driven to concept-driven). Data-driven products are more likely to summarize and generalize while concept-driven products are more likely to judge, evaluate, and anticipate.

- **Descriptive Analysis** reports or summarizes what is known about people, places, or objects.
- **Explanatory Analysis** probes the reason or cause of a situation, getting at why it has developed or is transpiring.
- **Evaluative Analysis** examines the significance of a problem or a topic as it relates to the various recipients’ interests, using logic to interpret or make judgments about values or meanings behind the data.
- **Estimative Analysis** looks to the future, asking what might happen next and proactively anticipating what courses of action decision makers may take in response to potential stimuli.

One way to conceptualize your analytic work is to identify what the fundamental reason you, your company or organization, or your government are interested in your topic. Often, the fundamental reason represents the greatest threat or possible effect that the topic might present to your way of life, general society, or the future.

- *Identifying Essential and Building Block questions.* When undertaking a new topic, seasoned analysts often ask: What are the essential questions that I must understand and answer and what are the building-block questions that underlie the reason for interest in my topic.
  - **Essential Questions** capture the core purposes for your analytic responsibilities. Are certain nations planning or conducting disinformation campaigns against your country? Are newly developed weapons systems able to harm targeted adversaries? Is the risk acceptable for your company to build a new facility or complete an agreement to work in countries undergoing political change?
  - **Building-Block Questions** are the core underlying topics that must be probed to enable you to answer the essential questions. These questions tend to be open-ended or, if close-ended, the “yes/no” or factual answer suggests the need for elaboration. They provide the basis for research, information collection, and monitoring. For example: Which nations are suspected of conducting disinformation campaigns? What tactics are they using? What are the targets? What do these elements tell us about the nations’ intentions and objectives?
- *Scanning the environment to find out what others think about the subject.* What issues surface repeatedly in the media or government publications? What can you learn from agendas or notes from decision maker meetings? On what issues are other intelligence and policy organizations focusing?
- *Identifying trends.* What can you learn from available data sets like economic indicators, crime statistics, episodes of civil unrest, health statistics, or environmental indicators?
- *Engaging in Outside-In Thinking.*<sup>2</sup> How will developments outside an organization or not directly related to an issue affect it? Consider, for example, how the invention of cell phones and the internet have impacted our personal and professional lives – from making contact to accessing knowledge to shopping and elections. By the same token, developments such as in artificial intelligence (AI) and machine learning merit the attention of all analysts who seek to understand the impact of “outside” drivers on “inside” issues.
- *Considering the “white space.”* White space in publication design is empty or negative space that focuses visual attention on what is there. In so doing, it can help aim your attention on what is known and what is important that is missing, poorly articulated, or not yet defined. White space provides the opportunity to reflect on what is missing or could be reframed to be more relevant and valuable

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<sup>2</sup>For more information about the Outside-In Thinking technique, see Pherson and Heuer, *Structured Analytic Techniques for Intelligence Analysis*, 3rd ed., 191–194.

to your client. Analysts then can help bridge differences or advance understanding by addressing questions in new or diverse ways.

- *Brainstorming key questions.* MIT Leadership Center executive director Hal Gregerson advocates brainstorming with colleagues for questions instead of for answers.<sup>3</sup> to energize thinking and yield unexpected insights. For intelligence organizations, this is a common technique for rethinking the Key Intelligence Questions (KIQs) that guide their research programs. Brainstorming can help identify better ways to frame issues, identify new or evolving drivers, and get beyond biases or established ways of approaching the issues.

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### 3.1 Five Characteristics of a Good Question

A good intelligence or policy question should require deeper levels of thinking that go beyond merely summarizing surface-level facts. When formulating the essential and fundamental questions that should be addressed, think about what differentiates one question from another. A good question should be:

1. *Relevant.* The question should focus on that aspect of an emerging issue, problem, or challenge that is of greatest interest to your company, your current or potential client, your organization, or your government. Has recent reporting signaled the possibility of a new challenge or opportunity emerging? For example, are recent technological developments likely to drastically alter the market for your product? Does social media contain indications of looming political instability and social unrest that could undercut (or support) your client, company, or government's direction, product, or key policy objectives?
2. *Timely.* Is there an action-forcing event that warrants alerting someone to this issue at this time? For example: Is there an important meeting occurring in the coming days? Have we gained critical new insights about the negotiating position of an adversary or a competitor? Will the new development require that action be taken to preempt an undesirable condition before it is too late? Is there a critical time frame outside of which the issue loses relevance?
3. *Precisely worded.* Is the issue framed precisely, in context, and with syntax that will ensure the recipient's understanding? Is the question stated clearly with sufficient focus to enable a recipient to act?
4. *Actionable.* What are the implications of this issue for those interested or affected by this issue or development? What is the "So What?" Are there obvious implications if the recipient(s) acts or does not act? Will anyone be harmed? Does attention need to be focused on what actions should be taken to prevent or mitigate risk? Does the recipient of the information have the power to influence the outcome significantly? Is the response posed in such a way that it offers several

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<sup>3</sup>Hal Gregerson, *Questions Are the Answer: A Breakthrough Approach to Your Most Vexing Questions at Work and in Life* (New York: HarperCollins, 2018).

possible courses of action and identifies opportunities but does not prescribe a specific course of action or option?

5. *Answerable in more than one way.* Is the question posed in such a way that the answer has more than one credible alternative or course of action? Can the question be answered by a range of possible hypotheses and not simply by a yes-or-no response? Is the question devoid of any hidden assumptions that might lead the recipient of the materials to take an ill-advised action not supported by the facts? Are there key uncertainties that could greatly affect the outcome?

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## 3.2 Evaluate Your Sourcing

Seasoned analysts take time to assess the wide array – or not – of sources available to help understand their topic(s). Assessing the credibility of available sources is a complex process. David Schum, who extensively researched and wrote on this subject at George Mason University before his passing in 2018, posited that credibility varies depending on whether one is evaluating tangible or testimonial evidence.<sup>4</sup>

### Evaluating Tangible Evidence

Tangible evidence includes documents, objects, charts, and images that can be directly examined by someone to see what is revealed. Schum distinguished between real tangible evidence, which is an actual object, and demonstrative tangible evidence, which includes such items as diagrams, maps, and market reports that represent or illustrate tangible objects (see Fig. 3.2).

The credibility of real tangible evidence is determined by a single criterion: authenticity. The key issue is whether the authenticity of the document can be confirmed and the chain of custody is well established. These criteria are often paramount in law enforcement cases.

The credibility of demonstrative tangible evidence is determined by three metrics:

1. Authenticity.
2. The reliability of the sensing mechanism.
3. The accuracy of the representation.

A reliable sensor generates the same report when observing the same phenomenon over time. For example, a machine that tests blood should generate the same report every time that sample of blood is tested. Checking the accuracy of reports is essential but often overlooked as deadlines approach – a practice that can prove highly embarrassing when a mistake is discovered later.

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<sup>4</sup>David A. Schum, Gheorghe Tecuci, and Mihai Boicu, “Analyzing Evidence and Its Chain of Custody: A Mixed-Initiative Computational Approach,” *International Journal of Intelligence and Counterintelligence* 22 (2009): 298–319.



Tangible Evidence Reporting Criteria		Associated Questions
Real Tangible Evidence	Authenticity	<ul style="list-style-type: none"><li>Is the object or event what it is represented to be?</li><li>Could the object have been tampered with or the image manipulated in some way?</li></ul>
Demonstrative Tangible Evidence	Authenticity	<ul style="list-style-type: none"><li>Is the illustration or representation what it is represented to be?</li><li>Could illustration or representation have been altered or adjusted in some way?</li></ul>
	Reliability of Sensing Mechanisms	<ul style="list-style-type: none"><li>Would the sensing mechanism yield the same information if used again under the same conditions?</li><li>Is the sensing device reliable? Is the output provided by the sensor always consistent with the input?</li></ul>
	Accuracy	<ul style="list-style-type: none"><li>Does the illustration or representation accurately capture the event or object?</li><li>Is the illustration or representation contradicted or confirmed by other facts?</li></ul>
Human Source Reporting Criteria		Associated Questions
Competence	Access	<ul style="list-style-type: none"><li>Did the source actually see, hear, or do the event being reported?</li><li>Did the source have direct access to the information?</li></ul>
	Expertise	<ul style="list-style-type: none"><li>Is the source a practiced or trained observer?</li><li>Did the source understand the events well enough to provide an intelligent account of the events?</li><li>Has the source been responsive to earlier questions we asked?</li></ul>
Credibility	Objectivity	<ul style="list-style-type: none"><li>Is there reason for the source to report what he or she expected to see instead of what he or she observed?</li><li>Is there reason for the source to report what he or she wished to see instead of what he or she observed?</li><li>How long ago did the observation take place?</li></ul>
	Veracity	<ul style="list-style-type: none"><li>What do we know about the source's character and honesty?</li><li>Is what the source is saying consistent with what the source reported in the past?</li><li>Is the source subject to outside influences or manipulation?</li><li>Is there independent confirmation of what the source reported? Are there any other facts that contradict it?</li></ul>
	Observational Sensitivity	<ul style="list-style-type: none"><li>Does the source have a reputation for being a good observer?</li><li>What is the source's track record for accurate observations?</li><li>Could the conditions under which the observation occurred have influenced what was reported?</li></ul>
	Cultural Perspective	<ul style="list-style-type: none"><li>Could the source's cultural heritage have influenced how the source perceived the event?</li><li>Could the source's cultural heritage have influenced what the source thought was appropriate or inappropriate to report?</li></ul>

**Fig. 3.2** Source credibility criteria and associated questions. (Source: Copyright 2024 Pherson. All Rights Reserved)



## Assessing Testimonial Evidence

In the world of intelligence analysis, far more energy is devoted to assessing the credibility of testimonial information, which is defined as reporting derived from human sources, informants, or assets. As Schum rightly noted, the traditional use of only two criteria to establish the quality of human source reporting – access and reliability – is far too simplistic and can often be misleading.

In the American court system, testimonial evidence is first evaluated in terms of two criteria:

1. The competence of the reporter or observer.
2. The credibility of that source.

We believe the same standard should be applied in assessing the reliability of sources in all fields of analysis, especially intelligence analysis.

Competence and credibility are independent factors. A competent observer, for example, may have reason to provide misleading information, and an incompetent observer could just as easily provide accurate or inaccurate information to please the questioner. As Schum and Morris state, “Competence does not entail credibility, nor does credibility entail competence.”<sup>5</sup> Deciding that we can believe a source because the source has good access is a non sequitur; the source with excellent access could also be purposefully trying to mislead to influence the behavior of the receiver or to promote a personal agenda. Intelligence collectors will often indicate whether they believe a source is providing information in an effort – genuine or pernicious – to influence the recipients of the report.

Whether sources are competent or qualified to provide the information is measured in terms of their access to and understanding of the events being observed. In the intelligence world, access is a highly valued commodity. Such understanding or knowledge is usually designated by the term expertise. The value of a source having direct access to an event – for example, by attending a meeting of senior policy officials or a board of directors meeting – has little utility if the source does not understand what is being discussed or the implications of what has been decided.

Schum listed three factors for evaluating the credibility of a source: (1) the objectivity of the reporter; (2) the veracity, sincerity, or truthfulness of the source; and (3) the observational sensitivity of the source under the conditions of observation. Evaluating a source or an informant based on these criteria usually requires that the source has an established track record of reporting.

One of the authors of this book, Randolph Pherson, added a final criterion to this list: cultural perspective. A source’s cultural heritage and exposure to the world can influence how that source reports what he or she observed. Cultural heritage can influence what a source is comfortable reporting to a receiver of the information. In

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<sup>5</sup>David A. Schum and Jon R. Morris, “Assessing the Competence and Credibility of Human Sources of Intelligence Evidence: Contributions From Law and Probability,” *Law, Probability, & Risk* 6, nos. 1–4 (2007): 247–274.

some cultures, specific topics are taboo and usually are not discussed even among close colleagues or family members.

In assessing the value of a particular source, analysts should take care not to confuse the credibility of the collector with the credibility of the source. A transcript of a conversation that has been snatched from the airwaves, for example, usually provides an accurate representation of the specific conversation. In some circumstances, however, this may not be true. This can occur when the translation is incorrect, or the speaker suspects the conversation may be intercepted and is intentionally spreading disinformation.

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### 3.3 Selecting Sources

When selecting sources to support your analytic claims and judgments, the most valuable ones are usually:

- Most directly relevant to the scope and purpose of the analysis
- Recent enough to be timely and unique
- Reflective of a declared point of view
- Appropriately expert or sophisticated
- Not further removed than a primary or secondary source

How do you know when you have enough sources? Most analysts have many more sources than they actually will use to interpret or understand their topic. A good analyst is always on the lookout for new information, and the best analysts stop and ask: what kind of information might make me change my mind about this individual, development, or issue? Search profiles used in browsing the internet or various streams of information should always include key words that would appear in “disconfirming” sources or information. You will be adding new sources and information and sloughing off those that are weaker or less interesting as you write. The goal is to find the fewest sources with the best information to make your case.

# Blackout in Berlin!

# 4

## Abstract

This case study is written from the perspective that you, the readers, are members of a select task force established by the German Chancellor who has asked the task force to determine how a major blackout occurred that had significant impact on Germany – and to recommend what to do about it. The case study showcases how SATs (Key Assumptions Check, Starbursting, Mind Mapping, Cluster Brainstorming, Multiple Hypotheses Generation, and the Inconsistencies Finder™) could have been used by you and your team to solve the problem. Dates, locations, and (company) names have been changed in this case study. However, it is based on a true event.

Several years ago, on a typical, hot, and humid August Thursday evening, London, United Kingdom, experienced an unexplained several-hour blackout. The power failure occurred just before 6:30 p.m., emptying stores and halting subway trains. Elevators stopped and traffic lights darkened. Hospitals and nursing homes operated on generators, while restaurant-goers ate and drank by the lights of their smartphones. In southern London, 500,000 people were affected. The power began to return around 10 p.m. and was fully restored by midnight.

Only a few weeks later, a major power cascade blacked out a large portion of the German capital, Berlin, depriving almost four million people of power – some for up to 4 days. The outages started in Moabit in the northern part of the city and cascaded through all other city districts. Some suspected that the London blackout was a trial run to identify vulnerabilities in Europe's electric infrastructure.

The impact of the blackout in Germany was economy wide. Cellular communications were disrupted, and internet access was limited. Some areas lost water pressure, causing potential contamination of the water supply. Thousands of people in some

city districts had to boil water for several days. All cargo and passenger trains traveling to and from Berlin were shut down until limited service could resume with diesel locomotives. Airplanes were grounded because passengers could not be screened. Gas stations could not pump gas. Looting was reported in at least two districts:

Studies of past outages have identified cyber-attacks, overloaded systems, weather and vegetation, operator error, and computer glitches as causes of blackouts. In recent years, the threat of physical sabotage, terrorism, and cyber-attacks has grown. Intelligence agencies have reported that China, Iran, North Korea, and Russia have targeted US and European infrastructure, compromising electric utilities, dams, and the defense industrial base. The age and interconnectedness of the electricity grid have turned what once was a demonstration of efficiency into a vulnerability. The question for your team is: What caused major parts of Berlin to go dark?

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## 4.1 Blackout in the German Capital

Initial research reviewed by your team shows that, in many ways, it was a typical summer day in the eastern part of Germany. It was hot – the mercury rose above 35° C in some areas – but there was no severe drought or other extreme weather events. The day began as a slow news day, reflecting a more relaxed pace of business as many Berliners took time off from work to enjoy the end of the summer. In Berlin-Mitte, the Bundestag was in recess, and parliamentarians travelled to their homeland electoral districts.

It was an unusually humid day. The absence of wind made it feel unbearable for many people. Consumer and commercial air-conditioners caused a surge in electricity demand. Ronny Kuschnik, a reliability operator for the power company, Vattenfall, which is one of the five biggest power providers of Germany described the day as a typical Thursday in August.

Ronny told the task force that when he arrived at work that morning, he phoned Farzad Tehrani, an employee in the Federal Network Agency (Bundesnetzagentur). During the call, they had a friendly debate about the prospects for the upcoming Bundesliga season.

The **Federal Network Agency** ([German](#): Bundesnetzagentur or BNetzA) for Electricity, Gas, Telecommunications, Post and Railway, or Bundesnetzagentur as it is commonly known, promotes effective competition in the regulated areas and ensures non-discriminatory access to networks. It protects important consumer rights and is also the root certification authority under the Electronic Signatures Act. In addition, the Bundesnetzagentur is responsible for implementing the Grid Expansion Acceleration Act.<sup>1</sup>

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<sup>1</sup> Adapted from The Bundesnetzagentur, December 30, 2020, <https://www.bundesnetzagentur.de/EN/General/Bundesnetzagentur/Bundesnetzagentur-node.html>.

Ronny was mentally focused on the coming weekend – a getaway with his family to their lakeside cabin in Brandenburg. At 3:46 p.m., however, he became aware that something was terribly wrong, the Vattenfall electrical network was in danger of collapse – reminding him of the several-hour blackout in London earlier in the month.

### **Pre-Blackout Activities**

Earlier that morning, Ronny read the turnover notes on the clipboard left from the reliability operator on the graveyard shift. The day looked typical, and the power system appeared stable. The hot temperatures meant demand for electricity to support air-conditioning was high. After the blackout, he remembered two key points from the overnight notes:

- The peak load on that day was likely to be the highest of the year, perhaps even 20 percent higher than 3 days earlier. Five units would be out of service, but the previous night's forecast of today's power requirements indicated adequate power.
- The Federal Ministry of the Interior had issued a bulletin reminding operators that in late July, intelligence agencies received reporting that several groups could attempt a physical attack during the summer involving explosions at oil-producing facilities, power plants, or nuclear plants in Western Europe. Management had been nervous about the possibility of a cyberattack?<sup>2</sup>

However, the unexpected often occurs, and power companies prepare for that. So, when a neighboring power system, E. ON, had several transmission lines trip out of use around noon in south-east Berlin, only E. ON – which experienced voltage and loading problems and increased generation in response – raised concerns. About the same time, Ronny was becoming concerned that voltage in the Vattenfall system was sagging, probably because of the heavy demand.

Meanwhile, Tehrani, the employee at the Federal Network Agency, told the team that, at 12:15 p.m., he purposely turned off the automatic update feature of the Estimator program, which assesses the current condition of the grid's operations. He told his boss that the program was not functioning properly. He reported that several power systems in the capital were facing difficulties and that he was trying to identify the problem.

### **The Blackout Unfolds**

Before Ronny knew it, an electric power cascade had blacked out large portions of the city in the largest power blackout ever, depriving almost four million people of power for up to 4 days. What he concluded was that he would not be driving to the lakeside cabin that night.

Press reporting showed that a little after 4 p.m. the loss of electricity caused the lights to go out and shut down airports, subways, trains, and tunnels. The loss of electric power suspended the operation of automatic doors, elevators, and drinking

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<sup>2</sup>Brian Krebs, "Hackers Did Not Cause Blackout," *Washington Post*, November 19, 2003, [www.washingtonpost.com](http://www.washingtonpost.com).

water utilities, depriving over a million customers of potable water. It forced hospitals to run on limited power produced by backup generators. Cell phone towers, cash registers, and ATM's went out of commission.

Evening commuters who were stranded in Berlin were forced to walk home because the city's public transportation system had ground to a halt.<sup>3</sup> Local officials in Berlin predicted that when power was restored, it would take up to 6 hours before public transportation resumed operations.

All over the city, the effects were keenly felt. It took 30 hours to restore power to the city.<sup>4</sup> During that time, transportation ground to a halt, leaving most people in the city in the heat and without a way home. With traffic lights out, the streets became clogged, subway trains stopped, and the two airports canceled flights. Businesses closed because computers and cash registers did not operate. The mayor denounced price gouging by stores selling essentials such as water and batteries.<sup>5</sup> Cell phones became useless because cell towers stopped operating.

The overall economic impact of the blackout was estimated to be between \$4 billion and \$6 billion for the region.<sup>6</sup> Berlin's share was over \$1 billion – or \$36 million an hour – according to the Berlin City Comptroller. Over \$800 million of this was attributed to loss of productivity by closed businesses, while another \$250 million was lost in perishable goods.

Maintaining security was expensive, but the city avoided widespread looting. The mayor estimated that overtime for police and other city workers totaled \$10 million.<sup>7</sup>

### **Reaction and Response: “It’s a Serious Situation”**

While the Chancellor ate lunch, he was informed that a massive blackout had hit Berlin. With the specter of terrorism looming and millions of Germans out of power on a warm summer day, the Chancellor's house became a Situation Room. From there, the Chancellor – with the help of a Blackout team of quickly-selected employees of various ministries and authorities – set about the task of responding to the massive blackout.

The senior administrative specialist on the team suggested that one of the first tasks of the team should be to conduct a Key Assumptions Check. The exercise had

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<sup>3</sup>“Major Power Outage Hits New York, Other Large Cities,” *CNN*, August 14, 2003, <http://www.cnn.com/2003/US/08/14/power.outage/>.

<sup>4</sup>Ken Belson and Matthew L. Wald, “‘03 Blackout Is Recalled, Amid Lessons Learned,” *New York Times*, August 14, 2008, <https://www.nytimes.com/2008/08/14/nyregion/14blackout.html>.

<sup>5</sup>“Biggest Blackout in US History,” *CBS News*, August 15, 2003, [http://www.cbsnews.com/2100-201\\_162-568422.html](http://www.cbsnews.com/2100-201_162-568422.html).

<sup>6</sup>JR Minkel, “The 2003 Northeast Blackout – Five Years Later,” *Scientific American*, August 13, 2008, <https://www.scientificamerican.com/article/2003-blackout-five-years-later/>.

<sup>7</sup>David Teather, “Blackout Costs New York 36 m an Hour,” *The Guardian*, August 19, 2003, <http://www.guardian.co.uk/business/2003/aug/20/usnews.internationalnews>.

three objectives: (1) to get the team on the same sheet of music by prompting them to share their relevant data and insights, (2) identify solid assumptions upon which they could comfortably base their final analysis, and (3) uncover assumptions that were not supported by the facts or logic and would require the team to conduct further investigations and analysis.

#### **Electricity: A High-Wire Balancing Act**

Electricity is a vital commodity. Its unique characteristics requiring a delicate and constant balance of supply and demand. Unlike other commodities, electricity cannot easily be stored and must be consumed almost immediately upon generation. It is generated using a variety of fuel sources, then transmitted long distances at very high voltages, and subsequently distributed at lower voltages to customers.

From the late 1800s through the mid-1930s, the electrical grid was merely a patchwork of independently-owned and -operated utilities. These utilities provided generation, transmission, and distribution, and they typically operated as vertically integrated monopolies within their service territory. As generation and transmission capacity grew over the subsequent decades and more non-utilities became energy producers, the grid grew to incorporate many more energy assets and resources. During these early years, electricity was generated primarily by burning coal. But by the late 1970s, new technologies such as nuclear power had taken hold. The technologies and associated laws ensured that alternative sources of energy, such as hydroelectric power, and renewable energy sources, such as wind and solar energy, would also be used to support Europe's growing energy needs.

At the time of the blackout, the grid had grown to include several distinct grids, called interconnections. Generation had expanded to include a range of energy types, with coal remaining as the single largest source. To perform the main functions of generation, transmission, and distribution, the electricity subsector had by this time become "an integrated system of generating plants, high voltage transmission lines, local distribution facilities, [and] industrial control systems." This diverse set of players had to "operate as a contemporaneous network in real time or in a synchronous manner to provide stable and reliable electricity to consumers." All participated in securing and improving the resilience – the ability to withstand natural disasters, manmade accidents, or attacks – of the Energy Sector. This included thousands of power plants with over 1000 gigawatts of installed generation produced by coal, nuclear power, natural gas, hydroelectric dams, oil, and renewable sources.

The team focused on two specific questions: (1) What assumptions are we making about the blackout that are solid and can be used to buttress any decisions, especially those that the Chancellor must make quickly, and (2) What assumptions are unsupported, deserving further investigation and scrutiny by the team? The exercise generated four solid assumptions, six unsupported assumptions, and two caveated assumptions (see Fig. 4.1).

- The four solid assumptions identified by the team were:
1. Europe’s susceptibility to an electric infrastructure attack has been increasing.
  2. The expanding grid was becoming increasingly vulnerable to internal systems problems.

	Key Assumption	Rationale	Rating S = Solid C = Caveated U = Unsupported
1	Europe's susceptibility to a cyber attack on electric infrastructure was increasing.	Systems are becoming more complex, hackers more proficient, and threats more diffuse emanating from both domestic and foreign sources.	S
2	Bad weather caused the outage.	Bad weather is a known and frequent cause of blackouts.	U
3	An extensive blackout would have major economic consequences.	This is well documented by previous blackouts in the US and Europe.	S
4	A cyber attack launched by a nation state caused the blackout.	Russia and Iran in particular would have motive to attack.	U
5	The predicate for the blackout could be either external or internal.	At this stage, it would be best to consider all possible scenarios.	S
6	Foreign adversaries are known to have targeted European electric infrastructure.	China, Russia, and Iran are reported to have targeted US and European electric infrastructure but it is unknown if this is true for other countries.	C
7	The first blackout was a trial run.	Often adversaries first attempt a smaller attack to test defenses and uncover vulnerabilities but it is unknown if this blackout was a trial run.	U
8	The blackout was the result of a kinetic terrorist attack.	A major blackout in Europe would qualify as a worthy iconic attack.	U
9	The blackout was carried out or assisted by an insider.	Utility employees are low paid and could be recruited or infiltrated.	U
10	The expanding, interconnected electric grids are becoming increasingly vulnerable to systems problems.	As systems become more complex they also become more vulnerable to breakdowns.	S
11	Systems operators were capable and competent professionals.	Critical infrastructure employees should be carefully vetted.	U
12	The computer systems had adequate safety and backup systems to prevent a major blackout.	The electric infrastructure has fallback systems designed to react to unanticipated surges and systems errors.	U

**Fig. 4.1** Blackout key assumptions check. (Source: Copyright 2024 Pherson. All Rights Reserved)



3. A major blackout would have substantial economic repercussions.
4. The cause could range from internal problems to an external attack.

The fourth solid assumption revealed the critical concern. The team recognized that a lot of work was needed to figure out what had happened, how to correct it, and what to do to restore power. This issue was illustrated by several of the assumptions that the team rated as unsupported, which led them to conclude:

1. At this point, what caused the outage is simply unknown; it could have been weather, a foreign adversary, a systems problem, or even a terrorist attack.
2. The computer systems appear to have lacked adequate safeguards to detect and prevent the breakdown.
3. More attention should be paid to whether the problem could be human factors, either an insider threat or operator incompetence.

As a result of the Key Assumptions Check exercise, teammates had a better understanding of the seriousness of the problem and useful insights about where to focus their attention in the coming days and hours.

### How to Restore Service?

Electricity officials knew that their first task was to restore power. They began to sort through the information they had to determine the cause but had difficulty pinpointing anything specific. The Senate of Berlin Communications Director summed up the situation: “There are a lot of different theories and we wanted to make sure that we get to the bottom of it.”<sup>8</sup> As officials struggled to grapple with the crisis, one thing was immediately clear: the German Energy Sector had suffered a huge blow with consequences that affected the entire German electric grid.<sup>9</sup>

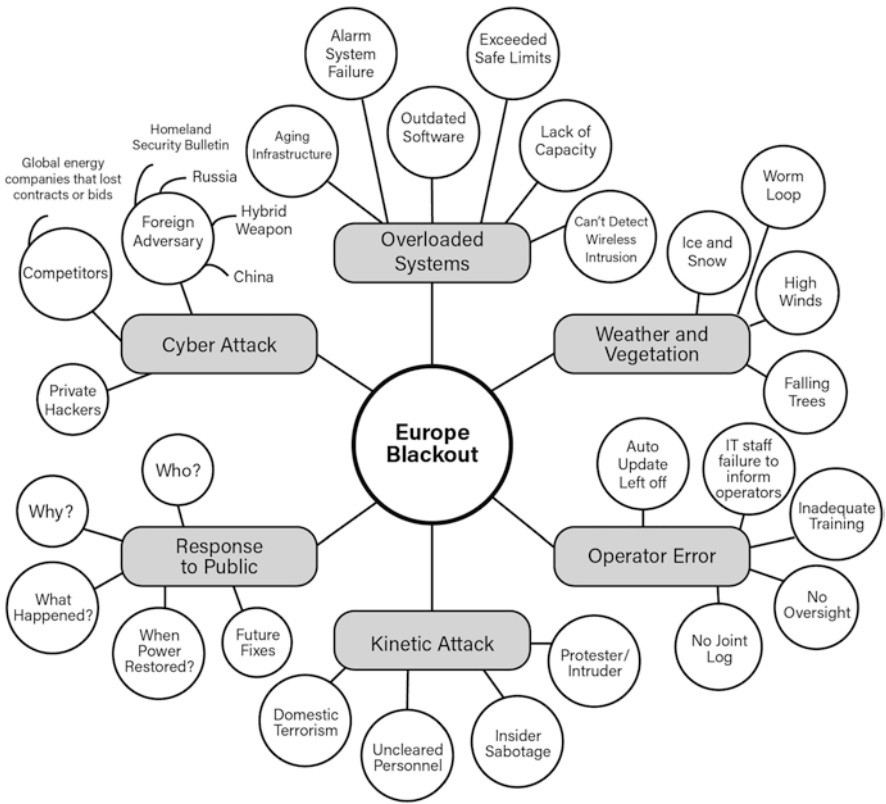
Because restoration of service was directly linked to the cause of the blackout, the Blackout Team decided to construct a Mind Map of all the ways the blackout could have occurred. By conducting an open-ended brainstorming session, the team was hoping to ensure that unlikely but credible explanations for the blackout would not be overlooked. Moreover, the technique could spur new questions and reveal some hidden linkages, vulnerabilities, and relationships.

Time was of the essence, so the work was done on a large whiteboard using sticky notes. The results of the Mind Map session were later recorded in the following graphic (see Fig. 4.2).

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<sup>8</sup>Elisabeth Bumiller, “The Blackout of 2003: The President: Bush Doesn’t Let Blackout Upset Lunch With Troops,” *New York Times*, August 15, 2003, <https://www.nytimes.com/2003/08/15/us/blackout-2003-president-bush-doesn-t-let-blackout-upset-lunch-with-troops.html>.

<sup>9</sup>Adapted from “Kraftwerke und Verbundnetzwerke in Deutschland,” Stand August 2020, *Umweltbundesamt*, December, 30, 2020, <https://www.umweltbundesamt.de/bild/kraftwerke-verbundnetze-in-deutschland>



**Fig. 4.2** Blackout mind map. (Source: Copyright 2024 Pherson. All Rights Reserved)

The Mind Map created by the team identified five distinct areas needing further investigation:

- Cyber-attack
- Overloaded or Deficient Systems
- Weather and Vegetation
- Operator Error
- Internal Kinetic Attack

In each of the five areas of investigation, the team identified several potential reasons why a system breakdown could have occurred in that context. In addition, the team decided to add one more node to the map to emphasize the importance of communicating quickly and transparently with the public.

As the Blackout Team worked on constructing the Mind Map, industry and government officials scrambled to restore service to the affected areas and investigate what could have been the cause. Four-and-a-half hours after the blackout began, officials updated the nation on what was known about the causes and consequences

of the blackout. Calling the blackout a “serious situation,” the Chancellor reassured the public that it was not the result of a bombing by a domestic or international terrorist group. With the specter of a terrorist attack ruled out, the nation turned its attention to assessing what caused the blackout and how to manage the consequences.

As people waited for the lights to come back on, speculation raged about the root cause and the effects of the blackout. The commentary ranged from cyber intrusion to aging infrastructure. Another concern was the impact such a widespread outage was having on public confidence. The Bundestag (parliament) announced it had tasked the Blackout Team with investigating the causes of the failure, and that the task force would work both “to identify the causes of the recent power outage” and “to seek solutions to help prevent future outages.”<sup>10</sup>

### Challenges to Critical Infrastructure Security and Resilience

At the start of the investigation, the team was reminded that large-scale blackouts occur – albeit infrequently – and they almost always spur incident reviews to identify the cause and to avoid a repeat event (see Fig. 4.3). Some key takeaways the Blackout Team harvested from these previous reviews were that:

- Interconnectedness of the grid and the speed of the failure often complicate pinpointing the cause (see Fig. 4.4).
- Elements of the grid are not time-synchronized, which makes identifying the sequence of events difficult.

Studies have identified overloaded systems, damage caused by weather and vegetation, operator error, and/or computer glitches as causes of blackouts:

- Utilities may overestimate how much reactive power capacity they have compared with demand, which could cause a sharp drop of voltage.
- Alternatively, the system might exceed safe limits without the knowledge of the operators.
- Weather is often an issue. In some countries, tornadoes during the spring and summer, along with droughts and heat spells, commonly cause outages, as do ice and snow during the winter.
- The growth of trees in the spring and summer can result in power lines contacting trees and tripping out without the operator knowing.
- Windless days in summer are a special problem because extra demand makes the lines hot, causing them to expand and sag, allowing some to touch trees and other obstacles. The complex electric grid with short reaction times leaves little room for operator or computer error.

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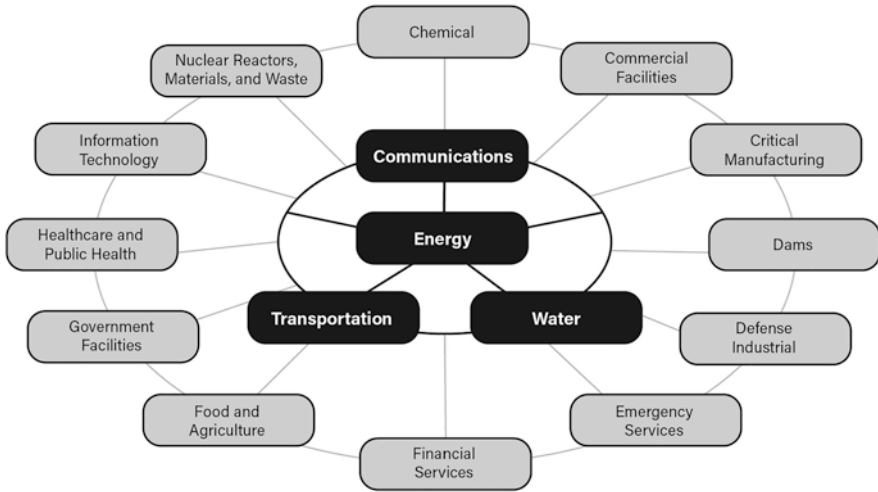
<sup>10</sup>“Power Returns to Most Areas Hit by Blackout,” *CNN*, August 15, 2003, <http://www.cnn.com/2003/US/08/15/power.outage/>.

Major Blackouts in Europe in the past 20 years	
09.05.2000	Southern half of Portugal
24.09.2003	Sweden
28.09.2003	Italy
12.07.2004	Southern Greece
22.06.2005	Switzerland
25.-28.11.2005	Münsterland, Germany
04.11.2006	Parts of Germany, France, Belgium, Italy, Austria, and Spain
23.07.2007	Barcelona, Spain
12.12.2007	Centre-East Netherlands
08.04.2008	Szczecin, Poland
23.01.2009	France
30.03.2009	Western Scotland
20.07.2009	South East London and North Kent, United Kingdom
30.03.2010	Northern Ireland
27.06.2010	Portsmouth, England
01.-21.09.2010	Iceland
11.-13.07.2011	Cyprus
04.04.2012	Cyprus
01.04.2013	Poland
12.08.2014	Malta
09.-19.08.2019	England and Wales
29.09.2019	Tenerife, Spain
03.11.2019	South West France

**Fig. 4.3** Major blackouts in Europe. (Source: Copyright 2024 Pherson. All Rights Reserved)

- In addition, there was a heightened fear of an attack by foreign adversaries on the power network. The US Intelligence Community warned in early 2018 that foreign countries and terrorist groups were developing the capacity to attack segments of Western infrastructure.

Prolonged denial of access to electricity, an important product on which most of the economy depends, could have a profound impact on public safety if nuclear plants were targeted. An attack could cause a Chernobyl-style meltdown. Security experts



**Fig. 4.4** Web of energy sector interdependence. (Source: Copyright 2024 Pherson. All Rights Reserved)

have described the nuclear power network as vulnerable to cyber-attack, physical attack, and employee sabotage.

Many of the studies reviewed by the team pointed out the potential for compromise of energy management systems and IT infrastructure by foreign adversaries or disgruntled employees. Vulnerabilities that were identified in the studies include: the ability to put nonessential programs on the system, loosely controlled system access and perimeter control, inconsistent patch and configuration management, and poor documentation of system security.

Foreign adversaries have a long history of attacking the computer systems of Europe and the United States (see Fig. 4.5). A computer security firm in 2016 concluded that hackers from different countries typically exhibit distinct behaviors. Chinese hackers pilfered “anything that looked like novel technical information.” Russians penetrated systems “mapping them and implanting hard-to-find backdoor access for potential future use.” In contrast, Iranian hackers sought to do “as much damage as possible.”<sup>11</sup>

Russia’s approach to cyber strategy has focused on infiltrating the critical infrastructure systems in the United States and the United Kingdom. Washington and London both issued warnings in 2018 that Moscow was trying to develop a capability to cause blackouts by accessing critical infrastructure entities through supply chains and home and business routers. Targets also included energy, nuclear, water, aviation, and manufacturing facilities.

<sup>11</sup>Annie Fixler and Frank Cilluffo, *Evolving Menace: Iran’s Use of Cyber-Enabled Economic Warfare* (Washington, DC: Foundation for the Defense of Democracies, November 2018), [https://www.fdd.org/wp-content/uploads/2018/11/REPORT\\_IranCEEW.pdf](https://www.fdd.org/wp-content/uploads/2018/11/REPORT_IranCEEW.pdf).

Our adversaries and strategic competitors will increasingly use cyber capabilities—including cyber espionage, attack, and influence—to seek political, economic, and military advantage over us. China and Russia increasingly use cyber operations to threaten both minds and machines to steal information, influence our citizens, or disrupt critical infrastructure.

In the last decade, our adversaries and strategic competitors have developed and experimented with a growing capability to shape and alter the information and systems on which we rely. For years, they have conducted cyber espionage to collect intelligence and targeted our critical infrastructure to hold it at risk. They are now becoming more adept at using social media to alter how we think, behave, and decide.

China presents a persistent cyber espionage threat and a growing attack threat to our core military and critical infrastructure systems. China is improving its capabilities and altering information online, shaping Chinese views and potentially the views of European citizens.

- Beijing will authorize cyber espionage against key technology sectors when doing so addresses a significant national security or economic goal not achievable through other means.
- China has the ability to launch cyber attacks that cause localized, temporary disruptive effects on critical infrastructure.

We assess that Russia poses a serious cyber-espionage, influence, and attack threat. Moscow continues to be a highly capable and effective adversary, integrating cyber espionage, attack, and influence operations to achieve its political and military objectives. Moscow is now staging cyber attack assets to disrupt civilian and military infrastructure during a crisis.

- Russian intelligence and security services will continue targeting information systems for technical information, military plans, and insight into our governments' policies.
- Russia can execute cyber attacks that generate localized, temporary disruptive effects on critical infrastructure—such as disrupting an electrical distribution network—similar to those demonstrated in Ukraine in 2015 and 2016.
- Moscow is mapping Europe's critical infrastructure with the long-term goal of being able to cause substantial damage.

**Fig. 4.5** European cyber infrastructure official public statement (*excerpts*). (Source: Copyright 2024 Pherson. All Rights Reserved)

- Russia had the ability to infiltrate and disrupt the German electrical distribution system – like it did in Ukraine in 2015 and 2016.<sup>12</sup>
- US officials in July 2018 revealed that a campaign by Russian intelligence in 2017 had compromised the networks of multiple US electric utilities and potentially enabled attackers to cause blackouts. Russia also conducted cyber intrusions in Ukraine in 2015 and 2016.

<sup>12</sup>Daniel R. Coats, Director of National Intelligence, *Statement for the Record: Worldwide Threat Assessment of the US Intelligence Community*, January 29, 2019, 5–6, <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR%2D%2D-SSCI.pdf>.

- In recent years, Russia has embarked on a long-term endeavor to create discord among elements of European and US populations through Digital Disinformation and false narratives spread mostly on social media platforms. One of the key objectives of this campaign is to instill doubt about the security of election computers and other infrastructure, striking at the very heart of liberal democracy.

The focus of Beijing's cyber strategy historically has been to steal corporate and government secrets to boost Chinese economic goals – including through a multi-year invasion of Western technology providers. However, in late 2012 evidence first surfaced of Chinese efforts to target the critical infrastructure seeking to disrupt or disable the power supply or to pre-position malware for a future attack.<sup>13</sup>

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## 4.2 The Investigation: What Happened?

The senior analyst heading the Blackout team next asked the members to pause a few hours and brainstorm all the issues that needed attention and decide how best to prioritize the list. When given this task, the team decided that the best technique was Starbursting. The Key Assumptions Check had revealed several key areas of investigation that needed priority attention but, instead of just “jumping in” to address the most obvious concerns, prudence dictated that it would be better to consider the key areas systematically. The team engaged in a Starbursting exercise to generate a comprehensive list of questions that merited further investigation. The generated questions could then be prioritized and investigated. The Starbursting exercise used the journalist's standard list of questions to structure the discussion: Who? What? How? When? Where? and Why?

The results of the Starbursting exercise are revealed in Fig. 4.6. The priority issues the team identified are highlighted. Conducting the exercise helped the team identify what mattered most and decide how best to focus the collection and research activities of their colleagues. It also gave them more confidence they were not ignoring a critical part of the puzzle.

In the following weeks, a Power System Outage Task Force was formed, and it began to analyze the evidence and interview operators. Unexpected events are common in the power industry, but blackouts do not usually happen. That is why utilities have defense-in-depth, an information assurance concept in which multiple layers of security controls (defense) are placed throughout an IT system (see Fig. 4.7). The analytic challenge was to identify the unexpected event that was the root cause.

Investigators could not find signs of deliberate physical damage to power generators or lines on the day of the outage. An official indicated that he had not yet found evidence that the outage was the result of criminal activity. Nonetheless,

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<sup>13</sup> Jim Finkle and Christopher Bing, “China's Hacking Against US on the Rise: US Intelligence Official,” *Reuters*, December 11, 2018, <https://www.reuters.com/article/us-United-States-cyber-china-idUSKBN10IA1TB>.





**Fig. 4.6** Prioritizing the Investigation with Starbursting. (Source: Copyright 2024 Pherson. All Rights Reserved)

intelligence assessments suggested there were malicious actors with the capability to disrupt the energy infrastructure with a cyber-attack.

In another study, electrical engineers conducted an extended simulation of the power system on the day of the blackout and concluded that at least up until the tripping of a major transmission line at 3:05 p.m., the system was secure enough to withstand any one of more than 800 contingencies. Modeling also suggested that loss of the E. ON lines did not affect the blackout. The engineers assessed that the root cause(s) of the accident happened after 3:00 p.m.

### Computer Failure?

Computer glitches particularly troubled investigators. That networks crashed at the worst possible time appeared to be more than coincidental. The failure of the alarm system at a crucial time in a way that left the operators unaware of the problem was particularly suspicious. Not knowing the system was about to fail, operators took no steps to avert disaster.

The outbreak of a new virus, Blaster, on the internet a few days earlier also raised concerns. Blaster is a [computer worm](#) that spread on computers running [operating](#)



Whether electricity is generated using fossil fuels (coal, petroleum, and natural gas), renewable energy (wind, solar, geothermal, solar thermal), hydroelectric power, or nuclear energy, several key physical, cyber, and human elements play a role in ensuring a functioning grid. Because electricity is consumed almost instantaneously after it is generated, operators use industrial control systems (ICS), such as supervisory control and data acquisition (SCADA) systems to predict, monitor, and balance supply and demand. Changes in any of the monitored activities are detected by the system, which brings the change to the attention of the operators.

These SCADA systems are essential for early detection and mitigation of a host of potential problems that can arise on any given day that affect supply and demand. New “smart” technologies such as sensors for monitoring loads; communication networks to ensure timely, real-time monitoring and information sharing, and automated control devices to manage the system had begun to emerge that allow for better real-time monitoring and control, but these technologies were still not in use in key areas.

To better coordinate this delicate balancing act, many regions used not-for-profit independent system operators (ISOs) to help manage the transmission of electricity in different areas via industrial control systems. Working with utility company power engineers, ISOs help to monitor and balance loads and ensure that they are operating within voluntary limits. They in turn coordinate with the Electric Reliability Corporation (ERC), whose mission as an international, independent, self-regulatory, not-for-profit organization is to ensure the reliability of the bulk power system (generation and high-voltage transmission). ERC was founded in 1968 by the electric utility industry to develop and promote mandatory rules and voluntary standards for the reliable operation of the transmission systems.

**Fig. 4.7** Electric infrastructure regulations and controls. ([https://www.nerc.com/AboutNERC/keyplayers/PublishingImages/New\\_Regions\\_map\\_no\\_FRCC.jpg](https://www.nerc.com/AboutNERC/keyplayers/PublishingImages/New_Regions_map_no_FRCC.jpg)[https://www.nerc.com/AboutNERC/keyplayers/PublishingImages/New\\_Regions\\_map\\_no\\_FRCC.jpg](https://www.nerc.com/AboutNERC/keyplayers/PublishingImages/New_Regions_map_no_FRCC.jpg))

systems Windows XP and Windows 2000. When the system crashed, Vattenfall and its software provider, Senfal, met to identify the problem. Some engineers discounted the Blaster virus because the software did not use Windows, which was the operating system used by Senfal and other power companies. Others were not so sure and thought that the worm might have infected the software in a different manner. Systems analysts eventually discovered the computer program had been trapped in a loop when two applications had simultaneous “write access” to the data. Programmers finally identified in the million lines of coding a command that could cause the loop to spark a “perfect storm” causing a blackout. This could only happen within a window of a millisecond. Senfal engineers were skeptical because no other utility had encountered this particular problem, and they had provided customers a patch to prevent it.

Electrical engineers modeled the expected results of a reliability contingency assessment – had it been done. The model indicated that some contingencies could not have been covered and that the system was not in a reliable state.

A Vattenfall system technician testified that he reported to the control room early in his shift that some remote energy management system sensors were failing. He was puzzled why no one on duty earlier had reported that problem. A possible explanation for the sensor failures was that the loss of two servers greatly slowed the computer system so screen refresh rates of 1–3 seconds had slowed to nearly a minute, making it frustrating for system operators to keep track of the health of the system. An IT staff member said his team was aware of the problem from automatic pages but in the rush of events did not inform the operators of the computer problems.

Cyber investigators on the Power System Outage Task Force discovered that Vattenfall was not running the most recent update of the Senfal software program when the blackout occurred. Vattenfall had switched to another software vendor recently and had not bothered to load the latest patch. At the time of the crash, Senfal technicians claimed that the failure to load the patch when vendors were being switched was a unique occurrence and suggested the only solution would be a cold reboot of the system. Vattenfall rejected that as taking too long during a time of peak demand.

### **Weather and Vegetation?**

Investigators also explored whether weather could have caused the blackout. On a day in late August, conductor temperatures can reach 100 °C (212 °F), and transmission lines can sag. The electric relay data showed classic signs of a tree contact short, so the investigation team visited the sites of three lines that failed. At the Hanna-Juniper outage site, a worker had observed contact with a tree. At the other two sites, the investigators found tree fragments and burns that indicated tree contact, but they could not conclude either happened on this day in August. In the three preceding years, outages were reported on those lines because of tree contact. Also, Vattenfall, in recognition of the danger of tree contact with power lines, flies over its lines twice a year to check on the condition of the right of way. The most recent flyover showed few signs of low-hanging trees that could damage the lines.

### **Human Error and Inadequate Procedures?**

Experts from the Power System Outage Task Force visited the control area at Vattenfall and voiced concerns about procedures. They noted the reliability operator was in a different room than the transmission operators. Individuals used handwritten logs, so there was no log of events for all to see. Briefing the next shift on conditions was haphazard at best.

Human action – as in the case of the disabling of the Estimator Automatic Evaluation System – and inaction – such as failing to turn the system back on – also lacked oversight. There were no processes to monitor an operator's take down of part of the system or to verify its coming back online. This lack of supervision left the system vulnerable to operator errors – either intentional or unintentional.

The investigators raised specific concerns about the ability of system operators to add or change software without prior authorization, and such changes could go undetected. In addition, procedures to update and maintain software were not defined. Some of the IT support personnel did not know how to perform diagnostic

and forensic routines on their software programs. Investigators also learned that Vattenfall and other firms had little ability to detect wireless intrusion and computer surveillance.

Investigators asked Farzad Tehrani why he disabled the evaluation system. He reported discovering that the E. ON line outage did not update automatically in the evaluation system as many other lines do, so he had to update it by hand. He had to turn the automatic system off to figure out the problem. Tehrani claimed that he reran the program manually and got a valid solution at 1 p.m. and a contingency assessment at 1:15 p.m. When pressed as to why he had not turned the automatic update feature back on, Tehrani admitted he had been in a hurry to get to a luncheon date and forgot to reactivate the automatic update feature before leaving.

Security investigators noted that uncleared personnel were occasionally allowed in sensitive areas sometimes without escort, even though there were regulations to do so. Also, they discovered that contract personnel did not receive as stringent a level of background checks as did staff.

Some analysts wondered whether nuclear power plants played a role in the blackout because several nuclear stations simultaneously lost their own power for unknown reasons. When that happens, there is a significant danger of damage to the reactors and release of highly radioactive materials even if the reactor is no longer functioning. A sustained nuclear station outage could lead to a serious situation and is a vulnerability of nuclear plants.

### **External Intrusion?**

A cyber intrusion into the system by terrorists or other adversaries either directly or by using cyber techniques could not be ruled out. Earlier in the year, an internet worm crashed monitoring computers at the Vattenfall nuclear plant in Krümmel. The inflection blocked commands that operate other power utilities. The control system was designed to operate in remote areas and over the internet to maximize functionality and interoperability with little attention to cyber security.

It did not take long before various groups claimed responsibility for the blackout.

- Several days after the blackout, a major international terrorist group, under orders of its leader, claimed responsibility through an Egyptian media outlet. The report claimed that terrorists had hit several power plants supplying the German capital.
- Two weeks after the blackout, a participant in a jihadist chat room claimed that terrorist sleeper cells used the power outage to infiltrate Germany.

Meanwhile, state sponsors of terrorism, including cyberterrorism, posed a growing and alarming threat to Western critical infrastructure – particularly the Energy Sector. China and Russia posed a persistent threat to critical infrastructure systems, strategically positioning capabilities to disrupt future operations.<sup>14</sup>

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<sup>14</sup> Finkle and Bing, “China’s Hacking Against US on the Rise.”

As the investigation of the Power System Task Force was coming to an end, the hard work of the Blackout Team was just beginning. The next task of the Blackout Team was to develop a set of hypotheses that would best explain why the blackout occurred. The team decided to meld two structured techniques to accomplish this task. First, they conducted a Cluster Brainstorming exercise to identify all the forces, factors, events, and actors that may have caused the blackout.

A key design element in this technique is that none of the participants are allowed to talk while generating their ideas. Only the facilitators can speak; their role is to read out what participants write down on provided sticky notes. The silent brainstorming technique ensures that individuals who are unlikely to speak out in group discussions have an equal opportunity to provide input to the deliberations by documenting their ideas and providing them to the facilitator to read aloud for all to hear before posting the sticky notes on a large whiteboard.

This task proved easy for the Blackout Team because they could build on the previous work done with the Mind Map and the Starbursting exercises. Fig. 4.8 shows the results of this silent brainstorming exercise.

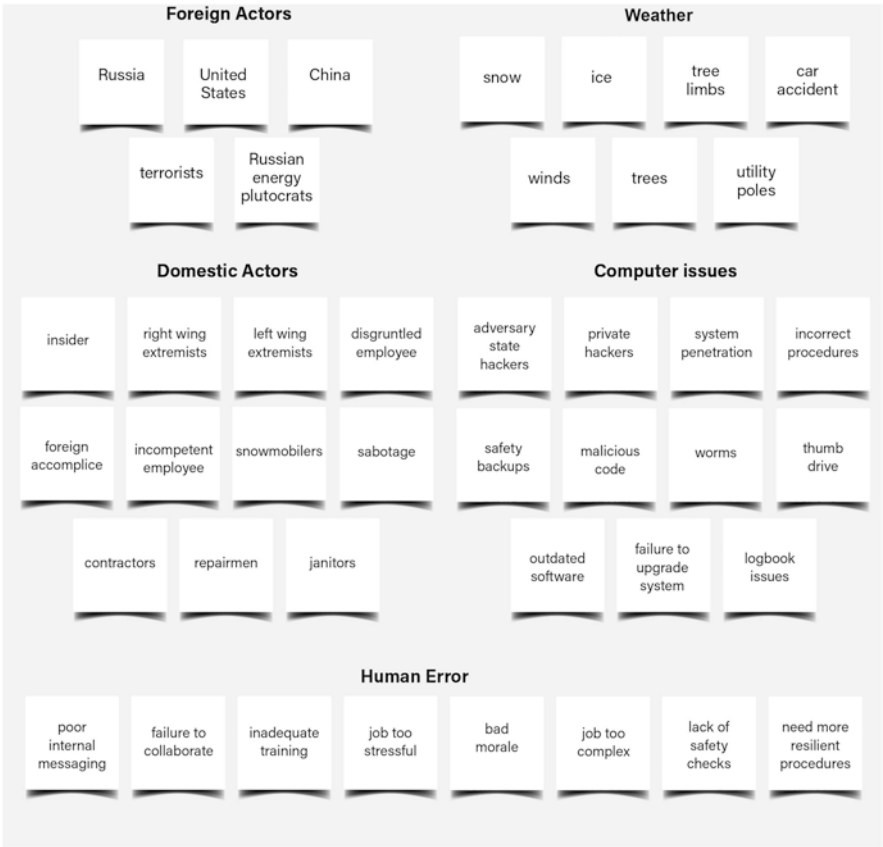


**Fig. 4.8** Identifying causes of the blackout with cluster brainstorming. (Source: Copyright 2024 Pherson. All Rights Reserved)

After all the forces, factors, events, and actors that could have caused the blackout were identified, the team gathered them into affinity groups. In this case, the teammates identified five distinct clusters of sticky notes (see Fig. 4.9):

- Foreign Actors
- Domestic Actors
- Weather
- Computer Issues
- Human Error

The next task of the Blackout Team was to transform these affinity groups into a set of alternative hypotheses that could explain how the blackout occurred. The group decided that the following hypotheses constituted a solid set of comprehensive, but mutually exclusive, explanations for what caused the blackout:



**Fig. 4.9** Grouping causes of blackout with cluster brainstorming. (Source: Copyright 2024 Pherson. All Rights Reserved)

- **Hypothesis 1:** The growing complexity of the computer systems created deficiencies and systems errors, causing the system to go down.
- **Hypothesis 2:** A foreign adversary hacked into the electric infrastructure causing the system to fail.
- **Hypothesis 3:** Someone working within the organization sabotaged the system.
- **Hypotheses 4:** Extreme weather caused electric power lines to break or tree limbs to fall on the lines, shorting out circuits.

The next task for the Blackout Team was to determine which hypothesis was most likely to be correct. The established analytic process is to list all the evidence that supports each hypothesis and then decide which hypothesis presents the most compelling case. The Blackout Team, however, opted for a different approach, focusing on what evidence undercut each hypothesis rather than what supported it. They decided that the Analysis of Competing Hypotheses (ACH) method would be more efficient and help them focus on the most diagnostic information. The ACH method focuses on what evidence can be used to disprove a hypothesis, ending with the hypothesis that has the least amount of information that disproves it. This hypothesis then becomes the most credible explanation. In this case, given the time pressure, the Blackout Team opted to employ a simpler version of ACH, called the Inconsistencies Finder™.

In the Inconsistencies Finder™ analysts array the alternative hypotheses at the top of a matrix, list the relevant information or evidence on the left side of the matrix, and then identify which information would be inconsistent with that hypothesis. In essence, the question the team asks itself is: If this hypothesis is correct, would I expect to see that information as part of the story? After all the cells in the matrix are filled in, the next task is to count how many items of inconsistent information were identified for each hypothesis. The hypotheses with the most inconsistent information are the least likely to be correct, and the hypothesis(es) with the least (or no) inconsistent information is/are most likely to be correct. When evaluating the inconsistent data, the Blackout Team had to address two basic questions.

1. Is the relevant information inconsistent with one hypothesis but also inconsistent with the other hypotheses, which would make the information non-diagnostic?
2. Is the relevant information inconsistent with one hypothesis but consistent with some or all the other hypotheses? In this case, the item of information is diagnostic and can be used to discount or eliminate other hypotheses.

The Blackout Team identified all the relevant information and loaded it onto the matrix. It then evaluated each item of information against each hypothesis to assess if that item of information was inconsistent with that hypothesis. Once the matrix was filled out, the number of inconsistent items of relevant information were tallied for each hypothesis.

The result of the analysis was that the hypothesis with the least inconsistent information was the Weather hypothesis (see Fig. 4.10). The matrix shows that the Weather hypothesis had the fewest inconsistent items of relevant information: only

	Relevant Information	H1: System Failure	H2: Foreign Adversary	H3: Internal Sabotage	H4: Nature
1	Outages started in the northern districts of Berlin				
2	Previous power failure in London was caused by unknown factors				
3	Adversaries have targeted US infrastructure, compromising electric utilities				
4	Antiquated, complex electrical grid				
5	Weather that day was hot, with temperatures rising above 35°C				
6	Turnover notes say system was stable	II			
7	Forecasts indicated adequate power capacity even with 2 nuclear units out	I			I
8	Federal Ministry of the Interior Bulletin warning of potential attack on power plants in Western Europe				
9	Previous Slammer internet worm attack worries management of new cyber attack				
10	Auto update feature turned off by operator				
11	Much of Berlin goes dark at 4pm				
12	Elements of the grid not time synchronized				
13	System can exceed safe limits without the knowledge of operators				
14	For many reasons, there is little room for operator error				
15	Experts describe network as vulnerable to cyber/kinetic attack or employee sabotage				
16	Adversaries could use cyber attack as hybrid weapon or negotiating ploy				
17	No signs of deliberate physical damage			II	
18	Intelligence analysts saw no evidence of terrorist intent or plans to attack		II	I	
19	Intelligence analysts say malicious actors have capability to launch such an attack				
20	Simulation shows system secure enough to withstand 800 contingencies before 3pm	I	I	I	I
21	Investigation shows difficulties at the neighboring power system in south-east Berlin did not cause the blackout				
22	Terrorist group claims responsibility	I	II	I	I
23	Jihadist group says they used outage to infiltrate sleeper cells				
24	China strategically positioning capabilities to disrupt energy utility operations				

**Fig. 4.10** Identifying the lead hypothesis with the Inconsistencies Finder™. (Source: Copyright 2024 Pherson. All Rights Reserved)

	Relevant Information	H1: System Failure	H2: Foreign Adversary	H3: Internal Sabotage	H4: Nature
25	SME warns in 2018 that North Korea would attack infrastructure to deter attack on its nuclear power facilities				
26	Russia could disrupt electrical distribution system like it did in the Ukraine in 2015-16				
27	Iranian hackers have targeted US oil & gas				
28	Computer alarm fails at critical moment				
29	Concern over Blaster virus as a cause				
30	Electrical engineer modeling shows system not in a stable state				
31	Some remote energy management system sensors were failing				
32	Loss of 2 servers greatly slowed response time from seconds to nearly a minute				
33	IT staff did not inform operators of computer response slowdown				
34	Did not run most recent software update				
35	Electric relay data shows signs of tree contact short	I	I	I	
36	Investigators found three examples of line contact with trees	I	I	I	
37	Reliability and transmission operators were in different rooms				
38	Handwritten logs not shared, read by next shift				
39	No oversight of operators				
40	Inadequate training of operators				
41	Failure to turn auto update back on				
	Total Inconsistencies	7	7	7	3

Fig. 4.10 (continued)

three items versus seven for the other hypotheses. It is important, however, to focus on the truly diagnostic data, which is defined as an item of data that is consistent for one hypothesis but inconsistent for another. Such a second look confirms the original conclusion that weather was the lead hypothesis. Weather had no diagnostic inconsistencies and the other three hypotheses have 2, 4, and 5 diagnostic inconsistencies. The low rating of 2 for Systems Failure suggested, however, that this hypothesis might have played a supporting role in the story.



The two most diagnostic items of data are evidence numbers 35 and 36, which document signs of tree contact shorts of the power line. Other diagnostic inconsistent data included:

- Insider sabotage was deemed unlikely because there was no sign of deliberate physical damage to computer systems.
- Foreign adversary or terrorist attack were deemed unlikely because intelligence analysts had seen no evidence of foreign intent to launch such an attack.

With the results of the Inconsistencies Finder™ analysis in hand, the Blackout Team could report back to the Chancellor that their analysis has led them to believe that the most likely cause of the blackout was weather that caused a tree branch to trip a power line. In addition, it was possible that irregularities in the systems software could have aggravated the problem.

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### 4.3 Key Findings and the True Story

The several-hour London blackout that was noted at the start of this case study actually happened. It took place on 28 August 2003 and investigations revealed that a lack of maintenance was the root cause of the blackout.<sup>15</sup>

Another actual and larger blackout that occurred on a “hot summer day in August” began as a series of relatively minor glitches early in the afternoon of 14 August 2003 in the United States. As a few plants and transmission lines failed, the two relevant Independent System Operators (ISO’s) – Midwest Independent System Operator (MISO) and PJM Interconnection (PJM) – and the electric power utilities whose areas those ISO’s oversaw – particularly FirstEnergy and American Electric Power (AEP) – worked to understand what was happening. The ISO’s fielded calls from across the region throughout the afternoon as transmission lines tripped and power plants automatically shut down. The tipping point came just after 4 p.m. when a series of accumulated failures among the physical infrastructure grid, the computers monitoring it, and human operators resulted in a perfect storm that resulted in a massive cascade of failures throughout the northeastern United States and into Canada.

A task force was created to investigate the blackout. Six months later, it published its study which contained 46 sweeping recommendations. The US-Canada Power System Outage Task Force found that both human error and equipment failures had caused the blackout:

A failure of the alarm processor in the control system of FirstEnergy, an Ohio-based electric utility, prevented control room operators from having adequate situational awareness of critical operational changes to the electrical grid. When several key transmission lines in northern Ohio tripped due to contact [sic] with trees, those lines initiated a cascading failure of 508 generating units at 265 power plants across eight states and Canada.

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<sup>15</sup>“Oil leak ‘caused London blackout’”, *BBC News*, December 30, 2020, [http://news.bbc.co.uk/2/hi/uk\\_news/england/london/3199594.stm](http://news.bbc.co.uk/2/hi/uk_news/england/london/3199594.stm).

In addition to inadequate vegetation management, the study found problems with human, cyber, and physical aspects of the grid, including:

- A failure to ensure operation within secure limits
- A failure to identify emergency conditions and communicate that status to neighboring systems
- Inadequate operator training
- Inadequate regional-scale visibility over the power system
- Inadequate coordination of relays and other protective devices or systems
- Inadequate interregional visibility over the system
- Dysfunction of a control area's Supervisory Control and Data Acquisition (SCADA) system
- Inadequate backup capability of that system<sup>16</sup>

With a clear understanding of what had caused the blackout, US government and industry officials turned their attention to developing strategies that could help to avert such large-scale blackouts in the future.

The worldwide threat assessment in Appendix C is a lightly edited version of an official statement released by Daniel R. Coats, Director of National Intelligence, *Statement for the Record: Worldwide Threat Assessment of the US Intelligence Community*, January 29, 2019, 5–6, <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR%2D%2D-SSCI.pdf>.

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<sup>16</sup>“Final Report on the August 14, 2003, Blackout in the United States and Canada: Causes and Recommendations,” US-Canada Power System Outage Task Force, April 2004, <https://reports.energy.gov/BlackoutFinal-Web.pdf>, page 110.

## Abstract

The assassination of Swedish Prime Minister Olof Palme in February 1986 sent the Nordic country into shock, grief and pain. For Western Europe, the murder was indeed a ‘John F. Kennedy moment.’ The crime was never solved. In June 2020, lead prosecutor Krister Petersson closed the cold case – and gave only one clue to the most plausible perpetrator: Stig Engström, the infamous ‘Skandia man’. Over the course of more than three decades, new teams of investigators failed to apply standard investigative techniques, damaging the reputation of the police and prosecutors in Sweden. The investigators’ incompetence soon triggered a political crisis: An increasingly poisoned public debate about responsibility for these failures gave way to conspiracy theories. We use the epic crime as a showcase to illustrate what analytical tools could have contributed to a resolution of the case. The methods we use include timelines and chronologies, star-mapping, profiling, competing hypothesis analysis and multiple hypothesis generation, cognitive bias testing, and actor analysis.

**Stockholm, February 28, 1986** *It is already shortly after 11 p.m. when Olof and Lisbeth Palme say goodbye to their son Marten and his girlfriend in front of the Grand Cinema (see Fig. 5.1). The current Swedish Prime Minister and the First Lady have ended their evening by going to the cinema. For the Prime Minister, it is not unusual to take the subway to the cinema, spontaneously and without personal protection – in Sweden, even the head of government is close to the people.*

Olof Palme flips up his collar against the icy night wind, Lisbeth hooks arms with him, and the couple strolls home along Sveavägen. Despite the cold, Stockholm’s main street is not yet deserted; Olof and Lisbeth stop briefly at a shop window and

**Fig. 5.1** Olof Palme.  
(Source: Wikimedia,  
online: [https://commons.  
wikimedia.org/wiki/  
File:Olof\\_Palme\\_-\\_Alvin\\_  
\(239914\).jpg](https://commons.wikimedia.org/wiki/File:Olof_Palme_-_Alvin_(239914).jpg), CC0)



continue their walk home arm-in-arm. At the corner of Sveavägen and Tunnelgatan, the Palmes hear a crunch in the snow behind them. Before they can turn around, a gunshot shatters the icy silence. Then another bang and a wailing scream. Lisbeth crouches over Olof Palme as the white snow quickly turns blood red beneath him. When Palme is taken to a hospital emergency room only 10 min later, the Prime Minister is already dead.

The shot from only 30 cm shatters Olof Palme's spine and ruptures his aorta and trachea. As Lisbeth Palme turns to her husband, a second shot grazes her, but the traumatized Lisbeth does not notice it at first. Meanwhile, the perpetrator runs up Tunnelgatan's stairs and, despite dozens of witnesses, disappears in Stockholm's nocturnal alleys. At the scene of the crime, cab drivers immediately notify the police, and the first patrols arrive just 3 min later. A passing ambulance takes the couple to the nearest hospital. Lisbeth, in shock but only slightly injured, does not leave her dying husband's side (see Fig. 5.2).

Olof Palme, Prime Minister for the second time since 1982 and the person at the epicenter of Swedish politics for two decades, is declared dead shortly after midnight. The cold-blooded assassination on the open street tears the nation out of its sheltered idyll; the subsequent investigations drag on unsuccessfully for decades through countless scandals and shake Sweden's self-image as a competent constitutional state.



**Fig. 5.2** Lisbeth and Olof Palme. (Source: Wikimedia, online: [https://commons.wikimedia.org/wiki/File:Lisbet\\_Olof\\_Palme\\_V%C3%A4rmland\\_1956.jpg](https://commons.wikimedia.org/wiki/File:Lisbet_Olof_Palme_V%C3%A4rmland_1956.jpg), CC0)

### Olof Palme: A Titan of Swedish Politics

*For 20 years, Swedish politics was pro-Palme, anti-Palme, or just Palme. – Carl Bildt, Chairman of the opposition “Moderate Party”.*

No one in Sweden had been able to escape the influence of the charismatic social democrat Olof Palme. A polarizing thoroughbred politician, Palme shaped Sweden’s welfare state and championed workers’ rights. But Palme especially made headlines with his international politics. As an eloquent critic of repressive regimes and as an advocate of peaceful solutions, he brought Sweden onto the political world stage. Palme was also frequently critical of the two great powers: the United States and the USSR. Instead, he promoted a “Third Way” in the Cold War.

More than 30 years after Olof Palme’s death, Ronald Reagan was to be proven right when he said that the world would remember Palme for his tireless struggle for peace and democracy. But Olof Palme is remembered not just for his political gravitas and the conspiracy theories associated with his assassination. The decades-long unsuccessful murder investigations, riddled with effective media scandals and investigative blunders, have made Palme the John F. Kennedy of Northern Europe.

In the turbulent days following Palme’s murder, one after another admission of guilt quickly appeared; over the course of time, and more than a hundred surfaced. All of them turned out to be boasts or delusions; the real perpetrator could not be caught. The fact that this murder could not be solved for over 30 years marks a wound in the Swedish national self-image that has not healed to this day. How could a stranger shoot the Prime Minister in the open street, escape, and evade the concentrated power of the police and the government for so long?

The state provided the investigators with all available resources, offered a reward worth more than five million dollars, and eventually suspended the 25-year statute of limitations for murder – 24 years after Palme’s assassination. Trace after trace

pursued by the investigators turned out to be false or had to be abandoned due to lack of evidence.

The first of the six investigating commissions attracted particular attention because of a series of tangible scandals and the commission's shocking incompetence. The public's trust in the investigators was broken, which, together with Palme's polarizing politics, was the ideal breeding ground for conspiracy theories. Over the years, the police themselves also pursued a whole range of hypotheses and theories from hostile intelligence services to terrorist groups and mentally unstable individual perpetrators.

But it was not until June 2020, 34 years after Olof Palme's death, that the public prosecutor in charge announced that the perpetrator had been found. The decisive factor was the work of a journalist who passed on his research findings to the authorities in 2017 and thus put the stalled investigating commission on the right track. According to public prosecutor Petersson, the subsequent police work yielded enough credible evidence to close the case. The preceding 34 years of investigative work will go down in history as the world's largest murder investigation: Over the years, the police interviewed more than 10,000 people and created more than 87,000 documents on individuals involved in the case. Overall, the files on the Palme murder case occupy a full 250 meters of shelf space, thus dwarfing even the Kennedy assassination investigation.

But why, despite this spectacular effort, was the perpetrator not found for such a long time? Where did the police analysts make mistakes, overlook important clues, or blindly get caught up in hypotheses? And, could the case perhaps have been solved much earlier with modern methods of systematic analytical work?

It is time to turn up the coat collar, light the pipe, and put on the cap: A murder is waiting to be solved by us. The murder of Olof Palme probably represents the most spectacular and complex criminal case in Scandinavia; the investigations are filled with aberrations, conspiracies, and political scandals. So, let us test our arsenal of analytical tools on the Palme case and see how we compare with our Swedish colleagues.

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## 5.1 Palme's Murder: Political Background

The victim was the nation's most important politician. The crime scene was at an intersection in the heart of the capital – so there was no shortage of witnesses, clues, and possible motives, neither for us nor for the investigators at the time. Before we get lost in clues and theories, however, it makes sense to take a few steps back and get an overview of the political background at the time of Prime Minister Palme's death. An awareness of contemporary events – and thus of possible political motives for the crime – can help us formulate (or rule out) hypotheses and not miss important clues. Sadly, if the investigating commission had conducted such a proactive analysis of the political situation, it may have avoided generating some of its erroneous conclusions.

Looking at the past allows us to distinguish between domestic events in Sweden and events in world politics. At the time of Palme's death, the Cold War dominated international politics. Sweden was strictly neutral and criticized both sides for their warmongering; but otherwise they scarcely made any enemies internationally. In general, Olof Palme and Swedish foreign policy under his direction were strongly pacifist.

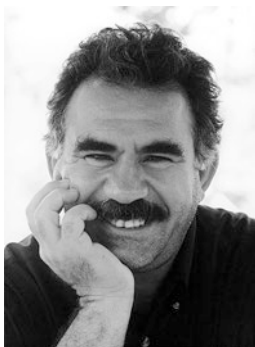
Palme's reputation for neutrality and pacifism even led to Palme's appointment as **UN special mediator in the Iran-Iraq war**, the second major conflict of the 1980s. Again, Palme's position as special mediator seems rather uncontroversial. However, at the time of his assassination, he was working on a final report which, by naming either of the warring parties the obvious aggressor, could severely damage the Iranian or Iraqi reputation. Reason enough to eliminate the Swedish Prime Minister?

Despite Palme's pacifist line, his role as a mediator in the Iran-Iraq War, and his criticism of arms exports, Sweden was a major exporter of war materiel. In 1984, it was revealed that some Swedish arms had ended up in the warring states of Iran and Iraq. Through intermediary buyers in Western Europe and Singapore, the Swedish Bofors corporation had smuggled weapons and explosives to the Middle East. Palme created a committee of inquiry in 1985 to investigate this "Swedish Irangate," as the scandal was dubbed by the media. Did his tough approach of **Bofors' illegal arms exports** step on the toes of this powerful corporation or anger one of the importing countries? On the morning of his death, he met with the Iranian ambassador, Muhammad Saeed al-Sahhaf, also known in the Western media under the sonorous nickname "Baghdad Bob."

Sweden had an open dispute with South Africa at this same time. Under Prime Minister Palme, Sweden became an eloquent **critic of fascist governments, such as the apartheid regime**, and, in the years leading up to Palme's death, supported the regime's opponents, most notably the African National Congress (ANC), with secret cash payments via Switzerland. In early 1986, as the apartheid regime became increasingly unstable, Palme gave a scathing speech against it only a week before his death, with hundreds of apartheid supporters in attendance. Did South Africa's secret service, notorious for its contract killings, possibly play a role in Palme's demise?

Domestically, Olof Palme had made a few enemies during his decades-long career. Palme's strongly social-democratic policies were not met with universal approval. Conservative-bourgeois circles viewed him with disdain, while right-wing extremists hated him.

In the 1980s, Sweden experienced extremism and terrorism across the political spectrum. There was a rise in **right-wing extremism within the police force**. The "Baseball League," one of four special units of the Stockholm police force, created in early 1982 to combat street violence, became known for its brutal methods as well as for its right-wing extremism and racism. Only a year after its creation, the scandal-ridden unit, known for its donning of baseball caps, was disbanded, but right-wing extremism did not diminish within the police force. After Palme's



**Fig. 5.3** PKK Founder Abdullah Öcalan. (Source: Wikimedia, online: Halil Uysal, CC BY-SA 3.0, [https://commons.wikimedia.org/wiki/File:Abdullah\\_%C3%96calan.png](https://commons.wikimedia.org/wiki/File:Abdullah_%C3%96calan.png))

murder, reports circulated that his death was toasted with champagne at police force parties.

Sweden was also rocked by **attacks by the Red Army Faction (RAF)**, a far-left German Marxist group. In 1975, 7 years before Palme's assassination, members of the RAF stormed the West German embassy in Stockholm and took numerous hostages. The hostage-taking failed when one of the hostage-takers accidentally caused an explosion; the surviving RAF members were extradited to West Germany by then Minister of Labor Anna Greta Leijon. In retaliation, in 1977, the RAF made an abortive attempt to kidnap Leijon. Because of the time lapse between this attack and Palme's assassination, it may seem unlikely to factor in the RAF as a possible perpetrator. At this point, all possible groups or actors should not be eliminated. Might the RAF have been more successful in another attack on a Swedish politician?

In the mid-1980s, the **activities of the Kurdish Independence Party (PKK)** caused quite a stir in Sweden. There was a sizeable Kurdish minority in Sweden as the Swedish government had invited Kurdish asylum seekers to Sweden in the 1960s. The Kurds, now numbering nearly 100,000, had integrated excellently into Swedish society, but a series of assassinations of former members by the PKK in 1984 and 1985 caused unrest. Subsequently, the Swedish government officially declared the PKK a terrorist organization and deported some of its members. PKK leader Abdullah Öcalan, who was denied a visa by Sweden in 1983, is not likely a particular friend of Sweden (see Fig. 5.3). But could he have ordered the assassination?

Because there was no lack of enemies of both the Swedish government and Olof Palme, a timeline noting domestic and foreign trouble spots would be helpful in narrowing the reason for Palme's assassination. The motivation could have been either a reaction to current developments or a desire to influence current Swedish politics.



**Timelines and Chronologies: Often Essential Tools**

Timelines and chronologies are a simple but effective way to organize collected information. They can help discover chronological relations or reveal unexpected gaps in the sequence of events.

For this purpose, the relevant and dated events and developments are plotted along a timeline. The separation of the timeline into two sides can be used, for example, to distinguish between different actors or settings (in our case, for example, foreign and domestic policy).

This representation now serves as a basis for further analysis: What connections can be found between actors, places, and events? What external causes could underlie the chronological sequence? And what could explain unexpected gaps or surprising events?

Armed with this background knowledge, we can keep track of specific clues without losing sight of the big picture and weigh which clues are worth pursuing?

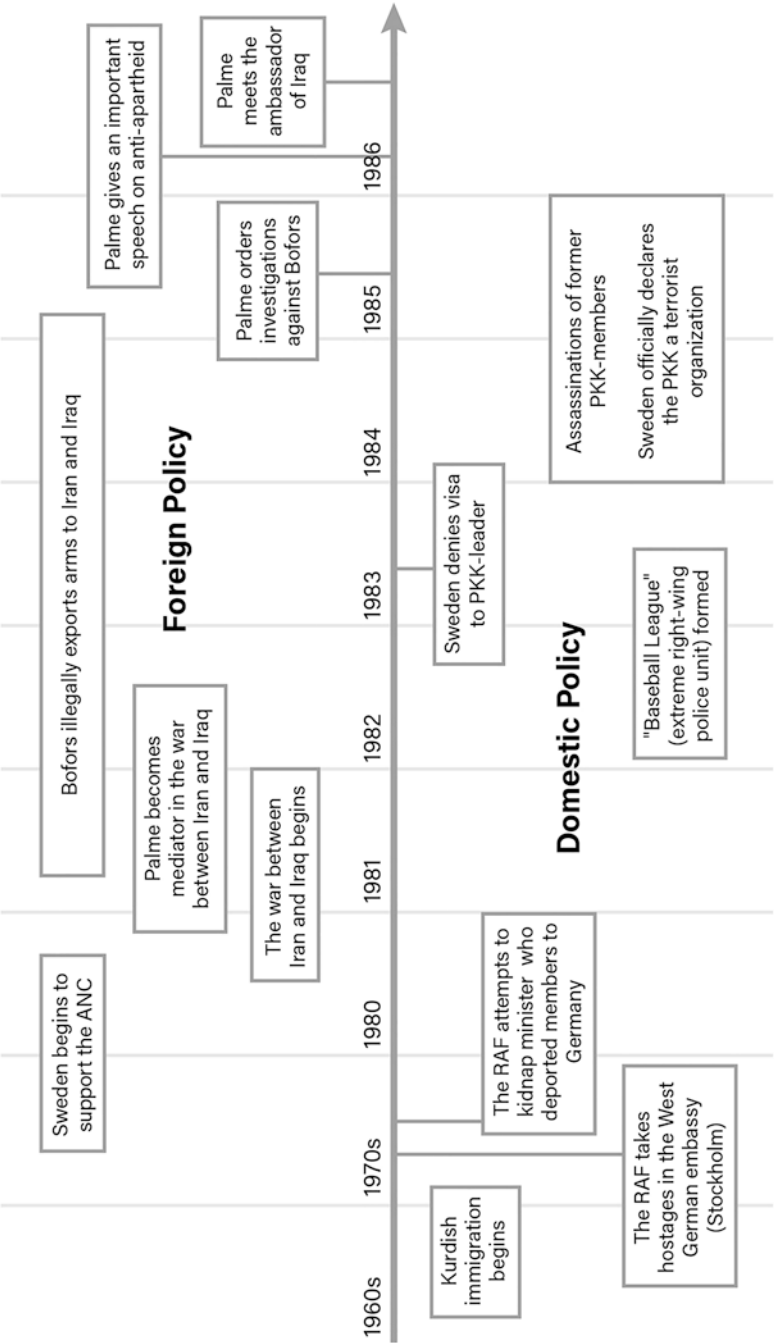
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**5.2 Sequence of Events and the Crime Scene**

Like most Fridays, the Prime Minister began February 28, 1986, with a morning tennis match against a friend, followed by a meeting with Iraqi Ambassador Muhammad Saeed al-Sahhaf (see Fig. 5.4). Ordinary government duties, such as a meeting with the Norwegian ambassador and some office work, took up the rest of the day. Late in the afternoon, Palme headed home, giving his bodyguards the evening off. Meanwhile, Olof's wife, Lisbeth, had been talking with their son, Marten, about the new movie, "The Brothers Mozart." When Olof got home, the couple spontaneously decides to join Marten and his girlfriend to see the movie at the Grand Cinema.

Lisbeth and Olof Palme left the house at 8:35 p.m. and walked to the nearest subway station to take the train to the city center. From there, they walked to the cinema and arrived around 9 p.m. They met the younger couple and bought tickets for the movie. Because the visit to the cinema was unplanned and forensic investigations have eliminated the possibility that the Palme family's homes or telephone calls were bugged, one can rule out that the perpetrator(s) were waiting for them at the movie. It is still not clear if they were followed on their way to the cinema as some witness statements point in this direction, but the statements are vague and even contradictory.

Shortly after 11 p.m., the movie ended, and the two couples chatted outside the cinema and said goodbye at 11:15 p.m. Olof and Lisbeth Palme walked along



**Fig. 5.4** Timeline of political backgrounds. (Source: Copyright 2024 Pherson. All Rights Reserved)

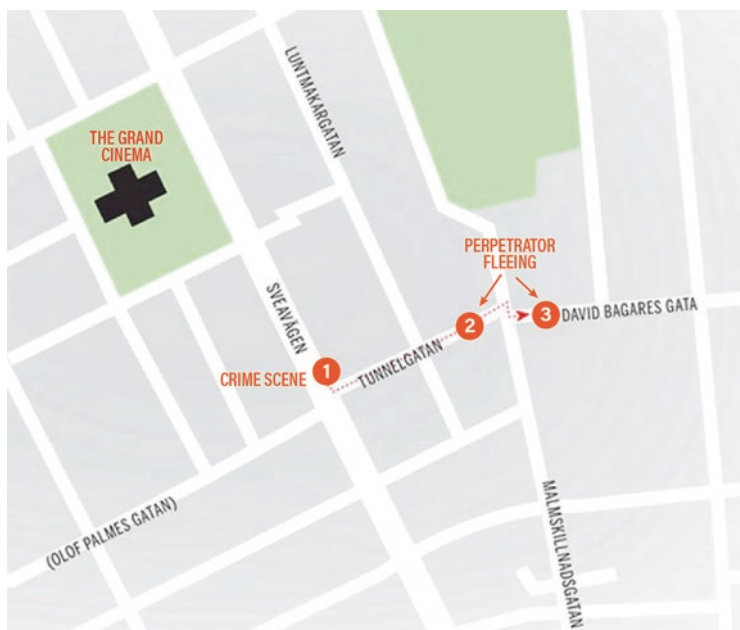


**Fig. 5.5** Artist's interpretation of the Palme crime scene. (Source: Quelle: Wikimedia, online: Windh, CC BY-SA 4.0, [https://commons.wikimedia.org/wiki/File:The\\_assassination\\_\(digital\\_painting\).png](https://commons.wikimedia.org/wiki/File:The_assassination_(digital_painting).png))

Sveavägen Street to the subway station, until a male figure approached them from behind at the corner of Sveavägen and Tunnelgatan. The man touched Olof Palme – still arm in arm with Lisbeth – on the shoulder with his outstretched hand before shooting him in the back at close range with a revolver. The penetrating gunshot hit Palme between the shoulder blades, and he immediately fell to the ground; a second shot grazed the spinning Lisbeth across the back (see Fig. 5.5). The perpetrator paused briefly over the couple, perhaps shocked by his deed, perhaps to reassure himself of his success, before jogging off into Tunnelgatan street where he disappeared.

Sveavägen is generally a busy street; that night a total of 25 people claimed to have seen the crime or parts of it. Nevertheless, no one could give an exact description of the perpetrator(s) because of the poor lighting conditions and, in one case, the drunkenness of the witness. Even Lisbeth Palme could not give an exact statement about the perpetrator's face in her first questioning, which lasted only 25 min. She had only seen him out of the corner of her eye and was understandably traumatized. The police – probably out of empathy – failed for a long time to question her repeatedly and in more detail. So, the police only had the following scanty witness data: a male, about 180–185 cm tall, between 30 and 50 years old, and wearing a dark coat.

After the gunshots and Lisbeth's cries for help shatter the sleepy scene, things moved quickly: One cab driver informed the central cab office by radio, which notified the police headquarters. Another cab driver alerted a police patrol parked nearby, which arrived at the crime scene 3 min after the gunshots. A minute later, a



**Fig. 5.6** Map of crime scene in Stockholm's Old Town. (Source: <https://www.is.fi/ulkomaat/art-20000001123101.html>)

second police patrol began pursuit of the perpetrator, while passers-by stopped a passing ambulance. The ambulance left the scene with Olof and Lisbeth Palme only 7 min after the gunshots were fired and reached the nearest hospital 3 min later. The Prime Minister was dead on arrival. Meanwhile, the perpetrator managed to escape. Several witnesses said he ran into Tunnelgatan street and was seen again only once in David Bagares Street before his trail was lost (see Fig. 5.6).

### Sweden in Chaos: The Day After the Crime

Immediately after Palme's murder, chaos and confusion reigned in the Stockholm police headquarters. Was the Prime Minister really the victim? Was this an isolated act or a broadly planned attack on the Swedish government? And how is the perpetrator supposed to be found in the streets and alleys of the old town? When Sweden's government announced the assassination of the Prime Minister at a press conference the next morning, which threw the country into chaos, the police had already made a series of fatal mistakes.

The initial search for the perpetrator was uncoordinated and without steady leadership as it was "sports week," a week-long school vacation during which half of Stockholm's population and half of the police force (including Hans Holmér, the chief of police) were out of the city skiing. The police who were in the city browsed it unsystematically and without even a rough description of the perpetrator. Stockholm's bridges were finally closed after several hours, but trains, ferries, and planes left the city unhindered.



**Fig. 5.7** Mourners at the Scene of Palme's Murder, 1986. (Source: Wikimedia, online: Holger. Ellgaard, CC BY-SA 3.0, [https://commons.wikimedia.org/wiki/File:Palme\\_Trauer\\_1986.jpg](https://commons.wikimedia.org/wiki/File:Palme_Trauer_1986.jpg))

When Holmér arrived in Stockholm the next morning, the perpetrator was long gone, and his pursuit had already been abandoned. The hardened leather-jacket inspector Holmér, who had never conducted a murder investigation before, styled himself as the savior of Sweden's traumatized citizenry in a media-effective television appearance. However, because of the poor police work the night of the crime, he was already behind when he began his investigation. Moreover, the crime scene had not been closed to the public, so mourners likely destroyed evidence while laying down flowers (see Fig. 5.7).

### Searching for Clues at the Crime Scene

Nevertheless, the crime scene, even though not secured immediately, was the most obvious place to start the murder investigation. Only a meager supply of clues remained: the good two dozen people who, having observed either the murder or the alleged perpetrator, can at least provide a reliable picture of the course of events including the attacker's behavior. Although the witnesses' statements did not provide any concrete clues as to the perpetrator's identity, they still contributed some important information and could be valuable in a police line-up.

In another example of police incompetence, law enforcement did not search for the bullets fired at the scene. Passers-by accidentally found them several days later and turned them into the police.

From the caliber and the deformations of the bullets, the ballisticians were able to determine that the murder weapon was a long-barrel .357 Magnum caliber revolver. The most common weapon of this type is the Smith & Wesson .357 Magnum, and the police began the search for it by collecting all the data on the

approximately 4000 revolvers of this type registered in Sweden. It also turned out that 10 of these weapons had been reported stolen at the time of the crime.

#### **Ballistic Examination Capabilities**

A found projectile can reveal the caliber of a weapon, show deformations and traces from its barrel, and thus provide detailed information about it. Moreover, these traces are so different for each specimen of a weapon that ballisticians can often verify from which weapon a projectile was fired – effectively like a fingerprint.

Initially, the Stockholm police planned to collect and test all the approximately 4000 registered Smith & Wessons to compare the fired projectiles with those from the murder weapon. After West German experts kindly pointed out that such a project would take an estimated 10 years, this plan was quickly abandoned. Instead, on March 29, fighter jets thundered over Stockholm the entire day to take aerial photographs of the area around the crime scene. The people of Stockholm were impressed, and the head of the investigation, Holmér, was the people's hero – until the whole operation had to be repeated the next day because someone had initially forgotten to insert film into the cameras of the jets.

Since the murder weapon remained untraceable despite the air search, police focused for a long time on locating the 10 stolen guns. After 3 years during which neither the murder weapon nor the revolvers reported stolen were found, the police decided in 1989 to test all .357 Magnum revolvers registered in Stockholm. The thought was: although only 10 weapons were reported stolen in the country, there were 620 of them registered in Stockholm alone. The likelihood that one of those 620 legally acquired revolvers was one of the 10 stolen and possibly the murder weapon was a reasonable assumption on the part of the police. The police also hoped that the collection appeal alone would provide helpful information, such as more weapons being reported stolen by their owners or even a confession from the cornered perpetrator.

Unfortunately, no one came forward, and the murder weapon was not among the tested revolvers. Instead, out of the 620 relevant weapons, 183 were sorted out, 429 were tested unsuccessfully, and two were reported stolen. So, the projectiles from the murder weapon ultimately proved to be a cold trace.

#### **Mind Maps and “Starbursting”**

Facing an unsolved crime as complex and multi-layered as the murder of Olof Palme can quickly become overwhelming: Countless clues and traces, countless possible motives and investigative approaches ... so where to start?

Fortunately, there are countless **methods** that can provide an organized overview of the factual situation and the questions that need to be answered. These include classics like Mind Maps as well as more specialized methods like Starbursting.

It is best to start a **mind map** with an open question that defines the problem to be solved. Then list related concepts and start grouping them. The actual “mapping”





### 5.3 Profiling Alias “Operative Case Analysis”

Whether due to human error on the part of the police force or due to the circumstances of the crime, none of the clues from the crime scene – neither the witnesses’ statements nor the projectiles from the murder weapon – led the Swedish investigators to the perpetrator. What remained was an almost unmanageable flood of clues and theories, all of which would be impossible to pursue thoroughly. Setting priorities and pursuing the most promising clues needed to be done but how?

The gold standard in any modern police investigation is so-called “profiling”, officially referred to as “Operative Case Analysis” in Germany. This involves the systematic collection and analysis of all available data on a particular crime, regardless of the investigation that is currently going on. The purpose of “profiling” is to generate hypotheses on the background and the motives of the crime – ideally creating a psychological profile of the perpetrators as well. The goal here is not to solve the case but to prioritize the investigations and to make them more efficient. Newly arriving clues or witnesses’ statements can also be structured and evaluated based on the hypotheses formed.

#### **Profiling: A By-Product of the Analytic Process**

Profiling, known from series such as “Criminal Minds,”, officially referred to as “Operative Case Analysis” or “Operative Fallanalyse (OFA)” in German, is a method used in criminal forensics analysis. It involves making hypotheses on the background of a crime to find new investigative approaches.

First used in the 1880s to solve the “Jack the Ripper” murders, profiling was made popular especially by the FBI’s “Behavioral Analysis Unit” and is mostly used in serious crimes such as murder.

Contrary to what is often portrayed in the media, in a modern OFA, the psychological profile of the perpetrator is usually more of a by-product of the analysis. Profiling takes place independently of any ongoing investigation. It is important to note that analysts have no prior knowledge of any suspects. This is the only way to ensure that the analysis is unbiased and has not been distorted by any knowledge of the suspects.

How valuable might a structured case analysis have been for the Swedish investigation commission rather than the haphazard pursuit of various theories? By doing so, the Swedes spent a disproportionate amount of time and personnel resources pursuing unpromising tracks while overlooking important clues. Even tips from official sources, such as the US State Department or investigators in other, possibly related cases, were usually ignored outright. On the other hand, in the late 1980s, profiling was still little known outside the United States. But even the small amount of analytical work done by the police force and their advisors was barely documented and therefore impossible for later investigators to trace.

In 1993 Detective Inspector Jan Olsson and psychiatrist Ulf Asgard successfully commissioned a systematic case analysis. However, both men pointed out that their



analysis would be biased because of their knowledge of the previous suspects. (Between 1986 and 1993, several main suspects had already been investigated and even charged before the court.) The two analysts asked for an external review by experts from the FBI, whose world-renowned “Behavioral Science Unit” is considered a pioneer of profiling. After the Swedish analysts had discussed their findings with their FBI colleagues in early 1994, they presented their finished “profile” to investigators in May 1994.

### **Hypotheses: A Single Perpetrator or a Political Conspiracy?**

The Swedish analysts began their systematic case analysis by proposing four hypotheses that differed regarding the number of perpetrators and their modus operandi. Subsequently, they consolidated three of the hypotheses because they shared the assumption that a group was responsible for the murder, even though the act itself may have been conducted by a single person. The remaining alternative hypothesis assumed a single perpetrator. These two hypotheses (labeled “**conspiracy**” and “**single perpetrator**”) also implicated different motives, particularly a political motive for the former. The analysts attributed a personal motive to a single perpetrator, e.g., a dislike of Olof Palme, which could also have been politically motivated, or a pathological craving for recognition.

#### **Multiple Hypotheses Generation: The Palme Assassination**

Multiple Hypotheses Generation (MHG) is a technique to develop multiple explanations for an event without falling victim to cognitive biases. MHG is particularly useful to form diverse hypotheses from a variety of available data, the plausibility of which can be compared in further steps. Thus, the method shows some similarities to profiling in criminology and is ideally suited for our murder case.

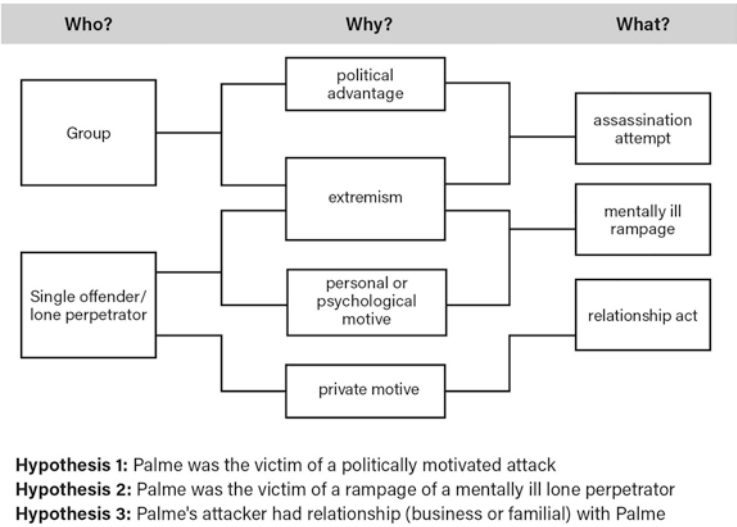
Often, MHG begins with an existing guiding hypothesis that is to be questioned. In our case, this could be the theory pursued by Holmer: Olof Palme became the target of an attack by a politically motivated group. MHG then lists alternatives for the “who”, “what” and “why” of this hypothesis; these should be mutually exclusive if possible. So, in our case, we question “who” committed the murder, “what” type of murder took place, and “why” did they do it (see Fig. 5.9). For the types of murders and corresponding motives, there are detailed categorizations in criminology, such as the *Crime Classification Manual*, which is also used by the FBI.

Of course, motive, type of murder, and number of perpetrators can be interdependent or in some cases mutually exclusive. In the next step, all possible combinations of the three variables are run through and unrealistic arrangements are eliminated. Hypotheses are now formulated from the remaining combinations. These should also be as mutually exclusive as possible, which is why some are combined in case of doubt (see Fig. 5.10). MHG also includes steps to compare the credibility of the hypotheses, but we leave this step to another method – Analysis of Competing Hypotheses.

**Lead Hypothesis:** *A group carried out a politically motivated attack on Palme.*

<b>Who:</b>	<b>Why:</b>	<b>What:</b>
<ul style="list-style-type: none"><li>• One group</li><li>• A single person</li></ul>	<ul style="list-style-type: none"><li>• Political advantage</li><li>• Extremist sentiments</li><li>• Private motive (revenge, quarrel, etc.)</li><li>• Personal motive (mental disorder, attention, etc.)</li></ul>	<ul style="list-style-type: none"><li>• Politically motivated attack</li><li>• Attacker had relationship with victim</li><li>• Rampage of mentally ill lone perpetrator</li></ul>

**Fig. 5.9** Palme multiple hypotheses generation: who, what, and why. (Source: Copyright 2024 Pherson. All Rights Reserved)



**Fig. 5.10** Palme assassination: candidate hypotheses. (Source: Copyright 2024 Pherson. All Rights Reserved)

Generally, a personal motive must be distinguished from a private motive. Personal here means any motive of a single individual; a private motive, however, presupposes a private relationship between perpetrator and victim, implying a **relationship crime**. However, the hypothesis of a private motive was quickly discarded during the profiling process as Palme had only a few close contacts, even fewer of whom could be considered “enemies,” and none of them behaved suspiciously. In general, Palme’s private life was quite introspective and free of scandal (except for his sham marriage to a Czech woman to enable her entry into Sweden in 1984; she remained friends with Olof and Lisbeth until Olof’s Palme’s death). Also, the financial situation of the Palme couple was completely unremarkable. This speaks against a private motive, which the investigating commission quickly ruled out, primarily from the investigators’ gut feeling rather than a systematic process.

So, if we exclude a private motive, we are left with two broad hypotheses: a single perpetrator with a personal motive or a politically motivated conspiracy. To weigh the likelihood of these hypotheses and thus determine the path for further investigation, the Swedish profilers compared Palme’s murder with previous political assassinations. Several features, atypical of politically motivated attacks, stood out: Olof and Lisbeth Palme had no personal protection at the time of the crime, the attack occurred late at night, and the perpetrator escaped. Despite his sometimes controversial politics, the profilers consider a political conspiracy unlikely. These factors may be due to the specific circumstances of the crime (and the unsatisfactory police work) and do not necessarily serve as an argument against a conspiracy. Beyond that, the profilers noticed more inconsistencies when comparing the crime with other assassinations: apart from Olof Palme himself, it was Lisbeth, the wife of the actual target, who was also attacked. Moreover, the attack on the Palme’s occurred near their neighborhood. These two data points are inconsistent with the hypothesis of a political conspiracy.

The profilers cited other details, which, in their opinion, argued more for a single perpetrator than for a multi-person conspiracy. Apart from the attacker’s unprofessional behavior, they asserted that an attack on Palme could not possibly have been planned precisely before he arrived at the cinema because the visit to the movies was spontaneous and there were no clear indications that Olof and Lisbeth were being monitored. The apparent spontaneity of the attack and the lack of “shadowing” argues against a professional and long-planned conspiracy. Even an “opportunistic” conspiracy, in which the actual act was conducted spontaneously, also seemed unlikely.

Moreover, the profilers found that political conspiracies usually have a certain “overflow,” which refers to people who do not know the actual goal of the conspiracy. When they learn that they were unwittingly involved in a murder, they usually turn to the authorities – often anonymously. At this point in the investigation, no one had yet confessed or come forward with a credible tip despite the huge reward, which, in the opinion of the profilers, spoke against a large-scale conspiracy. Moreover, any public admission of responsibility, which usually follows terrorist attacks, failed to materialize after Palme’s murder. Deterrence and publicity – two hallmarks of political assassinations – were not present. In the end, Palme’s death did not change Sweden’s foreign and domestic policy.

#### **Analysis of Competing Hypotheses (ACH)**

After we have found a number of possible explanations for the murder of Palme with the help of the MHG, it is necessary to weigh which of them is most probable. A helpful tool for this is the Analysis of Competing Hypotheses (ACH).

ACH uses the form of a matrix in which we plot the hypotheses against the available information, i.e., pieces of evidence, traces (or lack thereof), the

absence of evidence, or even key assumptions. We then rate each data point consistent or inconsistent with the hypotheses. This “rating” is revised again, e.g., as critical assumptions are questioned and information that is compatible with all hypotheses is deleted (see Fig. 5.11).

For each hypothesis we calculate how much of the available information contradicts it. Then the hypotheses can be ranked according to their plausibility. Of course, this does not disprove the less probable hypotheses and they must be kept in mind. In general, the ACH is well suited for monitoring ongoing developments. New information is simply added to the matrix, and the hypotheses are continuously weighed against each other.

**The Perpetrator’s Profile: A Failed Existence Seeks Attention**

In 1993, Swedish analysts concluded that Palme’s assassination was unlikely to be the result of a politically motivated conspiracy. The profilers suggested that the investigation focus on a single perpetrator who acted alone and spontaneously. FBI analysts classify such a crime as “chaotic,” as opposed to an “organized” crime. According to this hypothesis, the assailant probably met Palme either inside or outside the movie theater and acted out of a personal motive.

The Swedish profile describes the perpetrator as someone likely suffering from a personality disorder who had considerable difficulty controlling his emotions and acting logically under pressure. The perpetrator probably had experienced a number of private setbacks and suffered from a moderate alcohol or drug problem. His past

Information	Hypothesis 1 Assassination (political)	Hypothesis 2 Amoctate (personal)	Hypothesis 3 Relationship act (private)
No monitoring Palmes	I	C	C
Controversial policy Palmes	CC	C	C
No private enemies	C	C	II
No "overflow" of a conspiracy	I	C	C
No personal protection	C	C	C
Inconspicuous private life (scandals, indebtedness, ...)	C	C	I
Amateur approach	I	C	C
No confession of guilt	C	C	C
Busy environment (high risk)	C	CC	II
Murder not plannable (spontaneous cinema visit)	I	C	I
Inconsistencies:	4	0	6

Information is either consistent ("C") or inconsistent ("I") with a hypothesis. If it speaks particularly strongly for ("CC") or against ("II") a hypothesis, this is also noted and accounted for accordingly. If a fact is consistent with all hypotheses, it is discarded for lack of significance.

**Fig. 5.11**    Palme assassination: analysis of competing hypotheses. (Source: <https://sverigesradio.se/artikel/5883885>)



**Fig. 5.12** Memorial plate for Olof Palme. (Source: Wikimedia, online: BKP, CC BY-SA 3.0, [https://commons.wikimedia.org/wiki/File:Olof\\_Palme\\_Memorial\\_Plaque.jpg](https://commons.wikimedia.org/wiki/File:Olof_Palme_Memorial_Plaque.jpg))

and resultant emotional instability combined to form a pathological desire for attention and a strong dislike of Palme and his politics – two possible motives for the crime.

The profilers also recommended that the commission psychologically evaluate all suspects identified thus far and investigate their private lives in more detail. The profilers also wanted to investigate the countless threatening letters and other unusual mail that Palme, like other politicians of his stature, received. Based on their psychological profile of the perpetrator, the profilers also concluded that he was likely to return to the crime scene and other locations that reflected the crime. They recommended the police monitor Olof Palme’s grave (see Fig. 5.12) and the whereabouts of his widow, Lisbeth. Based on the possible motives for the crime – a morbid desire for prestige and attention – the profilers told the police to be on the lookout for individuals who showed a conspicuous interest in the investigation.

After the operational case analysis, the investigating commission questioned the late Prime Minister’s office staff and – incomprehensibly for the first time – his bodyguards. No suspects emerged, but the profilers’ analysis would have been enormously valuable for the initial investigation. Unlike investigators at the time and based on our use of SAT’s, we are able to pursue traces that might lead us to individual perpetrators with a personal motive.

### **The First Suspect: Viktor Gunnarsson, or “The 33-Year-Old”**

Unlike the investigators at the time, we have been able to base our investigations on a systematic analysis of the crime from the start. Based on our analysis thus far, we will focus on possible individual perpetrators, specifically on those who roughly correspond to the psychological profile we have developed. We will partly deviate from the chronological course of the actual investigations to focus entirely on individual suspects.

On the first day after Palme's death, a young woman contacted the Stockholm police and reported that on the night of the murder she and two friends had met a man in a café not far from the crime scene. This man had first made clear to them his deep hatred of Olof Palme and later handed them a business card – the name: Viktor Gunnarsson. Over the next few days, a number of other references to Gunnarsson were received: he had talked about overthrowing Palme, was a member of an extremist organization, possessed a gun, and claimed to have been trained by the CIA and FBI. It is clear, based on these statements that Viktor Gunnarsson hated Olof Palme.

In early March, the prosecutor decided to summon Gunnarsson, whom the media dubbed “the 33-year-old,” for questioning and ordered a search of his house. Gunnarsson had difficulty giving detailed information about his behavior on the night of the crime. In addition, two female moviegoers in a cinema near the scene of the crime testify that a rushed-looking man entered the auditorium in the middle of the show around midnight. In a line-up, at least one of the moviegoers identified Gunnarsson as the very man – although hesitantly. Meanwhile, in the search of Gunnarsson's house, the police found pamphlets from the far-right European Workers Party (EAP) in which Gunnarsson had marked hateful passages about Palme. Until recently, “the 33-year-old” was himself a member of the EAP, the Swedish branch of the international “LaRouche Movement.” The police also found gunshot particles on Gunnarsson's coat but ruled out conclusively that they did not come from the murder weapon.

Shortly after the questioning and search, a witness known as Ibrahim D. came forward saying that a man had stopped him shortly after the murder, not far from the crime scene, offering him money to be driven “somewhere.” In a line-up, Ibrahim D. identified Gunnarsson as the very man. Senior prosecutor K.G. Svensson had heard enough and issued an arrest warrant for Gunnarsson the next day.

A few days later, however, the evidence base began to crumble. D. had simply seen a photo of the suspect Gunnarsson before the line-up. Moreover, D., who spoke French, had no translator during his initial interview and said he could barely recognize the face of the person he described in the line-up. Prosecutor Svensson released Gunnarsson from custody but had him wiretapped and continued his investigation of “the 33-year-old.” A closer examination of Gunnarsson's coat by the West German police confirmed the Swedish police analysis that the residue on the parka was not consistent with the gun used in Palme's murder – even though this could not be ruled out completely. Subsequently, the identification of Gunnarsson by the two female moviegoers was judged to be unreliable. In addition, none of the witnesses at the crime scene identified Gunnarsson – one even explicitly excluded him as the perpetrator. In addition, Lisbeth's own description of the perpetrator did not match the clothing worn by “the 33-year-old” on the night of the crime.

**Cognitive Pitfalls Make Data Unreliable**

The line-up with witness D., in which he identifies Gunnarsson, is unusable due to a serious error on the part of the police. Ibrahim D. was shown photos of the suspect Gunnarsson before the line-up resulting in so-called biases, or “cognitive distortions” on the part of the police and the prosecution.

On the one hand, this is a classic case of Confirmation Bias during police work, meaning the targeted search for evidence or data that confirms one’s own, often hasty, conclusions or convictions.

Subsequently, an Evidence Acceptance Bias - the willingness to accept data without regard to its credibility if it tells a coherent story - can also be detected in the prosecution. Witness D. was not only influenced before the line-up, but readily admitted a few days later that he could not recognize the suspect’s face correctly. On close inspection it should therefore have been clear that this “data point” was not reliable.

Finally, in mid-May, Prosecutor Svensson announced the end of the investigation against Viktor Gunnarsson and resigned from the Palme case. According to Svensson, the suspicion against “the 33-year-old” had not been substantiated; furthermore, the investigators had partly acted unlawfully against Gunnarsson. Svensson stated that he had wanted to close the case much earlier but had been pressed by the police and obstructed in his work. Svensson’s resignation was the culmination of a long dispute between him and Police Chief Holmér. Upon Svensson’s advice, the government set up a commission of inquiry into the investigation of Gunnarsson. The commission came to the same conclusion as Prosecutor Svensson: “the 33-year-old” was no longer a suspect, and Holmér’s investigative work was legally questionable.

Sadly, the police continued to investigate Viktor Gunnarsson multiple times as “new clues” appeared. Because many Swedes still believed he was a prime suspect, Gunnarsson felt unjustly despised in his home country. When investigations against him were dropped for the second time in 1989 and his travel ban lifted, he emigrated to the United States. Sadly, in 1994 Gunnarsson was found half-naked and shot twice in the head in a wooded area in North Carolina. His girlfriend’s former fiancé, an ex-police officer, had shot him out of jealousy.

**Christer Pettersson, the Best-Known Suspect in the Palme Case**

When no quick investigative success emerged in the month following Palme’s murder, the police decided to publish a facial composite of the perpetrator. This decision was criticized in many quarters as none of the witnesses could accurately identify the assailant’s face. The resulting sketch was accordingly vague and probably resembled many people. Within a few days, the police received over 7000 tips, which hopelessly overwhelmed the investigators.



Nevertheless, the police also received two very promising leads in early April: Christer Pettersson, a notorious petty criminal with an alcohol and drug problem, seemed to fit the sketch well. Secondly, Pettersson had also been noted as a possible suspect back in March, when his name emerged in reports of previous violent crimes near the crime scene. Pettersson was not interviewed until a month after he was linked to the sketch even though he was deemed a prime suspect. He admitted being near the crime scene on the night of the murder, and his friends cannot confirm his alibi. Despite these two pieces of information, the police did not pursue Pettersson's trail, a momentous mistake when suspicion of him comes to a head 2 years later.

In the fall of 1988, the investigating commission decided to take another look at the crime scene, and Pettersson again became the target of suspicion. Two people confirmed having seen Pettersson outside the Grand Cinema around the same time that the Palmes' performance ended. When a food truck owner testified that a man who looked very much like Pettersson followed Olof and Lisbeth Palme on their way home, Pettersson was finally taken into custody. In a dramatic turn of events, Lisbeth Palme clearly identified him as the perpetrator in a line-up shortly afterwards. Only then is Pettersson arrested and charged. He was declared guilty in 1989 and sentenced to life imprisonment.

Shortly after his conviction, he was acquitted on appeal, and the prosecution's case was torn apart by the jury, who had no access to the murder weapon, nor was a connection between Pettersson and the weapon proven. Moreover, there was no plausible motive presented. Although Pettersson was certainly outside the cinema, this single fact proves nothing. All witness statements from the crime scene presented at the trial were declared unreliable as these clues were received more than 2 years after the crime and the passage of time can blur memories.

Lisbeth Palme's identification of Pettersson turned out to be problematic. She knew, prior to the line-up that Pettersson had a severe alcohol problem. In addition, the composition of the people in the line-up was questionable: apart from the suspect, it consisted exclusively of police officers and civilian police employees, from whom Pettersson, an addict who had retired early, stuck out like a sore thumb. Lisbeth Palme's first sentence when seeing the line-up was, "I can see right away which one of them is the alcoholic!" Thus, her identification of Pettersson, the only solid evidence of his guilt, was tainted. Only the following facts remained: Pettersson was near the crime scene on the night of the crime, had a criminal and violent past, and no alibi for the time of the crime. All these facts make him a suspect but are consistent with either guilt or innocence.

Pettersson remained a suspect and under surveillance even after his acquittal but does not garner attention again until 1997. In the ensuing 10 years, several new pieces of evidence surfaced, but were hardly reliable. There was no new concrete evidence, but the police used considerable resources to reopen the case. However, the Swedish Supreme Court refused to reopen the case in 1997 and 1998. Like Gunnarsson, Pettersson died in a fairly dramatic incident in 2004: While leaving the hospital to which he was admitted after a clash with the police, he stumbled outside the hospital entrance and died from the fall.



**A Suspicious Witness: The “Skandia Man:” Stig Engström**

One of the witnesses from the crime scene who testified in Christer Pettersson’s defense during his trial was Stig Engström, who was also of particular interest to the investigating commission separate and apart from Pettersson. Engström was one of the first witnesses to report to the police immediately the day after the crime; he emphasized that he was among the first to come to the aid of Lisbeth Palme and her husband and was thus a particularly important witness. During questioning, he stated that he had run to the scene immediately after the shooting, had spoken briefly with Lisbeth, and had then given details of the perpetrator’s clothing and appearance to a police patrol. During two further questionings in mid-March, he also stated that he had helped other witnesses in an attempt to revive Palme. His initial information and subsequent statements differ somewhat but this is not unusual after such dramatic experiences. Other witnesses’ accounts differed from one questioning to another, but none of them could remember Engström at the crime scene.

The police questioned Engström five times but quickly turned their attention to other leads. Engström was furious at their lack of interest in him and, in a series of interviews, severely criticized the police and presented himself as an essential key witness. He took a conspicuous interest in the investigation and gained notoriety quite quickly, earning the nickname “Skandia Man” as Engström was working as a graphic designer for the Skandia company, whose office was only 40 meters from the crime scene. Despite his proximity to the crime scene that night, he was not allowed to participate in a reconstruction of the crime with other witnesses. He staged his own reconstruction in April, which was even televised, again without any reaction from the police. Engström’s intrusive behavior and his obvious desire for media attention should have made investigators suspicious – even without the results of the profiling, which explicitly warned against such individuals.

In early June, the investigating commission received a memorandum from a former police officer who worked in Skandia’s security service. In it, he named Engström as a very likely perpetrator: his clothes exactly matched the description of the perpetrator, and Engström had lied to his colleagues when they asked him what he had done on the night of the crime. The police half-heartedly began investigating “Skandia Man” and soon discovered that Engström had deliberately given false information about exactly when he had left the Skandia building on the night of the crime. According to the time stamp on the gate, Engström had left the building early enough to shoot Olof Palme.

The police never took Engstrom seriously either as a suspect or as a witness despite Engstrom himself and the security guard’s report. His contradictory statements and hazy recollections were attributed to his craving for attention. Engström’s conspicuously intrusive self-promotion as a key witness was seen as a quirky personality rather than suspicious behavior. Ultimately, he was ignored as Police Chief Holmér vigorously pursued his hunch that the Kurdistan Workers’ Party (PKK) was involved in the murder.

## 5.4 Investigating Political Conspiracies and Motives

At this stage of our investigations, we have analyzed the possible political background of the crime and generated hypotheses about the perpetrator and his motive based on the available facts (course of events, crime scene, etc.) considered as part of an operational case analysis. Following the trails of the Swedish investigators, we pursued the leads that corresponded to the most promising hypothesis of our analysis: a psychologically unstable single perpetrator. So far, we still do not have a likely suspect. Does this mean that we were wrong in our analyses? Or did the Swedish investigators miss an important clue or give up a lead too early?

Hans Holmér, the head of the first investigating commission, seemed to show little interest in any individual perpetrators. He believed a political conspiracy was the motive for the murder. He specifically suspected the PKK. We should do the same. But what is the best way to proceed given the almost unmanageable number and variety of relevant actors: hostile intelligence services, extremist splinter groups, terrorist organizations, and powerful large corporations?

The task is to gather a broad pre-selection of possible perpetrator groups and to rank them based on some fundamental questions. These include: Who benefited from Palme's murder? Who had the means and the opportunity to carry out such an attack in the first place? To which actor does the perpetrator's action fit? And which actors would have gained knowledge of such a plan long ago? Seeking outside political expertise would be helpful in answering these questions and assessing our initial list of actors.

Hans Holmér initially consulted an external expert – more or less. The Foreign Ministry initially appointed a liaison person to collect and classify incoming evidence of a politically motivated assassination and forward it to the investigating commission. Holmér also recruited an old acquaintance, former ambassador Sverker Aström, as a foreign policy advisor to the commission. Although Aström kept his former ministry informed of his advisory activities, there was never any formal cooperation between the investigating commission and the Foreign Ministry.

### **"Cui Bono?"**

In English, "Who benefits?" This key question should be asked in any criminal investigation. The maxim quoted above was popularized by Cicero and attributed to the famous Roman judge Lucius Cassius. It also takes a central role in our investigations.

Apart from Aström's advisory work, Holmér's investigating commission was completely deaf to clues pointing to political opponents other than the PKK. The commission even ignored the clues that came from trustworthy and well-informed sources, including Foreign Ministry officials or investigators into other politically relevant crimes. In essence, Holmér's investigators blatantly ignored memoranda and offers of support from their own colleagues. By the time they followed up on a lead, it was often too late: the witnesses had disappeared, and the trail was cold and hardly traceable.

Aström's proactive approach, on the other hand, was quite promising. He began by systematically listing all the major governments, political organizations, and terrorist groups, assessing the extent to which each came into question for the murder. In doing so, he largely oriented himself around the questions which we asked in our actor analysis, e.g., motives, means, and patterns of behavior. He presented his findings to the police in a series of memoranda in which some important groupings gradually emerged. In these documents, he also mentioned, among other things, the very actors that we highlighted in our introductory overview of the political situation.

### Actor Analysis

If we turn our attention towards groups and organizations, we are confronted with both an advantage and a disadvantage. On the one hand, there is a wide variety of potential attackers: hostile governments, terrorist organizations, corrupt large corporations, and the like. On the other hand, these actors are at least well-known, as are (to some extent) their intentions, capabilities, and patterns of behavior.

There is no universal "recipe" for systematically determining which organizations are likely to qualify as potential attackers. The criteria that make actor relevant vary widely depending on the case. Fortunately, we can draw on the rich literature on criminology as well as on counterterrorism analysis to obtain possible criteria.

Counterterrorism research models the likelihood of an attack as a function of the actors' "intent" (**motive**) and "capability" (**possibilities**). The first dimension is often subdivided into "will" – the intensity of the motive and the willingness to take risks for it – and "gain" – in our case a concrete political advantage. For the dimension of "capabilities" (considering the relatively unspectacular procedure in our murder case), two criteria are particularly relevant: the possibility of operating on Swedish soil and doing so undetected.

Criminology suggests a third dimension relevant for us: the "**modus operandi**" of a perpetrator or suspect. The question of how typical the attack on Palme would be for a particular actor can be answered in a twofold way, by asking:

- Does this actor have a history of political assassinations, especially in Western countries?
- Would this actor would act as amateurishly as Palme's murderer did?

Thus, there are ultimately three dimensions, each with two to three criteria that we can use to assess the extent to which an organization qualifies as an attacker (see Fig. 5.13).

#### Actors Identified from Analyzing Current Political Events

- Apartheid regime
- Bofors (weapons manufacturer)
- Iran and Iraq
- PKK
- RAF
- Right-wing extremist police officers (*the only actor not named by Aström*)

Actor	Motives				Capabilities			Modus Operandi			
	Strength/ Intensity	Risk- taking	Political advantage	Total (0-6)	Access to Palme	Secret procedure	Total (0-4)	Pre-history	Tactics/ Procedure	Total (0-4)	Final
RAF	low	high	no	2	normal	easy	3	pronounced	unsuitable	2	7
Right-wing extremist police officers	medium	medium	no	2	easy	normal	3	none	unsuitable	0	5
EAP (extreme right party)	high	high	no	4	easy	heavy	2	none	unsuitable	0	6
Pinochet regime (Chile)	low	low	yes	2	heavy	easy	2	hardly	suitable	3	7
Contras (Nicaragua)	low	low	yes	2	heavy	normal	1	hardly	suitable	3	6
Apartheid regime	medium	medium	yes	4	normal	easy	3	pronounced	very suitable	4	11
Iran / Iraq	low	low	possible	2	heavy	easy	2	pronounced	suitable	3	7
Bofors (weapons manufacturer)	high	low	yes	4	easy	normal	3	none	suitable	2	9
PKK	medium	low	no	1	easy	normal	3	pronounced	unsuitable	2	6

In the investigative work to date, nine organizations have emerged that may have been behind the attack on Palme. Here, their motives, possibilities and behaviors are outlined based on the previously established criteria; we assign between 0 and 2 points per each criterion.

It is noticeable that the "motive" dimension is weighted somewhat more heavily. This makes sense if one thinks of the extreme cases: Just because a particular actor has the means and is known to commit assassinations, he will hardly shoot a Swedish politician in the street without any reason. In contrast, an extremely strong motive could lead a desperate actor to a very untypical and almost impossible assassination attempt.

**Fig. 5.13**    Palme assassination: analysis of competing hypotheses. (Source: <https://sverigesradio.se/artikel/5883885>)

Aström regarded some governments or groupings relevant that had not appeared in our political background check because their motives were not related to any concrete political events or processes and therefore did not play a role in our chronological analysis. These motives were related more to Olof Palme’s general political position. The groups included fascist regimes or groups in Latin America. Aström particularly emphasized the Contras in Nicaragua and the Pinochet regime in Chile. The reason for their inclusion in Aström’s analysis was Palme’s socialist views and his close friendship with the Cuban Communist Fidel Castro, whose interests he frequently defended against the United States.

Aström also paid attention to a Swedish group – the European Workers Party (EAP), a right-wing extremist party that was also the Swedish branch of the international LaRouche movement. We have already encountered the EAP: Victor Gunnarsson was a former member of this militant splinter party. In his first memorandum, Aström still regarded an assassination by the PKK as possible. However, in the case of these two organizations, which span the spectrum between party and militia, Aström made an important observation: if the EAP or the PKK were responsible for the crime, the Swedish security police, SAPÖ, would have to know about corresponding plans.

SAPÖ, which is also Sweden’s domestic intelligence service and personal protection agency for public servants such as Olof Palme, knew nothing about potential

plots but gave the police its own assessment of possible political assassins. SAPÖ's basic assumption was that classic terrorist groups would have claimed responsibility for the crime. As this was not the case, the SAPÖ excluded European, Arab, and Latin American terrorist organizations. Only the PKK was on SAPO's radar as a possible perpetrator: the PKK would be the only group with a motive to murder Palme without claiming responsibility so they did not endanger the Kurds living in Sweden.

Although Aström started from the same basic assumption, he concluded something quite different: since no group claimed responsibility for the crime, the goal of a political assassination would have been to stop a concrete policy of Olof Palme in particular. For Aström, therefore, right-wing extremist actors such as the Contras, the Pinochet government, or the apartheid regime were the most relevant. In his later memoranda, Aström regarded any PKK involvement as quite unlikely. But his change of mind came too late: chief investigator Hans Holmér had already tasted blood and could no longer be dissuaded from investigating the PKK.

### **The Track of the Kurdistan Workers' Party**

But what made the PKK so suspicious? Actually, Sweden's relationship with the Kurdish population was very positive. As part of Sweden's official policy of supporting national liberation movements, politically persecuted Kurds were actively invited to seek asylum in Sweden. The first asylum seekers arrived in Sweden as early as the 1960s, well before Olof Palme's first inauguration in 1969. In the decades that followed, a steady stream of persecuted Kurds, dissatisfied with the situation in Kurdistan, came to Sweden, and a sizable Kurdish community thus emerged, especially in Stockholm. On the foreign policy level, too, Sweden showed a great understanding for Kurdish aspirations for self-determination and for a nation of their own. So, what motive would the PKK have had for assassinating the Prime Minister of a friendly nation?

Sweden's relationship with the PKK as a party and a political organization began to deteriorate during the 1980s even though Swedish policy toward the Kurds themselves remained sympathetic. Sweden officially classified the PKK as a terrorist organization in 1984. Domestically, Sweden began to crack down on the PKK: two members living in Sweden were sentenced to life imprisonment for the murder of former PKK members there. Although Kurds continued to be readily granted asylum, the organization's leader, Abdullah Öcalan, was denied a visa to Sweden in 1983.

PKK anger could be a motive for the murder, and even Akström did not rule out the PKK as the perpetrator in his initial assessments. Suspicion against the PKK was based on motives only; there were no concrete indications of any connection to the crime. But, in intercepted telephone conversations, members of the PKK repeatedly spoke of a planned "wedding" – perhaps a code word for an assassination? Calling planned assassinations "a wedding" was not uncommon at the time, but, for Holmér, use of this term was suspicion enough to make the PKK a prime suspect already in the first weeks after the murder.

The police commission directed the lion's share of its resources in investigating the PKK. Telephone surveillance of the organization was intensified, sometimes without a legal basis and without the approval of the public prosecutor's office. This surveillance did not yield anything to substantiate suspicions, but Holmér was not deterred. Nevertheless, the police announced that they knew the perpetrator, and that there was a connection between the PKK and the murder weapon. Holmér's investigative work culminated in "Operation Alpha" in January 1987, when the police arrested 22 suspected PKK-members in an attempt to throw the organization off balance and to obtain a confession through intimidation.

"Operation Alpha" did not uncover any evidence of Palme's murder, nor did it produce any confessions. Moreover, the operation was clearly unlawful, and the next day all 22 arrested Kurds were set free by prosecutor Zeime. The latter had long condemned the intensive investigations against the PKK in the strongest possible terms. Zeime even described the announcement that evidence of the perpetrators and that the murder weapon had been found as "police disinformation." After the "Operation Alpha" debacle, government circles had had enough of Holmér's obsession with the PKK. The investigation commission was completely reorganized and Holmér was fired.

At the outset Holmér's decision to investigate the PKK had seemed reasonable, but the resources spent on it were not proportionate. Moreover, by focusing on the PKK, his team had overlooked other important clues and leads. Also, the police's prior analysis of political motives had overlooked clear contradictions. The investigating commission had not considered that an assassination of Palme promised no advantage for the Kurds. Moreover, Palme's successor likely would change nothing in Swedish politics regarding the PKK. In addition, if the PKK had assassinated Palme, doing so would have endangered Kurds living in Sweden. Finally, PKK assassinations outside Turkey and Kurdistan to date at that time had so far only targeted Kurds.

Holmér's successors and Sweden as a nation put the PKK trail to rest, but Holmér himself did not let up even after his dismissal. He continued to investigate the PKK with his journalist friend, Ebbe Carlsson; during their unauthorized investigations, the duo continued to gain access to confidential police files as well as political backing from the highest levels. When the so-called "Ebbe-Carlsson-Affair" was exposed in June 1988, Justice Minister Anna-Greta Leijon (the former RAF target) was forced to resign because of her involvement in their unauthorized activity. Holmér himself, his police career gone for good, then devoted himself to writing crime novels.

### **Illegal Arms Deals and Corruption: The Swedish Bofors Group**

Another investigative commission was simultaneously working to solve the biggest arms export scandal in Swedish history. Swedish arms manufacturer Bofors' was supplying arms to both sides of the Iran-Iraq war. Officially, Sweden had taken a position of "armed neutrality" in almost all armed conflicts, whether in the Cold War or the Gulf War (see Fig. 5.14). Although Sweden did not actively support any warring party and promoted peaceful solutions, it nonetheless produced high-class weapons. Sweden only allowed these arms to be exported to countries that were





**Fig. 5.14** A weapon system by the company Bofors. (Source: Wikimedia, online: Johan Fredriksson, CC BY-SA 3.0, [https://commons.wikimedia.org/wiki/File:Nuoli\\_40\\_mm\\_Bofors.jpg](https://commons.wikimedia.org/wiki/File:Nuoli_40_mm_Bofors.jpg))

outside conflict regions and respected human rights, mostly in Western Europe. Exports to the Middle East had long been out of the question.

Bofors, part of Alfred Nobel's corporate empire, was one of Sweden's oldest companies and the country's largest arms producer with excellent contacts in politics. It managed to smuggle weapons to Iran and Iraq via detours. This illegal business had begun as early as 1980, and even after Olof Palme assumed his role as mediator in the conflict, money and weapons continued to flow to the area. The scandal finally blew up in 1985, just a year before Palme's death. Bofors had been using Foreign Ministry permits for arms exports to non-conflict countries to ship war material to the Middle East. The corporation primarily used West Germany or Singapore as initial destinations; arms shipments suddenly changed route there and disappeared only to reappear in the Gulf states.

It was not clear which government circles were aware of Bofors' illegal dealings. Olof Palme reacted quickly and firmly to the revelation of the scandal: he blocked all Bofors exports that might have gone astray and set up a commission of inquiry. The scandal provided the Swedish public and the police with a range of motives for Palme's murder. Had Iran, recipient of the bulk of the arms shipments, killed the Prime Minister because he had stopped the supply of weapons? Or was Iraq responsible because of its indignation at Sweden's support for the opposite side? Or had

Palme even been the victim of a conspiracy by Bofors and political leaders who were afraid of the revelations of Palme's commission of inquiry?

This last theory became extremely popular about a year after the murder. In January 1987, Calf-Frederik Algernon was to testify before the commission of inquiry into Bofors. Algernon had himself unwittingly issued export licenses to Singapore through which Bofors smuggled weapons to the Middle East. Algernon was later appointed special investigator in the Bofors affair. A week before his testimony, Algernon met the chair of Bofors' parent company and 30 min later Algernon fell in front of a subway train and died. The official cause of death was suicide, but some witnesses claim that Algernon was pushed. Algernon's mysterious death naturally rekindled interest in the theory that Bofors was involved in Palme's assassination. Even in government circles, anonymous voices linked both deaths to Bofors and Middle East arms smuggling.

Again in 1987, the next chapter of Bofors' illegal arms dealings became known. This time Olof Palme played more than just a minor part. He had a private friendship with the then Prime Minister of India, Rajiv Gandhi. In 1986, the latter's government had put out to tender a contract for the supply of artillery pieces to the army – worth around US\$2.3 billion today. Palme, an avowed pacifist, exerted strong pressure on Rajiv Gandhi behind the scenes to secure the contract for Bofors. At the time of Palme's assassination, India and Bofors were in the final phase of the deal.

Bofors did not land the arms deal, even though it paid bribes to high-ranking Indian politicians, officers, and officials. The value in today's US dollars is estimated to be in the tens of millions of dollars, far exceeding any previous corruption scandals in India and Sweden. On the Indian side, the revelation led to the resignation of the defense minister and was probably partly responsible for the electoral defeat suffered by Rajiv Gandhi in 1989.

In Sweden, the scandal provided new substance to the theory that Bofors had been involved in Palme's murder. Despite his support for the lucrative deal with India, Palme apparently was clueless about the bribes. After the Iran scandal, Bofors would likely assume that Palme would not be in their corner for the Indian deal. This line of reasoning asserts that, if Palme had learned about the bribes, Bofors would have a clear motive to get rid of him. In addition to the large order that had fallen through, the reputation of the company and the politicians involved would be ruined and potentially subject to criminal proceedings.

It is plausible that Palme would be one of the first to learn of the scandal, and proponents of the theory of Bofors' involvement assumed that the corporation would want to prevent exposure of its criminal dealings – even by murder. According to this theory, the plan for Palme's murder had been prepared long ago and was set in motion the moment Palme learned of the corruption. The historian Jan Bondeson, for example, suspects that Palme learned of the corruption at a meeting that morning and that Bofors acted quickly to assassinate the Prime Minister that same evening.

Bofors' potential involvement in Palme's murder was not investigated for many years despite two possible motives and the theories and clues based on them. In the universe of political motives in this case, this lead was probably the one that would



have been easiest to pursue – the suspected organization was home-based and a public company, not an underground organization or an opposing regime. Nonetheless, Bofors was not thoroughly investigated in the Palme case until 1992 and again in 1998 after new evidence emerged. Even though suspicions against Bofors were not significantly substantiated, in retrospect it is surprising that this lead was not investigated earlier.

### **An Enemy at the Other End of the World: Apartheid and Olof Palme**

A similar judgment can be made about another highly explosive lead that reaches to South Africa. Just 1 week before his assassination, Olof Palme and Oliver Tambo, exiled president of the opposition African National Congress (ANC), gave a speech to the Swedish parliament in which both attacked the South African apartheid regime in the strongest possible terms. For years, Palme had been an outspoken critic of the fascist government in South Africa on the national and global stage.

Palme's support for the South African's domestic opponents, primarily the ANC, was not limited to words. For years, the Swedish government supported resistance groups with secret money transfers, most of which were handled through Switzerland. Given this information, it appears that there were plenty of reasons for the apartheid regime and its supporters to remove Palme. The brief time between Palme's anti-apartheid speech and his assassination is also striking, especially since hundreds of apartheid supporters were present at the speech.

Akström's analysis of international political motives highlighted the South African government as a possible perpetrator; similar to the views held by both the Swedish ambassador to the United Nations and a well-known Swedish expert on South Africa. The compilers of the 1993 perpetrator profile, however, noted that the fairly unprofessional assassination was not a hallmark of the South African government. In the past, the regime had repeatedly hired local criminals for political murders; the profiling study recommended that the Palme murder be systematically compared with earlier apartheid murders in Europe and further investigated on this basis. In the years immediately following Palme's murder, the police commission did not follow the trail to South Africa. However, the police must be given credit for the fact that South Africa was politically isolated at the time, and the investigation would accordingly have had little prospect of success.

New opportunities opened up for the Swedish police to investigate any South African connection to Palme's murder when the political situation changed in South Africa in the early 1990's. The newly formed South African government was extremely helpful in assisting the Swedish investigations. Swedish investigators made several trips to South Africa to question suspects and informants. Foremost among these was Colonel Eugene de Kock, a former security officer of the old regime. The latter testified before the South African Supreme Court that an agent of the apartheid regime had murdered Palme and named a former colleague, Craig Williamson, as the perpetrator. However, some of Williamson's former colleagues contradicted de Kock's testimony. They accused a Rhodesian Selous scout and a Swedish mercenary of having murdered Palme on behalf of the apartheid regime.

Ultimately, none of these leads led to any concrete evidence of culpability on the part of the South African government. The tardiness of the Swedish investigators was partly responsible for the lack of information, even though the investigators might have been hamstrung by the political situation. The theory that the apartheid regime had instigated Palme's murder continued to be popular and even reached the highest circles of Swedish crime experts. The world-famous Swedish crime writer, Stieg Larsson, extensively investigated Palme's connection to (apartheid) in South Africa in the years before his death and sent entire boxes of material to the police.

### **34 Years Later: Case Solved... Or...?**

Public interest in the Palme case flared up only periodically in the twenty-first century, but various investigative commissions and a long line of prosecutors continued to work on the case without a breakthrough. On 10 June 2020, more than three decades after Palme's murder, the lead prosecutor, Krister Petersson, announced that they had found the murderer: Stig Engström, the "Skandia Man." The conclusion was that this initial suspect, who became an attention-seeking eccentric, shot Palme in the heat of passion on the night of the crime.

According to the investigating commission, Engström's appearance and clothing matched witness descriptions of the perpetrator. He also had experience in handling weapons and close contacts to political circles hostile to Palme. What was particularly damaging was Engström's portrayal of himself as an omnipresent, important witness to the assassination. But no other witness or the police noticed him immediately after the crime. Conversely, Engström could only remember the witnesses who were present at the time of the crime and not those who came along shortly after the crime – thus he had exactly the same knowledge as the perpetrator.

Engström had been very critical of Palme, had financial problems for years, was an alcoholic, and was addicted to publicity – a perfect fit for the psycho-social profile. The most puzzling thing was that he did not have a clear motive. The police assumed he met Palme by chance on his way home from work the evening of the crime and shot him in the heat of the moment. Compared to the multitude of theories reminiscent of political thrillers that came to the public's attention over the decades, this describes a rather sobering crime scene.

Prosecutor Petersson announced that the investigation was closed, and the commission disbanded. Many Swedes – even those involved in strongly disagreed and criticized Petersson's conclusions. The murder weapon was never identified or found. Stig Engström committed suicide in his flat in 2000. An unsatisfactory result, which matched an equally unsatisfactory investigation and analysis. The case will likely continue to be an ideal breeding ground for a multitude of theories, some more and some less plausible.

# Conflict or Collaboration in the Arctic?

# 6

## Abstract

This case study is written from the perspective that members of a Strategic Analysis unit composed of experts in different fields in an Arctic Eight cyber intelligence office were tasked with determining how the Arctic is likely to evolve over the next 10 years, focusing in particular on the extent to which the Russians may exert dominance over the region – and to recommend what to do about it. The case study showcases how Foresight Structured Analytic Techniques (Key Drivers Generation™, Key Uncertainties Finder™, Multiple Scenarios Generation, Indicators, and the Opportunities Incubator™) could have been used by the team to address the challenge. The case study is based on true information, but the Strategic Analysis team is a fiction.

The crew of the US fishing boat Blue North is hoisting a promising catch out of the icy waters of the Bering Sea when a heavy Russian accent cuts through the static of the radio. Russian military maneuvers are taking place nearby, the ship is allegedly in danger and must leave the area immediately, warns the crew of a circling military aircraft. Capt. David Anderson is perplexed: he knows he is in international waters, but clearly in American fishing grounds. Capt. Anderson is reluctant to leave the lucrative fishing grounds off the coast of Alaska but is concerned for the safety of his 27-man crew. He turns to the US Coast Guard for help. Their answer: follow the Russian orders by all means.

A host of American fishing boats experienced this same threat<sup>1</sup> after Russia conducted the “Ocean Shield” military exercise in August 2020 with more than 50

<sup>1</sup><https://www.nytimes.com/2020/11/12/us/russia-military-alaska-arctic-fishing.html>

warships and 40 aircraft – the largest in the Bering Sea since Soviet times.<sup>2</sup> The incidents are part of a long-term trend: the Russian military has increasingly conducted maneuvers in Arctic waters, harassing American ships off the coast of Alaska, and invading the airspace of the United States, Norway, and Greenland during patrols. Western powers bordering the Arctic have increasingly shifted their attention and resources to the geopolitically contentious region as well. But where does this new-found interest come from? How will climate change and globalization affect developments in the Arctic? And will tensions in the far north continue to rise or even escalate?

## 6.1 What Drivers Will Shape the Future of the Arctic?

What techniques can help us gain clarity about possible developments in the Arctic? An important first step is to be clear about the forces and factors that will significantly shape the future of the region – the so-called “key drivers” behind the developments of the next decade. In the context of Foresight Analysis, key drivers are those forces or factors that have a strong influence on the development of a region or the evolution of an issue and, in turn, shape other, dependent factors.

Identifying these key drivers or driving forces helps us gain a better, more systemic understanding of the Arctic. Doing so is indispensable for thinking ahead, for recognizing important developments early on, and for identifying and preparing for unexpected, counter-intuitive future scenarios.

Two methods for generating a set of key drivers are Key Drivers Generation™ and the Key Uncertainties Finder™. Key Drivers Generation™ uses Cluster Brainstorming to generate several groupings of key factors. The Key Uncertainties Finder™ uses the Key Assumptions Check to identify Unsupported Assumptions that could evolve into Key Uncertainties, some of which provide the foundation for a key driver.

Your analytic team conducted the first exercise and reviewed the clusters or affinity groups created. The focal question the team addressed was:

*What are all the forces, factors, trends, and developments that will influence how the Arctic will evolve over the next decade?*

The next step was to establish criteria for judging the importance and value of the ideas. The group reached consensus on the following criteria:

- Potential impact on the region
- Political salience of the issue
- Feasibility
- Economic consequences
- Security implications

<sup>2</sup> <https://apnews.com/article/ap-top-news-international-news-europe-ak-state-wire-1f6c6dceba65e893aeec9dfa814ef8f>

In the Key Drivers Generation™ exercise, several affinity groups were identified as potential candidates for key drivers:

- Accessible natural resources
- Extraction capabilities
- Military power projection
- Oil prices
- Economic opportunity
- Commercial benefits
- Legal considerations
- Environmental degradation
- Disruption of Indigenous populations
- The pace of innovation and technological change

When conducting the Key Uncertainties Finder™ exercise, the first step was to do a Key Assumptions Check. The results are shown in Fig. 6.1. The focal question was:

*What assumptions can we make about how the Arctic will evolve in the next decade?*

**Supported** The supported assumptions are substantiated by evidence from historical events and scientific analysis. It is not possible to construct a credible story explaining how this assumption proved to be untrue.

For example, the assumption that sea ice will continue to melt is solid based on all the scientific evidence, but a key factor to track is how quickly the ice will melt and whether this will be a steady process or one with dramatic ups and downs.

**With Caveats** An assumption with caveat(s) is an assumption that is usually correct but for which there can be established exceptions. The exception must be specific and well defined. A decision maker must understand that under certain circumstances the assumption may not hold true and cannot be used to justify a decision. The caveated category should not be used when the analyst is simply having difficulty deciding whether the assumption is solid or not.

This process reveals the importance of amending assumptions to capture significant nuances, such as the assumption that global demand for oil and gas will remain strong. The share of energy from renewable and nuclear sources has increased steadily over the past decade. Breakthroughs in clean energy technology could further reduce demand for fossil fuels. Although this is a reasonable assumption, the unpredictable rate of innovation presents a caveat.

The assumption that the Arctic will become a new route for illicit activity such as smuggling and human trafficking is backed up by historical trends. For example, following the departure of European navies from the Horn of Africa region following the Second World War, those waters became a hub for smugglers, pirates, and

Key Assumption	Commentary	Supported	With Caveat	Unsupported
Ice will melt at the same rate or faster than it has been melting	All scientific evidence points to continued ice melting, but how fast the ice will melt is still debated	✓		
New population centers will emerge in the Arctic	The pace of rate of migration north will depend, however, on the rate of ice melt	✓		
There will be a large negative environmental impact of the Arctic	History shows that the pressure to exploit resources almost always comes at the cost of protecting the environment	✓		
Indigenous populations will be disrupted	Indigenous populations will face challenges to their traditional way of life; those exploiting the Arctic are unlikely to show much regard for their rights and needs	✓		
Demand for fish caught in Arctic waters will increase	Global warming will result in reduced catches in most of the seas below the Arctic as fish populations are forced to migrate north to escape warming waters	✓		
The Arctic will become a new domain for illicit activity such as smuggling	Unless an international body or the Russians begin patrolling the shipping lanes and restrict such activity		✓	
Global demand for oil and gas will remain strong	Much will depend on the pace of progress made in developing non-fossil fuel sources		✓	
Ice melt will result in the opening of more cost effective shipping lanes through the Arctic	Much will depend on the cost of fuel for ships and the availability of alternative passages through the Suez and Panama Canals		✓	
Eco-Tourism in the Arctic will increase	Unless the rule of law collapses or Russia decides to restrict such activity			✓
The Rule of Law will prevail in the Arctic with the Arctic Council adopting cooperative processes similar to those governing the Antarctic	The United States has yet to approve the UNCLOS and Russia could become less cooperative as Arctic resources become accessible			✓
Military conflict will not occur in the Arctic	Escalating demand for Arctic resources, expectations of substantially reduced shipping costs, and confusion over boundaries could spur countries to take military action to ensure free transit or protect their territory			✓

**Fig. 6.1** The future of the arctic: key assumptions. (Source: Copyright 2024 Pherson. All Rights Reserved)

slave traders. As the Arctic becomes accessible, criminals with the means to ship in the region will see opportunities. However, effective anti-smuggling and piracy monitoring and enforcement, whether by individual states or a cooperative international institution, would likely stem much of this illicit activity.

The assumption that the shipping routes opened in the Arctic by ice melt will be cost effective relative to other routes depends highly on unpredictable factors such as the rate of ice melt, the cost of fuel, and the availability of those other routes. The

Suez and Panama Canals have gone through periods of instability and prosperity in the past; fluctuations around these routes will affect transit through the Arctic routes.

**Unsupported** The assumption that eco-tourism in the Arctic will increase depends much on the attitude of Arctic states to such tourism and their ability to provide adequate security. Russia, for example, has been known to restrict tourists' access to regions with the justification of protecting fragile environments and has rescinded permission for cruise ships to travel in its waters during times of internal crisis.

The Russian government's response to a large influx of Western tourists is unpredictable. If the rule of law collapses in the Arctic region, tourists will be less inclined to risk their personal safety by traveling there.

The assumption that the Arctic Council will remain a cooperative forum for administration and regulation of the region relative to other geopolitical institutions disregards several relevant factors. For example, the US has not signed nor ratified the UN Convention on the Law of the Seas, an international agreement from which the Arctic Council draws much of its authority. Furthermore, it is likely that Russia will grow less cooperative, especially if the extraction of Arctic resources becomes profitable again. This could present a roadblock to the establishment of a strong rule of law in the region.

The assumption that there will not be military conflict in the Arctic ignores many factors that could escalate tensions, such as ill-defined boundaries and a lack of agreement on transit protocols in the region. Although the designation of "Unsupported" does not mean that there will be conflict in the Arctic, it points to the invalidity of using the assumption to justify major assessment decisions.

The Key Assumptions Check prompted the team to focus its attention on the unsupported assumptions that have emerged as key uncertainties. Two key issues that emerged were Russian intentions toward the Arctic and whether the ice is likely to melt faster than currently projected.

The team identified several candidate key drivers and melded the results of both techniques into an initial list of six candidate key drivers.

1. The rate of ice melt.
2. Global demand for fossil fuels, fish, and other natural resources in the Arctic.
3. The ability to maintain law and order in the region.
4. Reliance on existing institutions to resolve conflict peaceably.
5. Popular attitudes toward the Arctic and the need to preserve the environment.
6. The development and impact of disruptive technologies.

Based on the analysis generated by both techniques, the team reduced this list of six drivers to four drivers. In these examples, lack of interest in visiting or migrating to the Arctic would have little impact on how the region evolves. For this reason, it makes little sense to conduct analysis of this end of the spectrum. Similarly, the lack of innovation offers little to analyze.

Sometimes a key driver is better described as a potential disruptor of the status quo as opposed to a spectrum with two contrasting endpoints. One of the best indicators that one is dealing with a disruptor comes when the spectrum is defined as status quo on one end and the disruption on the other end.

As exploring how things will change under the status quo offers few insights, it is best to not include the status quo end of spectrum in the analysis and focus only on the potential impact of the disruptor. The method works best – and most efficiently – when two different disruptors are identified with each being assigned to a different half of the spectrum.

The two disruptors (game changing innovation and high demand for access) were deemed worthy of independent consideration because they captured:

- Substantial and sustained demand for access to the region for a growing array of reasons.
- Game-changing innovation in technology to extract oil and gas, precious minerals, or fish from the ocean.

They were consolidated into one “spectrum” for the following reasons:

- Lack of interest in visiting or migrating to the Arctic would have little impact on how the region evolves. For this reason, it makes little sense to conduct analysis of this end of the spectrum.
- Similarly, the lack of innovation offers little to analyze.

In conclusion, three drivers and two potential disruptive factors were visualized as shown in Figs. 6.2, 6.3, 6.4, and 6.5.

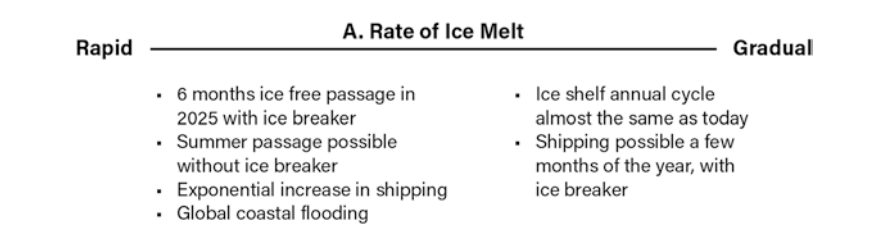


Fig. 6.2 Rate of ice melt. (Source: Copyright 2024 Pherson. All Rights Reserved)

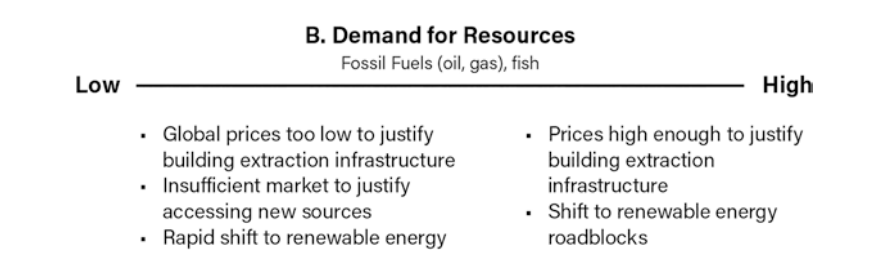
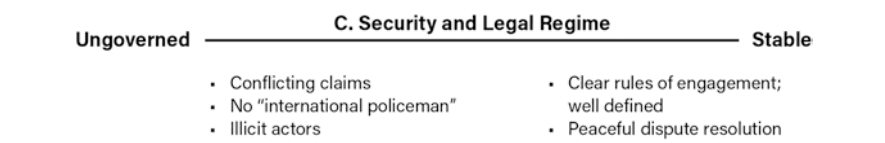
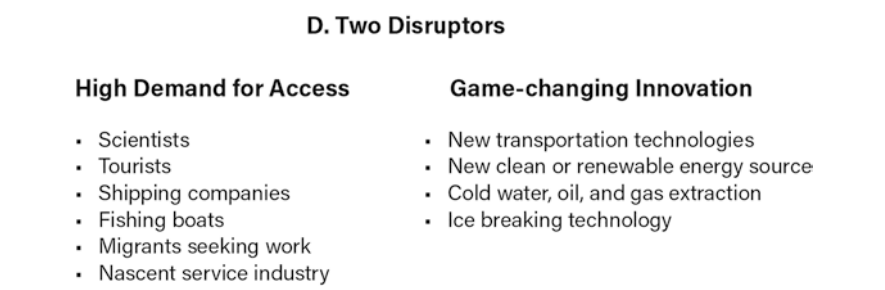


Fig. 6.3 Demand for resources. (Source: Copyright 2024 Pherson. All Rights Reserved)





**Fig. 6.4** Security and legal regime. (Source: Copyright 2024 Pherson. All Rights Reserved)



**Fig. 6.5** Two disruptors. (Source: Copyright 2024 Pherson. All Rights Reserved)

- Rate of Ice Melt
- Demand for Resources (oil, gas, fish, rare minerals)
- Security and Legal Regime
- Two Disruptors (game changing innovation and high demand for access)

Several institutions have also addressed which drivers are relevant for the future of the Arctic. In 2014, the Arctic Council itself launched the “Adaptation Action for a Changing Arctic (AACA)” project to help local decision makers develop strategies for dealing with the region’s changing climate. The project’s final report presents two types of key drivers:

- **Global drivers** affecting the larger context in which Arctic change is occurring: How will the global economy change in the coming decades? What will be the size of the world’s population in 2050? And how will the global demand for energy and natural resources change? These global factors are subject to great uncertainties, but they will determine the framework in which the Arctic will develop in the coming decades.
- **Arctic drivers** include population trends in the region itself, trade routes through the Arctic seas, and economic activity such as the exploitation of oil, natural gas, and rare earths as well as fisheries, and tourism.<sup>3</sup>

The analytic team opted to consider a more focused set of drivers, reflecting their individual experience and background. The expert in international law cited the

<sup>3</sup>Andrew, R. 2014. *Socio-Economic Drivers of Change in the Arctic*. AMAP Technical Report No. 9, Oslo, Norway. Arctic Monitoring and Assessment Programme (AMAP).

complex legal system in the Arctic as an important factor, the diplomat proposed major geopolitical power conflicts as a key driver, and the resource extraction specialist pointed to technological advances as determining how profitable Arctic resource extraction will be in the future.

In short, the object of a Foresight Analysis, be it a region, a product, or a technology, should be viewed from different angles. A popular tool to avoid neglecting any of these perspectives is the “STEMPLES+” analysis grid,<sup>4</sup> which lists key factors in the following categories: **S**ocial, **T**echnological, **E**conomic, **M**ilitary, **P**olitical, **L**egal, **E**nvironmental, **S**ecurity, + **P**sychology, **D**emographic, etc.

Many of the factors influence each other, no matter which perspective or “STEMPLES+” categories they fall into: they can reinforce or weaken each other, and they can be mutually exclusive or dependent. The extent to which oil and gas are produced in the Arctic is undoubtedly a key factor in determining how the region will develop. However, it also depends significantly on other factors, such as the global demand for fossil fuels or the technological progress in the extraction of offshore raw materials.

A distinction can therefore be made between “dependent” drivers, which are themselves strongly influenced by other factors and largely “independent” drivers, which as pulse generators set the other “cogs” in the system in motion. The latter are our actual key drivers. Whether and how two drivers influence each other can be represented, for example, in the form of a “consistency matrix,” which helps to identify the more important key drivers and better understand the system dynamics and interrelationships.

The actual key drivers, in turn, have different qualities. They can differ, for example, in the strength of their impact on the “Arctic” system or in how predictable their future development is. For example, the rate at which Arctic ice is melting, thus exposing trade routes and raw materials, will probably (and regrettably) have a stronger impact on the region’s development than the extent of public interest in protecting the Arctic ecosystem. At the same time, the climate change factor is subject to minor uncertainties: Arctic ice may be melting faster or slower in comparison with the current rate, but it will not expand again in the coming decades. Admittedly, the mood in geopolitics – confrontation vs. cooperation – is also an important factor for the development of the Arctic; however, it is uncertain in which direction it will develop in the coming decades.

Many of the drivers of importance to the Arctic that the team identified should be familiar to all observers of current affairs – such as climate change and major geopolitical power conflicts as well as changes in global energy supplies and demand for energy resources. Other drivers are more specific to the Arctic, such as the multi-layered legal regime in the Arctic North, the potential for fishing and resource extraction, and the opening of trade routes through Arctic waters. To understand how these “Arctic” drivers will shape the future of the region, the following section provides a brief overview of their status and potential development.

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<sup>4</sup>Also known as STEEP or PESTLE analysis.

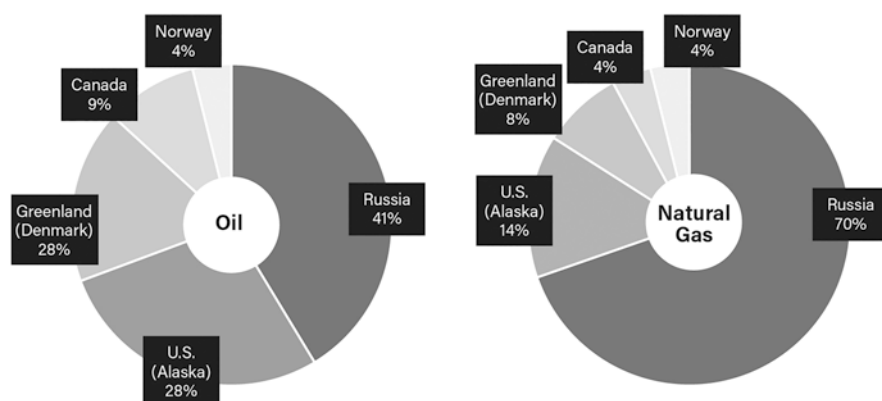
## 6.2 New Approaches to Natural Resources

Melting pack ice and technological advances are bringing the enormous reserves of natural resources beneath the Arctic within reach. Gaining access to fossil fuels is a particularly promising and contested objective: some 90 billion barrels of crude oil is believed to lie hidden beneath the Arctic, along with 1670 trillion cubic meters of natural gas.<sup>5</sup> This means that 13% of the world's undiscovered oil reserves are assumed to lie in the region, and almost a third of the world's still unknown natural gas reserves.<sup>6</sup> The majority of Arctic energy resources are located off-shore, particularly in Russia's EEZ. Figure 6.6 provides an overview of fossil fuel deposits as well as transport routes in the Arctic and provides an overview of the region from an economic perspective.

Metals, minerals, and rare earths have been mined in the Arctic since time immemorial, but they have become available in ever greater quantities due to the retreat of the permafrost and the introduction of new technologies. Apart from an increased conflict potential, the exploration and extraction of these resources would bring great economic potential for the region and its inhabitants, but it would also permanently change their way of life and the ecosystem.<sup>7</sup>

The extent to which the use of natural resources will shape the future of the Arctic also depends on other drivers, trends, and variables. While mining most resource deposits is still unprofitable,<sup>8</sup> the question arises how quickly

**Distribution of the Undiscovered Hydrocarbon Resources Among the Arctic Coastal States, %**



**Fig. 6.6** Distribution of undiscovered hydrocarbon resources in the Arctic, percent. (Source: "United States Coast Guard Arctic Strategy." Accessed December 25, 2016. [https://www.uscg.mil/senior\\_leadership/docs/cg\\_arctic\\_strategy.pdf](https://www.uscg.mil/senior_leadership/docs/cg_arctic_strategy.pdf))

<sup>5</sup> [https://nordregio.org/maps/resources-in-the-arctic-2019/#\\_ftn1](https://nordregio.org/maps/resources-in-the-arctic-2019/#_ftn1)

<sup>6</sup> <https://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf>

<sup>7</sup> [https://www.uscg.mil/Portals/0/Images/arctic/Arctic\\_Strategy\\_Book\\_APR\\_2019.pdf](https://www.uscg.mil/Portals/0/Images/arctic/Arctic_Strategy_Book_APR_2019.pdf)

<sup>8</sup> [https://nordregio.org/maps/resources-in-the-arctic-2019/#\\_ftn1](https://nordregio.org/maps/resources-in-the-arctic-2019/#_ftn1)

technological advances can reduce these costs. Similar problems emerge regarding the logistics of removal. The regional infrastructure and the capacity for search-and-rescue missions will have to withstand new challenges.<sup>9</sup> Another factor to consider is how global demand for fossil fuels will evolve considering the energy transition. Moreover, international legal frameworks and the global focus on the preservation of the Arctic ecosystem will play a role with regard to resource extraction.

### Potential for Commercial Fishing

The actual impact of the climate change on fishing in the Arctic is still unclear – the only certainty is that fishing in the area will change drastically. Commercial fishing in the Arctic Ocean is only allowed in the EEZs of the respective coastal states. However, the exact location of promising fishing grounds will constantly change in the coming years: rising temperatures will lead to a migration of fish shoals to colder waters in the north. In order to prevent uncontrolled fishing within, and illegal fishing outside, the EEZs, the Arctic Five agreed on the “Declaration to Prevent Unregulated Fishing in the Central Arctic Ocean” in July 2015.<sup>10</sup> As early as 2015, the Arctic coastal nations recognized that the decline in pack ice and rising sea temperatures, combined with a lack of scientific knowledge about the Arctic ecosystem, will require forward-looking action.<sup>11</sup> Our scenario analysis will provide a solid basis for just such action.

However, climate change, ocean acidification, and the resulting changes in the marine ecosystem will not only affect fisheries in the Arctic. If the migration of fishing stocks brings more lucrative catches and higher profits to the Arctic, the cost of fishing, fishermen’s wages, and ultimately the average income of households in the region will also increase in the process. So, a 71% increase in the potential income from fishing (as a 2016 study suggests for 2050<sup>12</sup>) will have drastic consequences for the Arctic economy. Against this economically positive forecast is the fact that the acidification of the oceans by CO<sub>2</sub> emissions may make fish stocks less productive.<sup>13</sup> When both effects are weighed against each other, the Arctic coastal states – unlike their tropical counterparts – emerge as economic winners of climate change.<sup>14</sup>

<sup>9</sup>[https://www.uscg.mil/Portals/0/Images/arctic/Arctic\\_Strategy\\_Book\\_APR\\_2019.pdf](https://www.uscg.mil/Portals/0/Images/arctic/Arctic_Strategy_Book_APR_2019.pdf)

<sup>10</sup>“Arctic Nations Sign Declaration to Prevent Unregulated Fishing in the Central Arctic Ocean.” US Department of State. Accessed December 28, 2016. <http://www.state.gov/r/pa/prs/ps/2015/07/244969.html>

<sup>11</sup> *ibid.*

<sup>12</sup>potential maximum revenues of EEZs in the Arctic Ocean compared to 2000, see: Lam, V., Cheung, W., Reygondeau, G. et al. Projected change in global fisheries revenues under climate change. *Sci Rep* 6, 32,607 (2016). <https://doi.org/10.1038/srep32607>

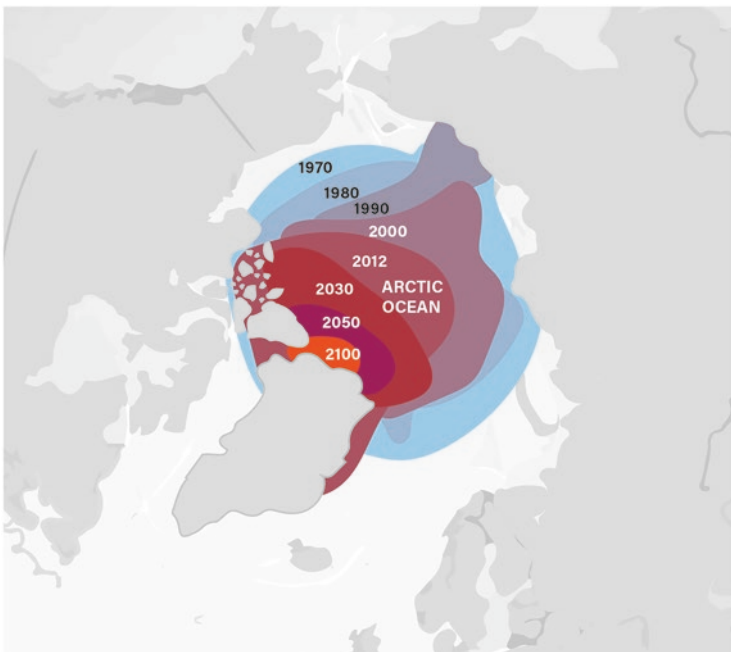
<sup>13</sup><https://www.fisheries.noaa.gov/insight/understanding-ocean-acidification>

<sup>14</sup>Weatherdon, Lauren V., Yoshitaka Ota, Miranda C. Jones, David A. Close, and William W. L. Cheung. “Projected Scenarios for Coastal First Nations’ Fisheries Catch Potential under Climate Change: Management Challenges and Opportunities.” *PLOS ONE* 11, no. 1 (January 13, 2016). doi:10.1371/journal.pone.0145285

### New, Groundbreaking Trade Routes

In the last 30 years, the sea ice covering the North Pole has decreased by 15–20%.<sup>15</sup> This trend will almost certainly continue, if not accelerate, as the Arctic is heating up four times as fast as average global temperatures (see Fig. 6.7).<sup>16</sup> Accordingly, the North Pole could have its first completely ice-free summers as early as 2030.

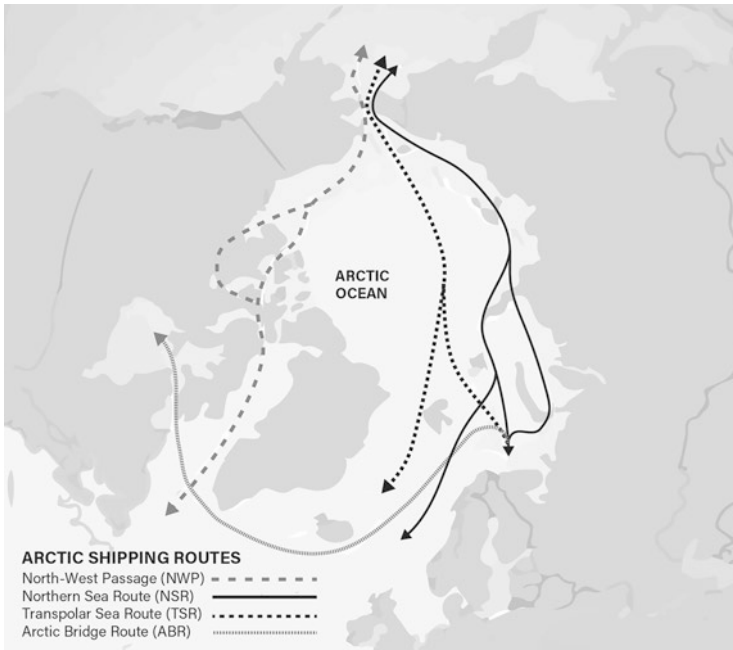
The retreat of the ice threatens the local ecosystem and the coastal dwellers worldwide, but it also makes new shipping routes accessible to global trade for the first time. Between 2030 and 2050, for example, two of the most famous of these previously frozen trade routes will become passable: the Northern Sea Route, a portion of the Northeast Passage also known as the Northern Sea Route (NSR), and the Northwest Passage (NWP) along the coast of North America (see Fig. 6.8). The interest in these two potential trade routes is enormous. If both routes should become



**Fig. 6.7** Projected rate of ice melt in the Arctic. (Source: “Climate Change.” The Arctic Institute. Accessed December 29, 2016. <http://www.thearcticinstitute.org/projects/climate-change/>)

<sup>15</sup>Lu, D., Park, G.-K., Choi, K., & Oh, S. 2014. an economic analysis of container shipping through Canadian Northwest Passage1. *International Journal of E-Navigation and Maritime Economy*, 1: 60–72.

<sup>16</sup>“The Thawing Arctic: Risks and Opportunities.” Council on Foreign Relations. Accessed December 25, 2016. <http://www.cfr.org/arctic/thawing-arctic-risksopportunities/p32082>



**Fig. 6.8** Arctic shipping routes. (Source: “Climate Change.” The Arctic Institute. Accessed December 29, 2016. <http://www.thearcticinstitute.org/projects/climate-change/>)

navigable, cargo could be transported from the Atlantic to the Pacific about 40% faster than through the Suez Canal.<sup>17</sup>

The course of the two new trade routes immediately shows the potential beneficiaries. The ports of Iceland and Greenland would become important transshipment hubs and supply stations. The enormous potential of new trade routes in the Arctic has already driven the littoral states to expand their infrastructure for cargo ships and the like.<sup>18</sup> Moreover, the NSR runs along Russia’s coast and this Arctic super-power has been working for years to prepare the route for commercial shipping.<sup>19</sup> Countries farther from the Arctic are already positioning themselves to benefit from the revolutionary trade routes. China made it clear in 2017 that the NSR should also

<sup>17</sup> Halvor Schøyen, and Svein Bråthen. “Bulk Shipping via NSR vs via the Suez Canal.” Accessed December 25, 2016. <http://www.wctrs.leeds.ac.uk/wp/wp-content/uploads/abstracts/lisbon/general/01720.pdf>

<sup>18</sup> Marc Lanteigne. “China’s emerging Arctic strategies: economics and institutions.” Accessed December 25, 2016. [http://ams.hi.is/wpcontent/uploads/2014/11/ChinasEmergingArcticStrategiesPDF\\_FIX2.pdf](http://ams.hi.is/wpcontent/uploads/2014/11/ChinasEmergingArcticStrategiesPDF_FIX2.pdf)

<sup>19</sup> <https://www.thearcticinstitute.org/russias-arctic-strategy-maritime-shipping-part-iv/>

become part of the “Belt and Road Initiative” and has been working with Arctic partners – first and foremost Russia – to develop the route.<sup>20</sup>

The **Northern Sea Route (NSR)**: Most experts and policymakers attribute the greatest economic potential to the NSR – especially as an alternative to sailing through the Suez Canal. During the Cold War, Russia began exploring and building infrastructure along the route. Russian interest began to wane after the fall of the Soviet Union, but the decline of the sea ice has caused Russia’s attention to turn northward again. After all, the NSR is in Russia’s EEZ. Although the United States insists that the sea route is an international shipping lane under UNCLOS and is open to all nations, the NSR has never been traversed without Moscow’s approval since 1965.<sup>21</sup> Nor would it be possible without the support of Russia’s immense icebreaker fleet for most of the year.

Russian President Putin has plans to ship some 80 million tons of cargo on the route by 2024 and wants to expand this volume to 150 million tons by 2030.<sup>22</sup> In preparation for this, Russia is continuing to expand the infrastructure along the coast. This includes expanding the 15 ports along the route, from Murmansk to Provideniya, as well as upgrading the nuclear icebreaker fleet and a new monitoring system for shipping traffic. At the same time, Russia is trying to bolster its claims to authority, for example, by imposing requirements that only Russian ships be allowed to transport oil and gas across the NSR.<sup>23</sup> Nevertheless, it remains unclear when the use of the NSR as a trade route will become practically feasible and profitable for Russia. Arguments against it include continued high costs, logistical hurdles, an unclear future about the global demand for fossil fuels, and the impact of economic sanctions by the West because of the Ukraine conflict.<sup>24</sup>

The so-called **Arctic Bridge** is a sea route that can be seen as a bridge between NSR and NWP. It will run from the port city of Murmansk, the western end of Russia’s NSR, south around Greenland to the Canadian port city of Churchill in Hudson Bay. From Churchill, which is also used as a base for expeditions to the Arctic, rail and air links will provide connections to the rest of Canada. At present, this route is only navigable for about four summer months, but Russia hopes that climate change will soon allow a connection between Russia and Canada via the Arctic Bridge all year round. For this, the port in Churchill would have to be significantly expanded and modernized. Opening this route would create shorter trade routes and would provide a basis for closer economic cooperation and improved relations between Russia and Canada.<sup>25</sup>

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<sup>20</sup> <https://www.sipri.org/commentary/expert-comment/2018/shipping-along-arctics-northern-sea-route-will-be-determined-russia-china-cooperation-region>

<sup>21</sup> <https://www.thearcticinstitute.org/russias-arctic-strategy-maritime-shipping-part-iv/>

<sup>22</sup> <https://thebarentsobserver.com/en/arctic/2021/07/moscows-big-plan-trans-arctic-shipping-2000-percent-growth-10-years>

<sup>23</sup> <https://www.thearcticinstitute.org/russias-arctic-strategy-maritime-shipping-part-iv/>

<sup>24</sup> <https://carnegieendowment.org/2021/03/29/russia-in-arctic-critical-examination-pub-84181>

<sup>25</sup> <https://intpolicydigest.org/arctic-trade-route-presents-opportunity-for-russia-west-cooperation/>



The **transpolar route** would be the most direct shipping route between Russia and Canada, generally in a straight line across the North Pole. It is true that a long-term ice-free North Pole is still a long way off, and thus the economic interest in the transpolar route is also low.<sup>26</sup> Nevertheless, countries like China and Russia are already positioning themselves to use the transpolar route as a drastic shortcut to North America in the ice-free summers of the mid-twenty-first century.<sup>27</sup>

### A Complex Legal System

A number of international organizations have taken on the task of managing the politically contentious region. In addition to the Arctic Council, the Arctic Eight are also members of other bodies that have negotiated, ratified, or are working on agreements concerning the Arctic. Apart from international organizations such as the United Nations, the NATO, the EU, and the International Maritime Organization (IMO), these include a number of regional organizations including the Arctic Five, the Barents Euro-Arctic Council (BEAC), and the Commission on the Limits of the Continental Shelf (CLCS) as well as the United Nations Convention on the Law of the Sea (UNCLOS) (see Fig. 6.9).

- Except Russia, all countries bordering the Arctic are NATO member states – a constellation that could facilitate successful conflict management in the region.<sup>28</sup>
- All nations bordering the Arctic are members of the International Maritime Organization (IMO), a specialized agency of the United Nations that contributes to maritime safety and strives to curb marine pollution from ships.<sup>29</sup>
- The Arctic Five are those countries among the Arctic Eight that directly border the Arctic Ocean, i.e., Russia, the United States, Norway, Canada, and Denmark (Greenland). This informal group meets sporadically at summits. At a summit in Oslo in 2015, it adopted a legally non-binding resolution to jointly curb uncontrolled deep-sea fishing in Arctic waters.<sup>30</sup>
- In contrast, the foreign ministers of the six member states in the BEAC – Russia, Norway, Sweden, Finland, Iceland, and Denmark (Greenland) – meet annually. The BEAC was founded in 1993 as a forum for regional cooperation and for the promotion of security, stability, and economic development in the Barents Sea.<sup>31</sup>

<sup>26</sup> Malte Humpert, and Andreas Raspotnik. “The Future of Arctic Shipping Along the Transpolar Sea Route.” Accessed December 28, 2016. [http://www.arcticyearbook.com/images/Articles\\_2012/Humpert\\_and\\_Raspotnik.pdf](http://www.arcticyearbook.com/images/Articles_2012/Humpert_and_Raspotnik.pdf)

<sup>27</sup> <https://doi.org/10.1016/j.marpol.2020.104178>

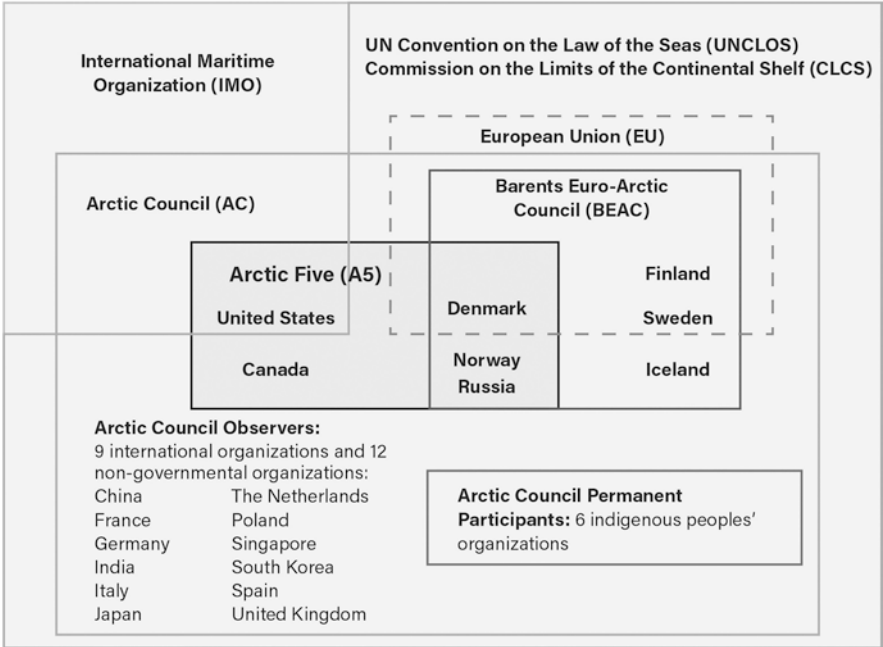
<sup>28</sup> Juha Jokela. “Arctic Security Matters,” June 2015. [http://www.iss.europa.eu/uploads/media/Report\\_24\\_Arctic\\_matters.pdf](http://www.iss.europa.eu/uploads/media/Report_24_Arctic_matters.pdf)

<sup>29</sup> International Maritime Organization (IMO), <http://www.imo.org/en/Pages/Default.aspx>

<sup>30</sup> Nielsson, Egill Thor and Dr. Bjarni Mar Magnusson, “The Arctic Five strike again,” July 30, 2015, <http://arcticjournal.com/opinion/1732/arctic-five-strike-again>

<sup>31</sup> Barents Euro-Arctic Council (BEAC), <http://www.beac.st/en>








**Fig. 6.9** Arctic Eight (Arctic Council) and international memberships. (Source: <https://www.iss.europa.eu/sites/default/files/EUISSFiles/Report%2024.pdf> p37)

Figure 6.9 shows how the membership constellations of these organizations overlap. Here it becomes clear: The principle of different perspectives on a region presented earlier can also be understood literally. Whereas Fig. 6.10 shows the Arctic from a demographic perspective (thus corresponding to the “S” in STEMPLES+), we see here the region from a legal-regulatory perspective (the “L”, for “legal-regulatory”).

In practice, the legal framework for the economic use of the Arctic is regulated by the UN Convention on the Law of the Seas (UNCLOS). UNCLOS is a cornerstone of international maritime law and is intended to regulate the use of all seas worldwide; the convention also obliges states to jointly solve any problems arising from economic use or exploitation.<sup>32</sup> Although the bordering states have not yet been able to agree on a definitive boundary in the Arctic, they mutually respect an exclusive economic zone (EEZ) that extends from the coastline 200 nautical miles (370.4 km) out to the open sea. Within this zone, a nation enjoys (limited) sovereignty and the exclusive right to exploit water and seabed. Natural resources such as petroleum, metals, and rare earths are believed to be predominantly located in these zones, as shown in Fig. 6.11.

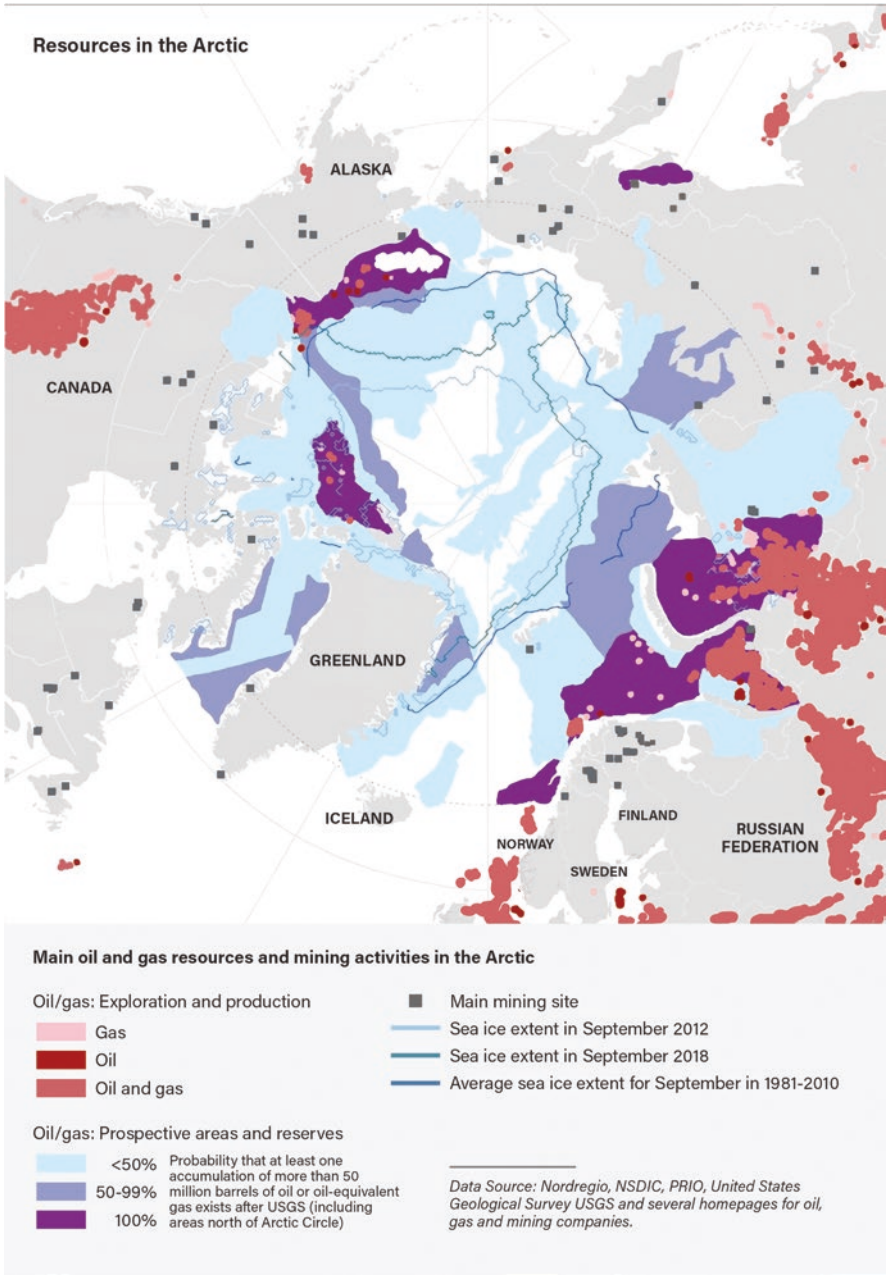
<sup>32</sup> Stokke, O. 2013. political stability and multi-level governance in the Arctic. In P. A. Berkman & A. N. Vylegzhanin (Eds.), *Environmental Security in the Arctic Ocean*: 297-311. Springer Netherlands.

Population in the Arctic Region: (thousand people)	
North American Arctic:	769 
United States	649
Canada	120
European Arctic	1,339 
Denmark (Greenland/Faroe Islands)	107
Iceland	313
UK (Orkney Islands)	20
Norway	465
Sweden	250
Finland	184
Russian Arctic	2,058 
Mumansk Region	842
Yamalo-Nenets Autonomous Areas	588
Arkhangelsk Region	3
Vorkuta/Norilsk/Taimyr Districts	355
Yakutia	37
Magadan Region	163
Koryak/Chukotka Autonomous Areas	70

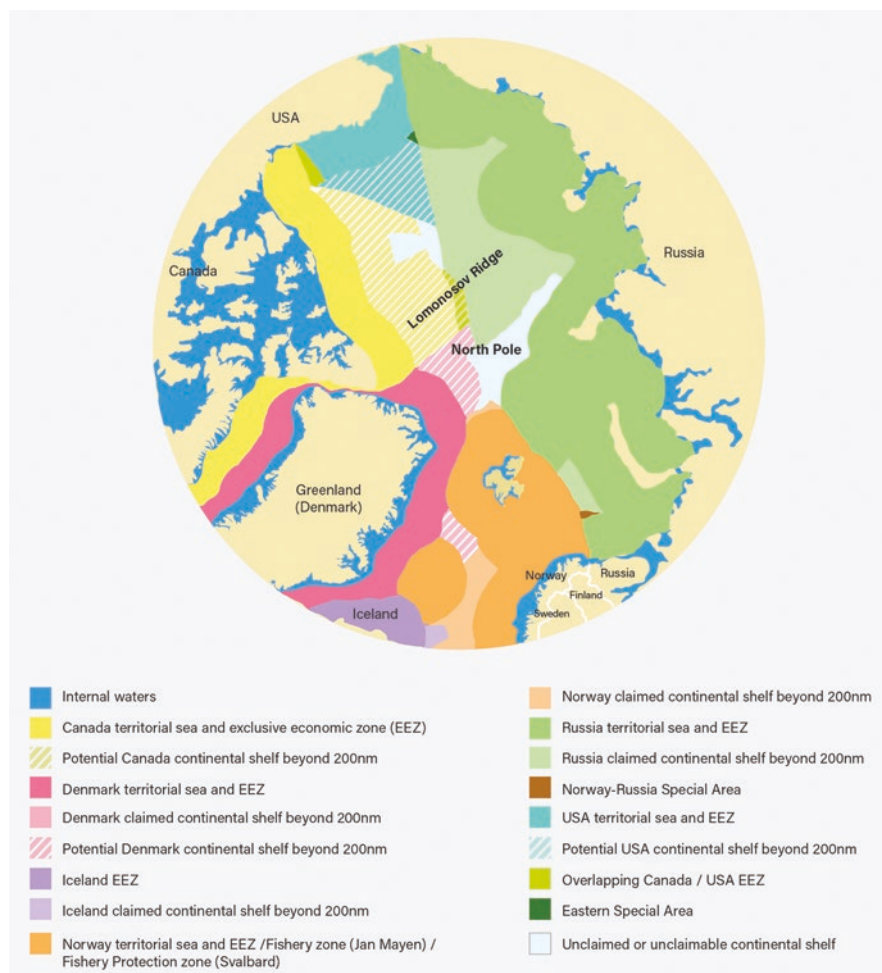
**Fig. 6.10** Population in the Arctic. (Source: Charles K. Ebinger, and Evie Zamavet Takis. “The Geopolitics of Arctic Melt.” Accessed December 7, 2016. [https://www.brookings.edu/wp-content/uploads/2016/06/11\\_arctic\\_melt\\_ebinger\\_zambetakis.pdf](https://www.brookings.edu/wp-content/uploads/2016/06/11_arctic_melt_ebinger_zambetakis.pdf))

Even beyond these 200 nautical miles, a state can claim the exclusive right to explore and exploit the natural resources in the seabed as long as the area is part of the continental shelf of the coastal state. The boundary of this continental shelf is determined by the Commission on the Limits of the Continental Shelf (CLCS) on the basis of geological data; no easy task in the region’s climate which is icy – both literally and in geopolitical terms. Russia, Denmark, and Canada, for example, claim the Lomonosov Ridge as part of their respective continental shelves,<sup>33</sup> and thus also the right to exploit the five billion tons of oil and natural gas assumed to

<sup>33</sup> <https://www.bbc.com/future/article/20200722-the-rush-to-claim-an-undersea-mountain-range>



**Fig. 6.11** Resources in the Arctic. (Source: [https://nordregio.org/maps/resources-in-the-arctic-2019/#\\_ftn1](https://nordregio.org/maps/resources-in-the-arctic-2019/#_ftn1) (free use))



**Fig. 6.12** Arctic territorial boundaries and claims. (Source: <https://www.amap.no/documents/doc/marine-jurisdiction-in-the-arctic-disputes-and/972>)

lie beneath the submarine mountains.<sup>34</sup> The territorial dispute made headlines in 2007 when Russian explorers anchored a national flag on the seabed beneath the North Pole as a symbol of their claim,<sup>35</sup> thus demonstrating the growing interest in the economic exploitation of the Arctic (see Fig. 6.12).

<sup>34</sup> <https://www.telegraph.co.uk/news/worldnews/europe/russia/11782413/Russia-claims-resource-rich-swathe-of-Arctic-territory.html>

<sup>35</sup> <http://news.bbc.co.uk/2/hi/europe/6927395.stm>

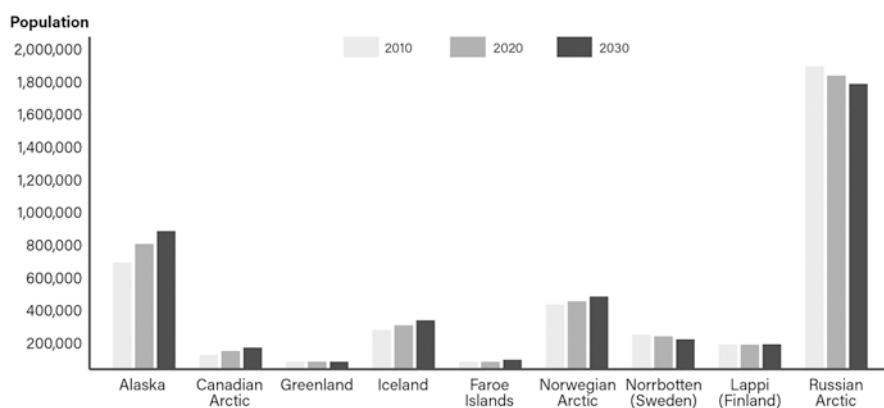
### 6.3 The Main Players

We have now identified the key drivers, and thus mapped out the possible framework that could shape the Arctic over the next decade. The key players in the region must position themselves on this playing field, and it is to them that we now turn our attention.

#### Russia: Regional Hegemon on the Rise

Russia can undoubtedly draw the greatest potential from climate change-induced changes in the Arctic, as our analysis of potential new trade routes has already shown. Russia controls more than half of the Arctic Ocean's coastline,<sup>36</sup> and it also accounts for the largest share of the region's population: two million Russians live in the far north of the country, and the population centers of Murmansk, Norilsk, and Workuta are three of the four largest settlements north of the Arctic Circle.<sup>37</sup> Even if the Russian population north of the Arctic Circle declines over the next decade (see Fig. 6.13), Russia represents the largest share in the Arctic in terms of population, coastline, and mineral resources. However, the importance Russia attaches to the Arctic is not just based on economic enthusiasm. Moscow also looks north with a worried eye: along with economic potential, the melting of the Arctic ice entails the challenge of defending a new border that is more than 24,000 kilometers long.<sup>38</sup>

It is no surprise that Russia is steadily expanding its capacities in the region. President Putin himself (who likes to publicly declare his nation's claim to regional



**Fig. 6.13** Projected population trends in the Arctic. (Source: [https://www.eea.europa.eu/data-and-maps/daviz/projected-population-trends-in-the-arctic#tab-chart\\_1](https://www.eea.europa.eu/data-and-maps/daviz/projected-population-trends-in-the-arctic#tab-chart_1))

<sup>36</sup> <https://www.thearcticinstitute.org/countries/russia/>

<sup>37</sup> "Population/Arctic." Accessed December 26, 2016. <http://arctic.ru/population/>

<sup>38</sup> <https://www.swp-berlin.org/10.18449/2020C57/>

leadership<sup>39</sup>) seems quite aware that Russia currently represents the dominant power in the Arctic. The backbone of Moscow's maritime superiority is the Russian icebreaker fleet of more than 40 ships, the majority of which are state-owned and operational.<sup>40</sup> Thus, the Russian fleet leaves all other Arctic nations far behind (see Fig. 6.14), especially in terms of heavy icebreakers that can also operate in thick pack ice. All but one heavy icebreaker, which is badly outdated, is in Russian hands. Moscow also maintains the world's only nuclear-powered icebreakers. And the Kremlin wants to further expand this top position: as recently as 2020, the world's largest and most powerful polar icebreaker was launched in Russia, and by 2035 the fleet is expected to include 13 such vessels, nine of them nuclear-powered.<sup>41</sup>

Apart from these civilian vessels, Moscow has the upper hand in conventional military terms with regard to the Arctic Ocean.<sup>42</sup> The core of Russia's "hard power" in the Arctic is the Northern Fleet, which – underscoring Moscow's focus on the region – has been playing an increasingly important role in the internal organizational structure of the Russian Navy since 2014.<sup>43</sup> Along with administrative upgrades, the Northern Fleet is also undergoing technical and personnel upgrades: adding new warships and land vehicles, missile and air defense systems, as well as better communications and surveillance technologies.<sup>44</sup> The Northern Fleet participated in the increasingly complex "Ocean Shield" military exercises in the Baltic Sea involving 70 warships in 2019. Russia is also expanding and constructing military bases in its north as well as augmenting its navy. The map in Fig. 6.15 shows the most important of those bases, thus offering a military or security perspective of the Arctic.

The declared goal of this rearmament is to push the NATO forces in the Arctic bit by bit into insignificance.<sup>45</sup> This may have succeeded in terms of fleet size and personnel, but the Russian navy is vulnerable to NATO's ever more accurate long-range weapons.<sup>46</sup> The massive military buildup that Moscow has undertaken in the Arctic protects an important source of income – already, one-third of the country's fish catch and 20% of its total exports come from regions north of the Arctic Circle.<sup>47</sup>

<sup>39</sup> Lassi Heininen, Alexander Sergunin, and Gleb Yarovoy. "Russian strategies in the arctic: avoiding a new cold war." Accessed December 26, 2016. [http://www.uarctic.org/media/857300/arctic\\_eng.pdf](http://www.uarctic.org/media/857300/arctic_eng.pdf)

<sup>40</sup> <https://www.heritage.org/global-politics/commentary/us-needs-icebreakers-keep-china-and-russia-arctic>

<sup>41</sup> <https://www.theguardian.com/world/2019/may/26/russia-launches-new-nuclear-powered-icebreaker-in-bid-to-open-up-arctic>

<sup>42</sup> <https://carnegieendowment.org/2021/03/29/russia-in-arctic-critical-examination-pub-84181>

<sup>43</sup> Andrew Radin, et al., *The Future of the Russian Military Russia's Ground Combat Capabilities and Implications for US-Russia Competition* (Santa Monica, CA: RAND Corporation, 2019); International Institute for Strategic Studies, "Chapter Five: Russia and Eurasia."

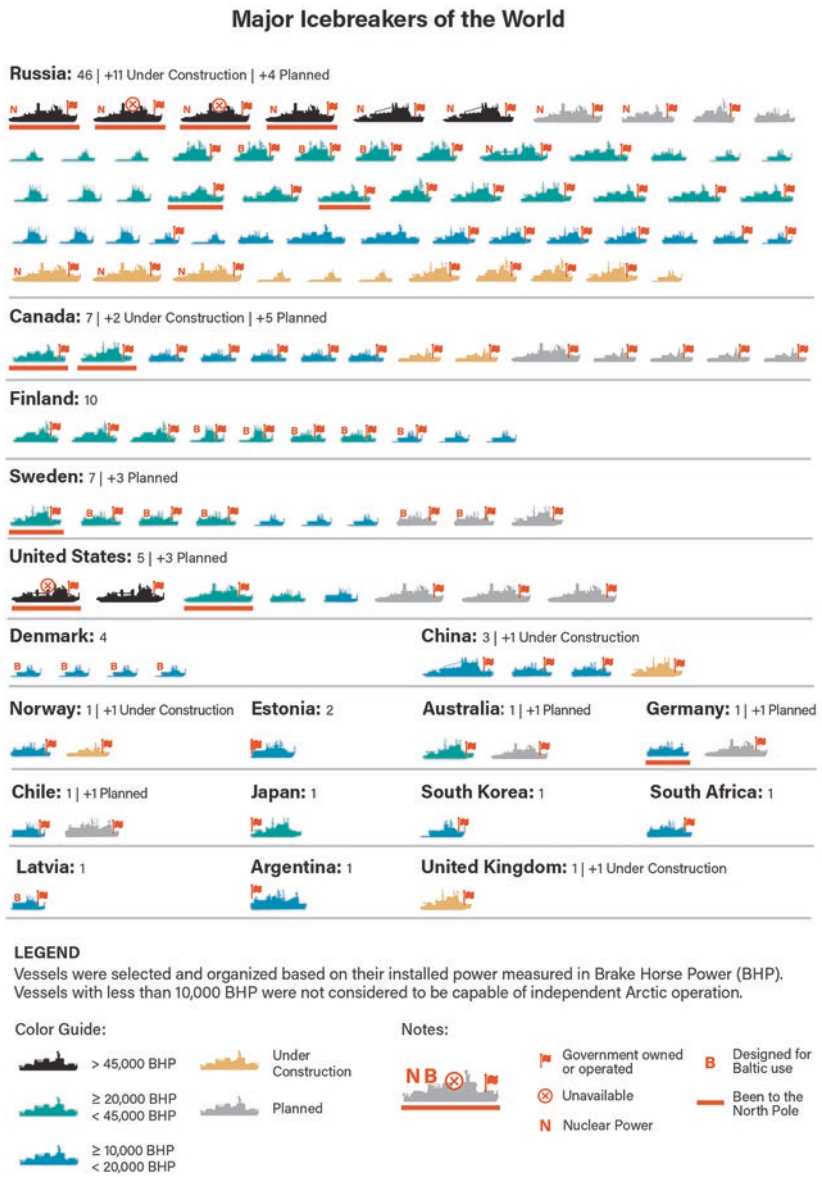
<sup>44</sup> *ibid.*

<sup>45</sup> <https://www.businessinsider.com/russias-northern-fleet-beefs-up-its-nuclear-capabilities-phase-nato-out-arctic-2017-6>

<sup>46</sup> <https://carnegieendowment.org/2021/03/29/russia-in-arctic-critical-examination-pub-84181>

<sup>47</sup> *ibid.*





The United States Coast Guard Office of Waterways and Ocean Policy (CG-WWM) began producing the chart of major icebreakers of the world in July 2010. Since then, we have gathered icebreaker information and recommendations from a variety of sources and experts, including icebreaker subject matter experts, internet, posts, news updates, Arctic experts, and Coast Guard offices with icebreaker equities. This chart was last updated 1 in 2017. Vessels meeting the general definition of a polar icebreaker per the 2007 National Research Council report on Polar Icebreakers in a Changing World are included. These vessels "have sailed in significant sea ice strengthened ships (enough to survive in ice, rather than operate in it).

**Fig. 6.14** Arctic icebreakers. (Source: <https://www.dco.uscg.mil/Portals/9/DCO%20Documents/Office%20of%20Waterways%20and%20Ocean%20Policy/20170501%20major%20ice-breaker%20chart.pdf?ver=2017-06-08-091723-907>)



**Fig. 6.15** Russia's militarization of the Arctic. (Source: [https://www.eea.europa.eu/data-and-maps/daviz/projected-population-trends-in-the-arctic#tab-chart\\_1](https://www.eea.europa.eu/data-and-maps/daviz/projected-population-trends-in-the-arctic#tab-chart_1))

Security concerns also factor into the buildup. Russia wants to protect its submarine fleet, which is anchored off the Arctic peninsula of Kola and forms an essential part of the country's nuclear deterrent.<sup>48</sup>

The importance Moscow attaches to the Arctic has not gone unnoticed by other major powers. In 2019, a study by the US Congressional Research Service found that the Kremlin is strengthening its position in the Arctic rhetorically and militarily. The US Navy and Coast Guard are trying to keep pace with this development. The report also noted that Moscow's focus on the region – along with a potential for conflict – brings a potential for more international cooperation.<sup>49</sup> Simultaneous with Russia's military buildup is its interest in leveraging its diplomatic channels to promote its status in the region. These include Russia's application to the Commission on the Limits of the Continental Shelf (CLCS) to declare the Lomonosov Ridge part of the Russian mainland to gain exclusive access to the mineral resources beneath it. This would clearly expand Russia's scope of action in the Arctic, as about one-third of the Lomonosov Ridge lies in areas more commonly assigned to Canada and Denmark (see Fig. 6.12).

Moscow can also use the extraction of resources as a power-political tool. Western companies are likely to contribute most of the capital and know-how to the

<sup>48</sup> <https://www.chathamhouse.org/2019/06/russias-military-posture-arctic>

<sup>49</sup> <https://crsreports.congress.gov/product/pdf/R/R41153/144>



costly endeavor and, in turn, later act as key stakeholders in persuading Western governments to take a pro-Russian stance.<sup>50</sup> Of course, such power-political intrigues are not to be found in Moscow's official rhetoric. When, in May 2021, Russia took over the chair of the Arctic Council for 2 years, the declared objectives in the region included more international cooperation, the reduction of greenhouse gas emissions, good investment conditions, and improved living conditions for the indigenous population.<sup>51</sup>

### **The United States: A Late Start for a Geopolitical Race to Catch-up**

Across the Bering Strait in Alaska, the United States, which had focused mostly on Asia and the Middle East in the last decades, has begun to focus on the Arctic. In a 2019 report to Congress, the US Department of Defense confirmed its vision for the region: a secure and politically stable region where US territory and interests can be defended and nations can collectively solve problems.<sup>52</sup> However, the report also acknowledged that this vision is a long way off. Moscow and Beijing are also significant competitors in the Arctic, and Russia specifically has the upper hand in military and economic terms.<sup>53</sup> President Biden's administration announced in September 2021, that much is needed to be done to respond to the economic and climatic upheavals in the Arctic and to protect the indigenous people, the fragile ecosystem, and US security interests.<sup>54</sup>

To achieve its objectives, the United States must cooperate with its NATO partners. Its most important partner is Canada, which has been cooperating closely with Washington in the Arctic since the Cold War. The North American Aerospace Defense Command (NORAD) is a joint air defense and missile organization, and NORAD's commander also heads the US Regional Command for North America (NORTHCOM). He warned as early as 2019 of the security challenges posed by a thawing Arctic.<sup>55</sup> The United States is also becoming increasingly active in the European Arctic region, for example, by engaging in joint military exercises with British<sup>56</sup> and Scandinavian NATO partners.<sup>57</sup>

Nevertheless, the United States remain militarily underrepresented in the region. The US Navy and Coast Guard maintain only nine military bases in Alaska and in

<sup>50</sup> <https://carnegieendowment.org/2021/03/29/russia-in-arctic-critical-examination-pub-84181>

<sup>51</sup> <https://arctic.ru/international/20201125/988468.html>

<sup>52</sup> <https://media.defense.gov/2019/Jun/06/2002141657/-1/-1/1/2019-DOD-ARCTIC-STRATEGY.PDF>

<sup>53</sup> *ibid.*

<sup>54</sup> <https://www.whitehouse.gov/ostp/news-updates/2021/09/24/biden-harris-administration-brings-arctic-policy-to-the-forefront-with-reactivated-steering-committee-new-slate-of-research-commissioners/>

<sup>55</sup> <https://www.defense.gov/News/News-Stories/Article/Article/1913989/northcom-commander-cites-arctic-as-area-of-concern/>

<sup>56</sup> <https://www.defense.gov/News/News-Stories/Article/Article/2180254/us-british-arctic-exercise-shows-us-concern-for-region/>

<sup>57</sup> <https://thebarentsobserver.com/en/security/2021/04/norway-host-biggest-exercise-inside-arctic-circle-cold-war>

Greenland. In Alaska, some 20,000 military personnel are assigned to the local Alaska Command (ALCOM);<sup>58</sup> on Greenland, the United States maintains Thule Air Base, the world's northernmost deep-water port, a key NORAD site for air and space surveillance.<sup>59</sup> In general, US Arctic forces lack infrastructure, equipment, technology, and vehicles; accordingly, the various US military forces have made it their objective to expand bases in the region, to better equip and prepare the existing forces for Arctic conditions, and to modernize their surveillance systems.<sup>60</sup>

The United States has the greatest need to catch up in the so-called "Icebreaker Gap," which with Russia is particularly enormous (see Fig. 6.14). The United States's only heavy icebreaker, some 45-years old, has long since exceeded its planned service life. According to its captain, the "Polar Star" is literally falling apart, and the crew has only been able to find some spare parts via eBay.<sup>61</sup> Likewise, the only other US icebreaker, the "Healy", had to go into drydock for an entire year in 2020.<sup>62</sup>

To close the gap with Russia, the Biden administration has requested \$170 million for the Coast Guard icebreaker fleet. Despite the increased funding, the gap will not be closed in the short term. The construction of six new icebreakers, three of them heavy polar icebreakers, has been approved, but the first is not scheduled to be launched any earlier than 2024.<sup>63</sup>

The security role of such ships should not be overestimated. Security policy experts agree that icebreakers have an important, even symbolic role to play. For example, they can respond to an incursion into the US EEZ or by showing US presence during Russian military exercises.<sup>64</sup> The fact that Washington is considering leasing ships from private companies<sup>65</sup> underscores its urgency to better position itself in the Arctic.

### **Canada: Long-term Rearmament in the Sparsely Populated North**

The remainder of the North American Arctic coast is occupied by Canada, which, despite its enormous land mass, accounts for only a small portion of the Arctic population (Fig. 6.16). Approximately 100,000 Canadians live north of the Arctic

<sup>58</sup> Siemon T. Wezeman. "Military Capabilities in the Arctic." SIPRI, March 2012. [http://books.sipri.org/product\\_info?c\\_product\\_id=442](http://books.sipri.org/product_info?c_product_id=442)

<sup>59</sup> "821st Air Base Group." Accessed December 29, 2016. <http://www.peterson.af.mil/Units/821st-Air-Base-Group>

<sup>60</sup> <https://warontherocks.com/2021/05/a-u-s-security-strategy-for-the-arctic/>

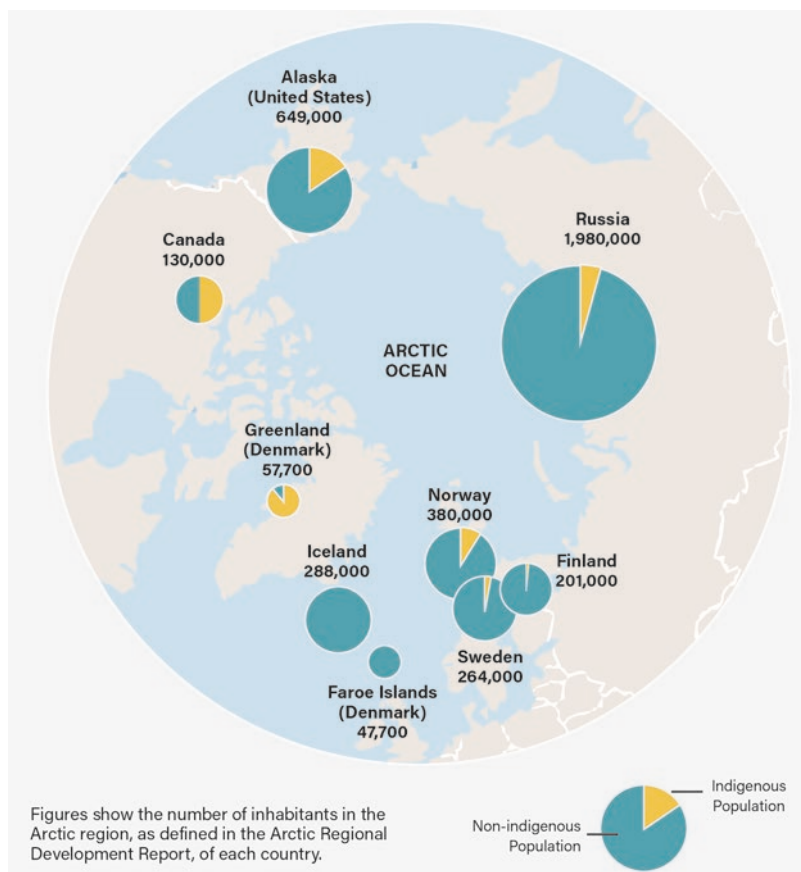
<sup>61</sup> <https://www.businessinsider.com/coast-guard-icebreaker-polar-star-running-out-of-spare-parts-2021-3>

<sup>62</sup> <https://www.heritage.org/global-politics/commentary/us-needs-icebreakers-keep-china-and-russia-arctic>

<sup>63</sup> <https://www.navytimes.com/news/your-navy/2020/12/15/congress-oks-new-arctic-icebreakers-for-coast-guard/>

<sup>64</sup> <https://www.nbcnews.com/news/us-news/u-s-urgently-needs-new-icebreaker-ships-patrol-arctic-will-n942236>

<sup>65</sup> <https://crsreports.congress.gov/product/pdf/R/R41153>



**Fig. 6.16** Indigenous and non-indigenous Arctic populations. (Source: <https://shop.globalytica.com/collections/critical-thinking-case-studies/products/e-pub-uncharted-territory-conflict-competition-or-collaboration-in-the-arctic-1>)

Circle.<sup>66</sup> Nevertheless, the country has important interests in the region. In the government's vision, the protection of the indigenous population plays a major role, which includes improvement of the local infrastructure, the energy supply, economic development, and the creation of jobs as well as the preservation of the Arctic ecosystem.<sup>67</sup> Canada also has made it clear that it sees itself in a leading role in the region.

<sup>66</sup> <https://shop.globalytica.com/collections/critical-thinking-case-studies/products/e-pub-uncharted-territory-conflict-competition-or-collaboration-in-the-arctic-1>

<sup>67</sup> <https://www.rcaanc-cirnac.gc.ca/eng/1560523306861/1560523330587>

To protect these interests, the Canadian Armed Forces have steadily expanded their presence in the region over the past two decades,<sup>68</sup> partly in response to Russia's expansionist policy. This includes the acquisition of new jets and transport aircraft. In addition, the Canadian Air Force is conducting daily maneuvers in the Arctic.<sup>69</sup> On the ground, the "Canadian Rangers" have taken over the defense of the sparsely populated region; the reserve unit (approximately 5000 strong) operates from more than 200 different communities in the three "Northern Territories".<sup>70</sup> Canada has the second largest icebreaker fleet in the world (Fig. 6.14), but Ottawa sees a need for new capacities to cope with the increasing shipping traffic in the region. In 2021, the Canadian Coast Guard had 18 icebreakers and will add six as the result of a 2019 investment package.<sup>71</sup> In addition to its own forces, Canada is bound to the United States through NORAD, and both would join to defend the region in extreme cases.

### **Greenland and Denmark: Strategically Positioned, Politically Controversial**

Greenland is further north in the Arctic Circle and across Baffin Bay. It is the world's twelfth-largest landmass but has only 58,000 people, making it the smallest of the Arctic nations (see Fig. 6.16). Notwithstanding a growing independence movement, Greenland has been under Danish control for nearly 300 years, although Denmark relinquished much of its influence over Greenland's politics in 2009 through a self-government law.<sup>72</sup> Since then, domestic politics as well as control over the island's raw materials have rested firmly in the hands of the local government in Nuuk. Copenhagen, however, has continued to control the foreign and security policies of Denmark's "autonomous unit" and to represent it in international organizations such as the UN and the Arctic Council.<sup>73</sup>

Urbanization, climate change, political independence the exploitation of new raw material deposits, and the melting ice bring opportunities and challenges for the island nation's population. Apart from new sources of oil, the retreat of Greenland's ice sheet is making valuable metals and rare earths, in particular, mineable all year-round: gold, zinc, copper, diamonds and rubies, platinum, titanium, and uranium. Experts predict that these mineral resources could lead to a "gold rush" worth from

<sup>68</sup>Adam, Lajeunesse. "The Canadian Armed Forces in the Arctic: Purpose, Capabilities, and Requirements." Canadian Global Affairs Institute. Accessed December 26, 2016. [http://www.cgai.ca/canadian\\_armed\\_forces\\_in\\_the\\_arctic](http://www.cgai.ca/canadian_armed_forces_in_the_arctic)

<sup>69</sup>"Department of Defense2013\_Arctic\_Strategy.pdf." Accessed December 26, 2016. [https://www.defense.gov/Portals/1/Documents/pubs/2013\\_Arctic\\_Strategy.pdf](https://www.defense.gov/Portals/1/Documents/pubs/2013_Arctic_Strategy.pdf)

<sup>70</sup><http://www.army-armee.forces.gc.ca/en/canadian-rangers/index.page>

<sup>71</sup><https://www.canada.ca/en/canadian-coast-guard/news/2021/05/government-of-canada-announces-polar-icebreakers-to-enhance-canadas-arctic-presence-and-provide-critical-services-to-canadians.html>

<sup>72</sup>"Politics in Greenland – Naalakkersuisut." Accessed December 11, 2016. <http://naalakkersuisut.gl/en/Aboutgovernment-of-greenland/About-Greenland/Politics-in-Greenland>

<sup>73</sup>"International Security Advisory Board: Report on Arctic Policy." US Department of State. Accessed December 11, 2016. <http://www.state.gov/t/avc/isab/262342.html>

US\$742 billion up to US\$1643 billion.<sup>74</sup> At the same time, increased wealth also brings tensions in both domestic and foreign politics.

An important point of tension is the role of foreign companies in the logistically complex mining and removal business. After it was given a free hand as recently as 2012 to include the import of cheap labor,<sup>75</sup> the government in Nuuk responded to sharp domestic and international criticism and obliged international companies to work with local labor and partner companies.<sup>76</sup> One of the targets of this criticism was China, whose role in mining and investment is viewed skeptically by Denmark's NATO partners. Many Greenlandic and especially Danish politicians fear that Greenland will fall into a debt trap and that China will take advantage of this to gain influence over the island, which is so favorably located in geostrategic terms. Copenhagen, for example, rejected a Chinese company effort to build a major airport with investments worth more than US\$100 million – which, in turn, sparked off anger within Greenland's independence movement.<sup>77</sup>

Apart from promising resource deposits, Greenland's strategic location makes the island so important that former US President Trump asked Denmark in 2019 whether Greenland was for sale (the Greenlandic population reacted with little enthusiasm, as expected). Greenland forms a bridge between North America and Europe and juts out as a spearhead into the Arctic, which is becoming increasingly important in geostrategic terms.<sup>78</sup> The United States has used Greenland as a home to the enormously important Thule Air Base since the Cold War and in 2018 announced plans to significantly expand its presence – a step that was welcomed in both Copenhagen and Nuuk.<sup>79</sup>

Denmark, which is responsible for the island's defense, is aware of Greenland's strategic importance. As recently as 2021, the NATO member state has released an additional US\$645 million for the surveillance of the Arctic and the North Atlantic. US\$245 million of this amount has been earmarked for surveillance drones stationed in Greenland.<sup>80</sup>

The role Greenland will play in the Arctic in 2030 will depend greatly on whether the island remains an autonomous part of Denmark and whether the independence movement gains momentum among the population. In a 2019 survey by the

<sup>74</sup>“Natural Resources and Economic Power: The Development-Security Nexus of Greenland – Viewcontent.cgi.” [http://scholar.dickinson.edu/cgi/viewcontent.cgi?Article=1045&context=student\\_work](http://scholar.dickinson.edu/cgi/viewcontent.cgi?Article=1045&context=student_work)

<sup>75</sup>Hans Peder Kirkegaard, Md. Mehedi, and Maywand Asif. “Mining and Education in Greenland.” Roskilde University. <http://rudar.ruc.dk/bitstream/1800/9581/1/Group%2018,%20House%2021.%20%20.pdf>

<sup>76</sup>“Greenland.pdf.” <http://rudar.ruc.dk/bitstream/1800/16015/1/Greenland.pdf>

<sup>77</sup><https://isd.eu/danish-concerns-chinese-investment-greenland/>

<sup>78</sup>[https://www.europarl.europa.eu/RegData/etudes/briefing\\_note/join/2014/522332/EXPO-AFET\\_SP\(2014\)522332\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/briefing_note/join/2014/522332/EXPO-AFET_SP(2014)522332_EN.pdf)

<sup>79</sup><https://www.arctictoday.com/china-us-strategic-designs-greenland/>

<sup>80</sup><https://www.reuters.com/article/us-denmark-defence-arctic/denmark-to-spend-more-on-arctic-defence-as-melting-sea-ice-prompts-jostle-for-control-idUSKBN2AB1VR>

University of Copenhagen, 68% of Greenland's adult population wanted independence from Denmark within the next few decades.<sup>81</sup> However, if a referendum on the issue were held today, only 38% of the respondents would vote for independence. This may be related to the fact that, according to the same survey, only 32% of the population is convinced that secession would have a positive impact on Greenland's economy and the living conditions of its people. Greenland is heavily dependent on economic aid from Denmark, which accounts for about half of the government revenues and a quarter of the GDP.<sup>82</sup> If newly accessible mineral resources and a growing tourism sector were to make Greenland independent of Copenhagen's support, this would probably tip the balance in favor of independence.

### **Iceland: Hub for Trade, Tourism, and Fishing**

Iceland's population of around 354,000 can boast of a range of stunning landscapes as well as strategically favorable location between Europe and Greenland.<sup>83</sup> Featuring more than two dozen ports, Iceland can play a key role in opening Arctic trade routes such as the Northern Sea Route or the Northwest Passage. Apart from combating climate change, tapping natural resources, and deepening cooperation, shipping plays a central role in Iceland's Arctic strategy.<sup>84</sup> Tourism is also becoming increasingly important for Iceland as the weather gets milder; the number of tourists increased by 400% from 2010 to 2017.<sup>85</sup>

Possible profits from trade and tourism could become exceedingly significant for Iceland; the government is looking anxiously at climate change, which could potentially harm its enormously important fishing industry.<sup>86</sup> Iceland exports 1.7 billion euros worth of fish and other marine products annually, about 40% of its total exports.<sup>87</sup> Rising water temperatures may shift migration and spawning grounds of fish shoals to Iceland's disadvantage, although science cannot yet provide accurate predictions. The Reykjavik government is preparing for new economic realities, some in cooperation with Russia. In 2016, for example, Icelandic diplomats exchanged views with Russian officials in Murmansk on new fishing conditions and potential tourism offers in the region.<sup>88</sup>

<sup>81</sup> <https://www.altinget.dk/arktis/artikel/martin-breum-her-er-den-egentlige-forskel-paa-dansk-og-groenlandsk-syn-paa-fremtiden>

<sup>82</sup> <https://www.cia.gov/the-world-factbook/countries/greenland/#economy>

<sup>83</sup> <https://www.cia.gov/the-world-factbook/countries/iceland/>

<sup>84</sup> "A Parliamentary Resolution – A-Parliamentary-Resolution-on-ICE-Arctic-Policy-Approved-by-Althingi.pdf." <http://library.arcticportal.org/1889/1/A-Parliamentary-Resolution-on-ICE-Arctic-Policy-approved-by-Althingi.pdf>.

<sup>85</sup> <https://www.cia.gov/the-world-factbook/countries/iceland/>

<sup>86</sup> "Icelandic-Fisheries-Press-Kit-Enska-30-Sept-2013.pdf." <http://www.iceland.is/files/icelandic-fisheries-press-kitenska-30-sept-2013.pdf>

<sup>87</sup> <https://www.responsiblefisheries.is/seafood-industry/export-statistics>

<sup>88</sup> "Visit to Murmansk." <http://www.iceland.is/iceland-abroad/ru/english/newsand-events/visit-to-murmansk/8951/>

At the same time, Reykjavik is increasingly concerned about Russia's offensive Arctic policy. Russian bombers have repeatedly penetrated Icelandic airspace in recent years.<sup>89</sup> One response has been the growing cooperation with Iceland's NATO partners. Being one of 12 founding members of the organization, Iceland is particularly reliant on NATO: The country has no military of its own, and NATO is responsible for defending Iceland and controlling its airspace.<sup>90</sup> To counter Russia's gestures, Iceland has deepened its cooperation with the United States. A 2016 defense agreement continues to allow American forces to use Icelandic infrastructure, while the United States has pledged to maintain a robust defense plan for the island.<sup>91</sup>

Iceland has established closer relations with the People's Republic of China in trade, research, and oil production. As early as 2013, Chinese and Icelandic representatives met to discuss the future of the Northern Sea Route; China predicted at the time that up to 10% of its trade volume with Europe (and thus US\$37 billion annually) could flow through this Arctic trade route.<sup>92</sup> That same year, Iceland became the first Western European country to sign a free trade agreement with China.<sup>93</sup> Chinese companies play an important role in the production of oil off Iceland's coasts – partly because Iceland relied on foreign donors after its economy collapsed in 2008.<sup>94</sup> Given its key geographic position, Iceland must find an adequate geopolitical position between Russia, the United States, and China in the coming years.

### Norway: Preparing for the Future

Across the European Arctic Ocean from Iceland, is Norway with a rugged 2650-kilometer coastline. This coastline provides Norway with ideal access to the Arctic Ocean and the Barents Sea. Norway has close ties with the Arctic in other ways: 490,000 of its inhabitants, or one-tenth of its population, live there. They make up the third largest segment of the Arctic population – after the inhabitants of Arctic Russia and Alaska (see Fig. 6.16). This is one reason why, according to former Foreign Minister Børge Brende, the Arctic is Norway's top priority in terms of foreign policy.

The potential that Norway sees in the Arctic of the future is shown in Fig. 6.17. In addition to a considerable portion of its population, Norway has a large share of its resources in the Arctic. One third of the revenue from the mining of mineral

<sup>89</sup> <https://www.icelandreview.com/news/russian-bombers-enter-nato-airspace-near-iceland/>

<sup>90</sup> <https://www.cia.gov/the-world-factbook/countries/iceland/#economy>

<sup>91</sup> <https://www.defense.gov/News/News-Stories/Article/Article/820904/us-iceland-sign-security-cooperation-agreement/>

<sup>92</sup> <https://foreignpolicyblogs.com/2013/03/19/the-northern-sea-route-an-iceland-china-link/>

<sup>93</sup> [https://www.europa.eu/RegData/bibliotheque/briefing/2013/130631/LDM\\_BRI\(2013\)130631\\_REV1\\_EN.pdf](https://www.europa.eu/RegData/bibliotheque/briefing/2013/130631/LDM_BRI(2013)130631_REV1_EN.pdf)

<sup>94</sup> *ibid.*





**Fig. 6.17** Norway's Arctic policy. (Source: "Nordkloden\_en.pdf." Accessed December 18, 2016. [https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/nord/nordkloden\\_en.pdf](https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/nord/nordkloden_en.pdf))

resources is generated in the north of the country, and 43% of Norway's still undiscovered energy resources are believed to lie beneath the Barents Sea.<sup>95</sup>

Oslo sees economic potential for the Arctic in fishing, tourism, and especially shipping, as a full 80% of Arctic shipping passes through Norwegian territorial waters.<sup>96</sup> If the Northeast Passage stays ice-free for longer periods year after year, this would attract more commercial traffic. Norway and potential port cities like Narvik would benefit. On the other hand, a look at Norway's most important export goods reveals how important the resources of the Arctic are for the country. Crude oil, natural gas, fresh fish, and refined petroleum are the top four of its exports, accounting for US\$65 billion, or about 18% of Norway's GDP.<sup>97</sup>

Norway's government wants to protect these economic interests and is working closely with NATO partners to do so; Oslo is particularly worried by Russia's increasingly assertive Arctic policy.<sup>98</sup> One reaction was the "Cold Response" military exercise which, organized by Norway, has been the largest in the north of the

<sup>95</sup> <https://www.regjeringen.no/en/dokumenter/nordkloden/id2076193/>

<sup>96</sup> *ibid.*

<sup>97</sup> <https://oec.world/en/profile/country/nor>

<sup>98</sup> [https://www.regjeringen.no/en/dokumenter/arctic\\_policy/id2830120/#tocNode\\_16](https://www.regjeringen.no/en/dokumenter/arctic_policy/id2830120/#tocNode_16)



country since the Cold War, involving 40,000 troops.<sup>99</sup> The Ofoten region in Norway's north plays a key role in NATO's overall Arctic strategy. Ofoten, next to the border with Russia, is the location of a modern fleet of P8 Poseidon maritime surveillance aircraft and of NATO fighter jets.<sup>100</sup> Beyond this, Norway is upgrading its own capacity for fighter and surveillance aircraft as well as submarines to strengthen its presence in the Arctic.<sup>101</sup> Most recently, the country announced that – together with Sweden, Finland, and Denmark – it would transfer its air forces to a joint organizational structure.<sup>102</sup>

In addition to these military aspects, research and economic cooperation are flourishing in Norway's thawing Arctic. To tap previously inaccessible oil reserves in the Barents Sea and the Arctic Ocean, Oslo and Moscow reached a cooperation agreement in 2010.<sup>103</sup> At the same time, Norway's research institutes, in cooperation with American partners, have published the third most English publications on the Arctic. All these steps are in line with the priorities set out by Norway's Ministry of Foreign Affairs in its "Arctic 2030" plan, which emphasized the importance of international cooperation in research, economic innovation, infrastructure, and environmental protection.<sup>104</sup>

### Sweden: Total Defense

Although Sweden does not have its own access to the Arctic Ocean, a quarter of a million people live in the Arctic north of the country between Norway and Finland. Together with Norway, Sweden shares what is probably Europe's longest, oldest, and most peaceful border as well as the indigenous Sámi people. For thousands of years, the Sámi (roughly 70,000 to 100,000) have been moving between Sweden, Finland, Norway, and northwestern Russia.<sup>105</sup> Accordingly, Sweden's goals for its Arctic policy are to protect the indigenous population and the Arctic ecosystem through international cooperation and strong international law in the region.<sup>106</sup>

Sweden is well positioned to do so. Lacking its own access to the Arctic Ocean, Sweden is dependent on Norway's ports; however, it possesses a considerable ice-breaker fleet with a total of seven ships. By escorting vessels through the Arctic and

<sup>99</sup> <https://thebarentsobserver.com/en/security/2021/04/norway-host-biggest-exercise-inside-arctic-circle-cold-war>

<sup>100</sup> *ibid.*

<sup>101</sup> [https://www.regjeringen.no/en/dokumenter/arctic\\_policy/id2830120/#tocNode\\_16](https://www.regjeringen.no/en/dokumenter/arctic_policy/id2830120/#tocNode_16)

<sup>102</sup> Reuters: Nordic countries plan joint air defence to counter Russian threat, online: <https://www.reuters.com/world/europe/nordic-countries-plan-joint-air-defence-counter-russian-threat-2023-03-24/>

<sup>103</sup> "Avtale\_engelsk.pdf" [https://www.regjeringen.no/globalassets/upload/UD/Vedlegg/Folkerett/avtale\\_engelsk.pdf](https://www.regjeringen.no/globalassets/upload/UD/Vedlegg/Folkerett/avtale_engelsk.pdf)

<sup>104</sup> "Nordkloden\_en.pdf" [https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/nord/nordkloden\\_en.pdf](https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/nord/nordkloden_en.pdf)

<sup>105</sup> "A Brief Saami History – Synopsis of Sami-UN Relations PDF.pdf" <http://www.thearctic.is/PDF/Synopsis%20of%20Sami-UN%20Relations%20PDF.pdf>

<sup>106</sup> <https://www.government.se/4ab869/contentassets/c197945c0be646a482733275d8b702cd/swe-dens-strategy-for-the-arctic-region-2020.pdf>

the Baltic Sea, these icebreakers generate 20 to 40 million euros annually for Sweden's government.<sup>107</sup> Sweden, which has asked to join NATO as a result of the war in Ukraine, lends its icebreakers to the United States and Canada. In general, it works closely with NATO, maintaining a "Partnership for Peace."<sup>108</sup> Its relationship with NATO will presumably grow stronger after it joins the alliance.<sup>109</sup>

The government and the people of Sweden are concerned about Russia's expansionist policies, especially after Moscow's annexation of Crimea, the intrusion of Russian ships into Swedish waters, and the Russian war against Ukraine. Faced with these threats, a broad political consensus has emerged to increase defense spending by 40% by 2025 and to double the number of people drafted into the military.<sup>110</sup> As a sign of presence, Sweden has established a military base on the Baltic island of Gotland and hosted multilateral exercises with NATO countries.<sup>111</sup> Apart from NATO, Stockholm has deepened its alliances with the West, including a trilateral defense agreement with Finland and the United States, which was concluded in 2018.<sup>112</sup>

Sweden's foreign and defense policy is shaped by the official "Total Defense" doctrine. It provides a solid measure of military deterrence unilaterally. Sweden's military is projected to grow from 55,000 troops to 90,000 by 2030<sup>113</sup> and includes a special unit for operations in the Arctic: the "Lapland Ranger Regiment." This unit is superbly equipped and trained for operations in Arctic conditions.<sup>114</sup> The regiment's troops train in Sweden's polar north as do US special forces and those of Norway and Finland.

### **Finland: Between the Frontlines**

Like Sweden, Finland itself has no direct access to the Arctic Ocean. Instead, it shares borders with Sweden and Norway and its longest border is with Russia. With one-third of its land area and just over 180,000 of its 5.5 million inhabitants north of the Arctic Circle, Finland considers itself an Arctic nation.<sup>115</sup> In its regularly renewed Arctic strategy, the government in Helsinki is particularly focusing on the consequences of climate change and the protection of the indigenous population.<sup>116</sup>

<sup>107</sup> "BIM Report 15-16.pdf" <http://www.baltice.org/app/static/pdf/BIM%20Report%2015-16.pdf>

<sup>108</sup> "NATO – Topic: Relations with Sweden." [http://www.nato.int/cps/en/natolive/topics\\_52535.htm](http://www.nato.int/cps/en/natolive/topics_52535.htm)

<sup>109</sup> <https://www.nzz.ch/international/nach-dem-entscheid-zum-nato-beitritt-von-finnland-folgt-jetzt-schweden-ld.1683660>

<sup>110</sup> <https://www.theguardian.com/world/2020/oct/15/sweden-to-increase-military-spending-by-40-as-tension-with-russia-grows>

<sup>111</sup> <https://www.politico.eu/article/finland-russia-nato-wary-finns-take-another-look/>

<sup>112</sup> <https://www.defensenews.com/training-sim/2018/05/09/finland-sweden-and-us-sign-trilateral-agreement-with-eye-on-increased-exercises/>

<sup>113</sup> <https://thehill.com/opinion/international/530651-russia-prompts-sweden-to-revive-its-defense>

<sup>114</sup> "Unofficial Arctic Ranger Page." <http://arcticranger.tripod.com/>

<sup>115</sup> <https://arctic-council.org/about/states/finland/>

<sup>116</sup> <https://valtioneuvosto.fi/en/-/10616/finland-revised-its-arctic-policy-strategy>



**Fig. 6.18** Finland as a gateway to the Arctic. (Source: <https://euobserver.com/nordic/141142>)

About 10,000 of the Sámi live in Lapland, Finland's northernmost and largest province, which is the only one north of the Arctic Circle.<sup>117</sup>

Finland's economic interests in the thawing Arctic would appear to be minor as it lacks its own access to the Arctic. As the northernmost country of the EU, however, Finland sees itself as a gateway to the Arctic Ocean and thus to future trading partners in Asia. Finland wants to become an important access point to the Northern Sea Route. Toward this end, Helsinki, together with Norway, is planning a train line from the Finnish port city of Oulu, at the northernmost end of the Baltic Sea, to Kirkenes, a Norwegian port on the Northeast Passage (see Fig. 6.18). The construction of this train connection will probably not begin until 2030.<sup>118</sup>

Finland is already benefiting indirectly from the thawing of the Arctic. As shipping traffic in the Arctic Ocean increases, so does the global demand for icebreakers, and Finland is the largest producer of such craft.<sup>119</sup> At first glance, Finland maintains a substantial fleet of icebreakers including nine vessels.<sup>120</sup> Most of these,

<sup>117</sup> <https://arctic-council.org/about/states/finland/>

<sup>118</sup> <https://euobserver.com/nordic/141142>

<sup>119</sup> <https://www.politico.eu/article/finland-icebreakers-arctic-meltin-ice-industry-global-warming/>

<sup>120</sup> <https://www.highnorthnews.com/en/finland-wants-break-ice-everyone-everywhere>

however, are outdated, and some are only equipped for use in the Baltic Sea.<sup>121</sup> Helsinki recognizes the need for new vessels, but its shipyards are already at capacity fulfilling orders from countries ranging from the United States to South Africa.

Just like in neighboring Scandinavian countries and in the Baltic States, Finland has become alarmed by Russia's rearmament and provocations, which have spurred it to join NATO. Finland – like Sweden – had previously only been linked through a “Partnership for Peace.” Finnish troops have participated in joint military exercises with NATO, especially with Baltic and Nordic partners. However, in the wake of Russia's annexation of the Crimea, the war with Ukraine, and the intrusion of Russian aircraft and ships into Finnish territory, Helsinki (which has already been involved in two bloody wars with Moscow) has increased military spending<sup>122</sup> and opted for NATO membership.<sup>123</sup>

Finland, thanks to universal conscription, can draw on some 300,000 reservists,<sup>124</sup> which is considerable for a nation with less than six million inhabitants. Finland is also home to several renowned research institutes dealing with the Arctic and its future, such as the “Arctic Centre” at the University of Lapland.<sup>125</sup> Altogether, the country finds itself in a less than favorable position – squeezed between Russia and Europe and without its own access to the Arctic – but it has the potential to have a say in shaping the future of the Arctic.

### China: The Wildcard

The keyword “Arctic” will trigger associations with China in few people's minds, and yet the People's Republic should not be missing from any analysis of the region. China can hardly be called an Arctic nation and only has a permanent observer status in the Arctic Council. Beijing has long recognized the immense potential of a thawing Arctic and made strategic preparations accordingly. As an observer, China has no voting rights in the Arctic Council, but it can attend meetings, submit proposals, and influence discussions. Apart from participating in diplomatic forums, China primarily pursues an economic approach in which the Chinese state and state-related companies buy into Arctic-related projects.<sup>126</sup>

China sees Greenland and Iceland as prominent targets to buy influence and increase potential profits. Beijing's approach has raised concern in the United States where the State Department has noted that China's generous investment policy is

<sup>121</sup> <https://www.rcinet.ca/eye-on-the-arctic/2019/10/18/finland-icebreakers-modernization-fleet-ships/>

<sup>122</sup> <https://www.politico.eu/article/finland-russia-nato-wary-finns-take-another-look/>

<sup>123</sup> <https://www.nzz.ch/international/nach-dem-entscheid-zum-nato-beitritt-von-finnland-folgt-jetzt-schweden-ld.1683660>

<sup>124</sup> <https://us.boell.org/en/2018/07/12/finlands-reluctance-join-nato>

<sup>125</sup> <https://arctic-council.org/about/states/finland/>

<sup>126</sup> Wright, Timothy. 2014. China's Race toward the Arctic: Interests, Legitimacy, and Canadian Security Implications. University of Calgary, Graduate Studies, Military and Strategic Studies, <http://hdl.handle.net/11023/1889>

	Population	GDP	GDP per capita	Number of Transactions	Average Transaction Size (in USD)	Total Value (Billion USD)	% of GDP
Canada	35,362,905	\$1.53 trillion	\$46,400	107	\$442.1	\$47.3	2.4%
Greenland	57,728	\$1.06 billion	\$37,600	6	\$33.4	\$2.00	11.6%
Iceland	335,878	\$20.05 billion	\$49,200	5	\$30.8	\$1.2	5.7%
Norway	5,265,158	\$370.60 billion	\$69,400	17	\$147.9	\$2.5	0.9%
Russia	142,355,415	\$1.28 trillion	\$26,900	281	\$691.7	\$194.4	2.8%
USA	323,995,528	\$18.62 trillion	\$57,600	557	\$340.6	\$189.7	1.2%
Total	-	-	-	884	\$508.66	\$449.66	-

**Fig. 6.19** Comparing Arctic Border State GDP. (Source: [https://www.cna.org/cna\\_files/pdf/COP-2017-U-015944-1Rev.pdf](https://www.cna.org/cna_files/pdf/COP-2017-U-015944-1Rev.pdf))

pushing back American influence in Greenland.<sup>127</sup> The Chinese action is part of its far-reaching “One Belt One Road” initiative, in which Greenland and Iceland play an important role because of their location at the other end of the Arctic trade routes and their deposits of metals and rare earths.

In 2014, Beijing and Copenhagen (as Greenland’s foreign policy representative) agreed on a memorandum that would allow the development of the Kvanefjeld deposit, one of the world’s largest deposits of uranium and rare earths.<sup>128</sup> However, after an ecology-minded party opposed to the project won the 2021 parliamentary elections in Nuuk, the future of the Kvanefjeld project remains uncertain.<sup>129</sup> The elections on the sparsely populated island were closely watched by China, as the United States and major European economies would also like to diversify their supply of rare earths.<sup>130</sup> Although the outcome of the election is a setback for Beijing, its influence on Greenland is not based solely on this project: Chinese companies also invest heavily in Greenland’s infrastructure and research projects.

The impact of Chinese investment on the economies of some Arctic nations – and thus the potential impact of China on the future of the Arctic – is attested to by the fact that Chinese investment between 2012 and 2017 was equivalent to 11.6% of Greenland’s GDP and to 5.7% of Iceland’s GDP (see Fig. 6.19). Greenland’s and

<sup>127</sup> Peng, Jingchao, and Njord Wegge. “China’s Bilateral Diplomacy in the Arctic.” *Polar Geography* 38, no. 3 (July 3, 2015): 233–49. doi:10.1080/1088937X.2015.1086445.

<sup>128</sup> “GMEL – NFC MoU Announcement – GMELNFC\_MoU\_Announcement.pdf.” [http://www.ggg.gl/docs/ASX-announcements/GMELNFC\\_MoU\\_Announcement.pdf](http://www.ggg.gl/docs/ASX-announcements/GMELNFC_MoU_Announcement.pdf)

<sup>129</sup> <https://asia.nikkei.com/Business/Markets/Commodities/Greenland-says-no-to-China-backed-rare-earth-mine-in-election>

<sup>130</sup> <https://www.clingendael.org/pub/2020/presence-before-power/4-greenland-what-is-china-doing-there-and-why/>

Iceland’s potential financial dependence on China raises concern globally, but the influx of Chinese labor, which Chinese companies prefer to use for projects in the Arctic, threatens to displace the sparse indigenous population.<sup>131</sup>

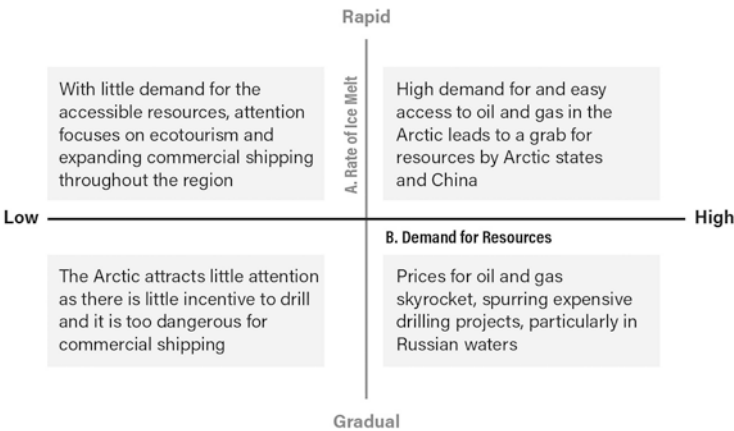
Apart from Greenland and Iceland, Russia is an important leverage point for China’s Arctic strategy, especially as China is likely to have the greatest interest in the Northeast Passage as a potential trade route. To this end, Beijing and Moscow established a joint billion-dollar financing mechanism in 2017 for projects to develop this route.<sup>132</sup> Concrete projects are a long way off, as Beijing is well aware of the major hurdles that still exist for commercial use of the Northern Sea Route.

Future Trajectories for the Arctic

Having developed a set of key drivers and reviewed the capabilities and intentions of the major players, the next task for the Strategic Analysis team was to pair the drivers into a series of 2 × 2 matrices and develop a short scenario for each quadrant of each matrix. The matrices they generated are shown in Figs. 6.20, 6.21, 6.22, 6.23, 6.24, and 6.25. A short synopsis of each scenario appears in each graphic.

The team reviewed all 24 scenarios or stories and generated three new and distinct scenarios that illustrated the most compelling, challenging, and “attention-deserving” futures. They looked for themes that were captured in several of the scenarios or for stories that could be combined into a single coherent scenario. Criteria they considered when generating the new set of scenarios were whether the scenarios as a set described:

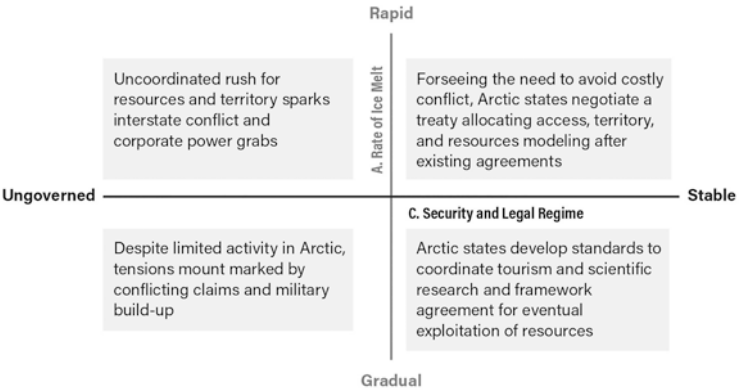
- The most credible downside risk
- The consensus or mainline assessment



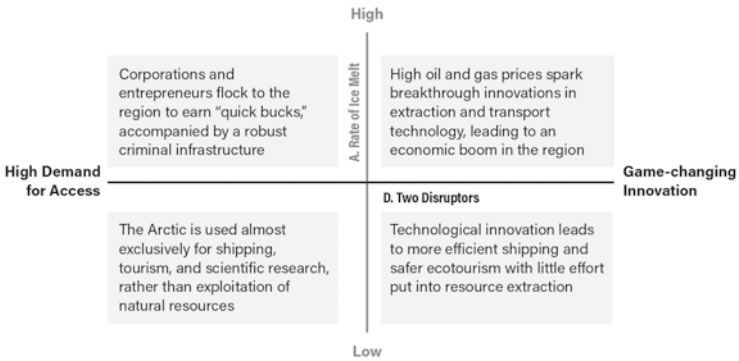
**Fig. 6.20** Rate of ice melt/demand for resources matrix. (Source: Copyright 2024 Pherson. All Rights Reserved)

<sup>131</sup> [https://www.cna.org/cna\\_files/pdf/COP-2017-U-015944-1Rev.pdf](https://www.cna.org/cna_files/pdf/COP-2017-U-015944-1Rev.pdf)

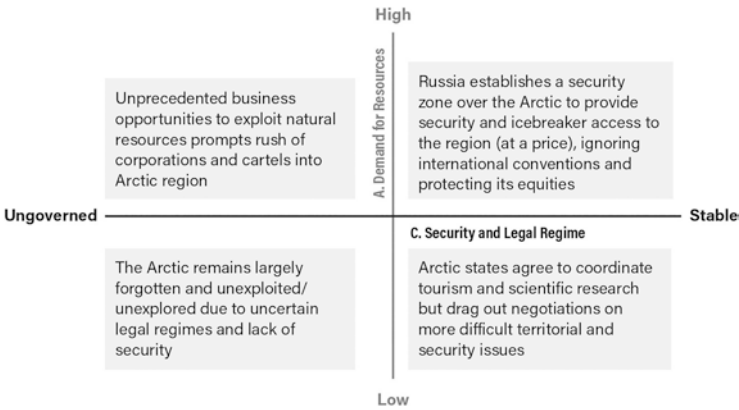
<sup>132</sup> <https://www.thearcticinstitute.org/emergence-sino-russian-economic-partnership-arctic/>



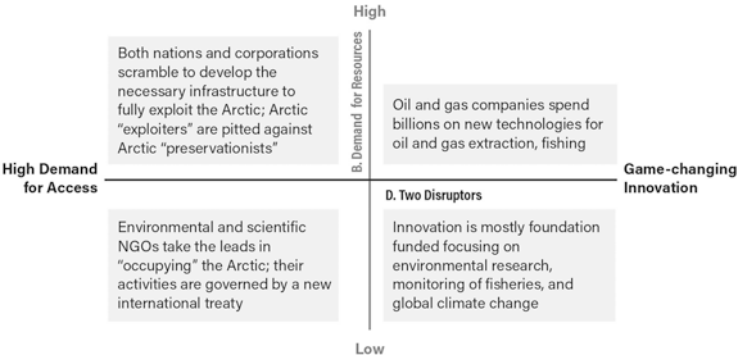
**Fig. 6.21** Rate of ice melt/security and legal regime matrix. (Source: Copyright 2024 Pherson. All Rights Reserved)



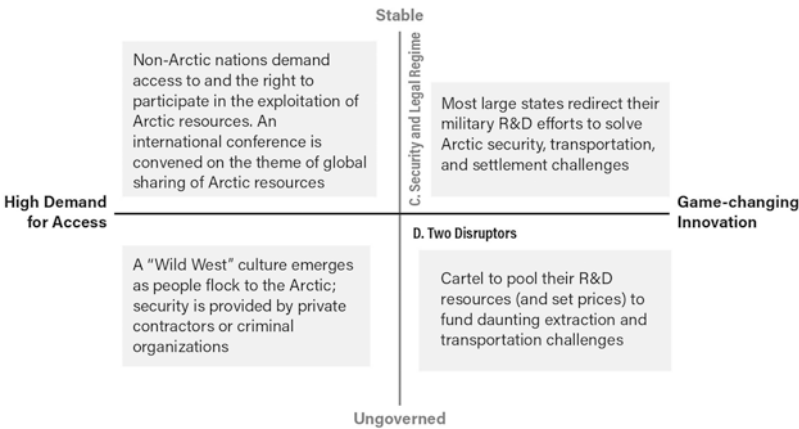
**Fig. 6.22** Rate of ice melt/two disruptors matrix. (Source: Copyright 2024 Pherson. All Rights Reserved)



**Fig. 6.23** Demand for resources/security and legal regime matrix. (Source: Copyright 2024 Pherson. All Rights Reserved)



**Fig. 6.24** Demand for resources/two disruptors matrix. (Source: Copyright 2024 Pherson. All Rights Reserved)



**Fig. 6.25** Security and legal regime/two disruptors matrix. (Source: Copyright 2024 Pherson. All Rights Reserved)

- A new opportunity
- A new or previously unexamined trend, dynamic, or obstacle.

For the purposes of this exercise and in response to the initial tasking, three compelling scenarios were constructed building off the insights gained from the Multiple Scenarios Generation exercise:

- **Red Ice:** Rapid ice melt, high demand for resources, and strong security regimes prompt Russia to extend its hegemony over the entire region, providing a security umbrella and regulating all commercial activity within the Arctic Circle.
- **Corporate Coldbox:** Rapid ice melt, game-changing innovation, and a weak legal regime prompts Russian Kleptocrats to partner with major global oil corpo-



rations to exploit Arctic resources. They ignore national sovereignty issues, establish a security umbrella by contracting with the Russian navy, and accelerate exploitation with new technologies.

- **Wild, Wild North:** Rapid ice melt accompanied by non-existent rule of law and strong global demand for Arctic natural resources prompts global corporations, entrepreneurs, and criminal groups to seek their fortunes in the Arctic. Law and order is a serious problem and organized criminals fill the security gap using the shipping routes to smuggle drugs, arms, and people.

Specifics of each scenario are provided below:

## **Red Ice**

### **Key Drivers**

- Rapid ice melt
- High demand for resources
- Strong legal and security regimes

### **Characteristics**

- Major push to exploit oil, gas, and rare earth resources
- Russia is in the lead, hoping new revenue streams will mitigate its worsening domestic economic situation
- Russia extends its “security umbrella” to the entire region, demanding payment by other corporations/countries working in the Arctic for services rendered (such as ice breaker escort for commercial ship passages – shades of Barbary Coast), physical security of camps and facilities, search and rescue, etc.)
  - Access to both passages largely controlled by Russia
- Other countries protest loudly but lack capability to challenge the Russians

### **Implications**

- Russia keeps its economy afloat by taking over the Arctic and by gaining revenue from reserves and taxes of others working in region

## **Corporate Coldbox**

### **Key Drivers**

- High demand for resources
- Game changing innovation
- Low demand for access
- Weak legal and security regime

**Characteristics**

- Strong global demand for oil and gas finances new inventions to improve extraction and transport of oil and gas from the Arctic
- Innovations reduce the cost of building icebreakers
- Major corporations (dominated by the Russian kleptocracies) form an Arctic cartel modeled after OPEC (but not involving nation states)
- Corporate stakeholders write the rules for extracting and sharing the resources
- Corporate stakeholders establish a security regime, outsourcing this function to the Russian Navy

**Implications**

- Efficient extraction and delivery of Arctic oil and gas resources with most of the revenue flowing into corporate – mostly Russian – coffers
- Potential conflict with Gulf states over oil pricing and other issues
- Result of historic failure of nation states to establish rule of law and provide security to the region

**Wild, Wild North****Key Drivers**

- Rapid ice melt
- Absent rule of law
- High demand for access
- High demand for resources

**Characteristics**

- Dizzying array of new actors move north
- New “gold rush” settlements
- Unpoliced territory/reliance on private security forces
- Arctic states lack capacity to establish a legal regime
- Environment severely degraded
- Substantial organized criminal activity involving alien smuggling, money laundering, prostitution, gambling

**Implications**

- Survival of the fittest culture
- Substantial Russian and organized crime presence
- Limited opportunities for international cooperation

Indicator	Validation Characteristic				
	Observable/ Collectible	Valid	Unambiguous	Stable	Unique
Red Ice					
1. Six month ice free passage expected in 1-2 years	x	x	x	x	
2. Russian military establishes military naval, ground, and air presence at entry to Northwest and North Sea passages	x	x	x	x	x
3. Russian TV highlights disarray in Nordic Council deliberations and its inability to organize the community	x	x	x	x	
4. Russia requires all ships making North Sea Passage to register and pay a passage escort fee	x	x	x	x	x
5. Arctic Council protests Russian aggressive behavior	x	x		x	
Corporate Coldbox					
1. Strong demand for fossil fuels spurs new technology to extract and transport oil and gas	x	x		x	
2. Major corporations and Russian Kleptocrats form a cartel similar to OPEC for the Arctic	x	x	x	x	x
3. Corporate shareholders outsource security to the Russian Navy	x	x	x	x	x
4. Arctic Council unable to agree on how to regulate corporate activities and enforce rule of law in Arctic region	x	x		x	
5. Rules for exploiting Arctic resources established by the cartel without nation state input	x	x	x	x	x
Wild, Wild North					
1. Six month ice free passage expected in 1-2 years	x	x	x	x	
2. Global security firms announce major contracts to provide security protection to those moving to the Arctic	x	x	x		
3. Increased annual air traffic to Arctic communities	x	x	x	x	
4. Increasing bank loans to those investing in Arctic projects	x	x	x	x	x
5. Major companies and cartels ignore efforts by Arctic Council to regulate their activities	x	x	x	x	x

**Fig. 6.26** Validated indicators for three Arctic scenarios. (Source: Copyright 2024 Pherson. All Rights Reserved)

6.4 Indicators Generation and Validation

After the scenarios were defined, the next step was to generate a set of indicators for each scenario. Indicators are observable or deduced phenomena that can be periodically reviewed to help track events, distinguish between competing hypotheses, spot emerging trends, and warn of unanticipated change. An indicators list is a pre-established set of actions, conditions, facts, or events whose simultaneous occurrence would argue strongly that a phenomenon is present, or a hypothesis is correct. Preparing indicators lists is usually a good learning experience for all participants. Doing so can also be a useful medium for an exchange of knowledge between analysts from different organizations doing tactical, operational, and strategic analysis.

The identification and monitoring of indicators are fundamental tasks of strategic analysts because they are the principal means of avoiding surprise. Indicators take on meaning only in the context of a specific scenario with which they have been identified. The human mind tends to see what it expects to see and to overlook the unexpected. The prior identification of a scenario and associated indicators can create an awareness that prepares the mind to recognize and prevent a bad scenario from unfolding or help a good scenario to occur.

The next step for the team was to prepare sets of detailed indicator lists for each scenario (see Fig. 6.26). The indicator list can become the basis for directing collection efforts and routing relevant information to all interested parties. Identification and monitoring of indicators that a scenario is emerging can provide early warning of the direction in which the future is heading, but these early signs are not obvious.

Separate sets of indicators were created for each alternative scenario. Team members knew that each indicator must meet the following criteria as much as possible. They discarded those they found wanting.

- **Observable and collectible.** There must be some reasonable expectation that, if present, the indicator will be observed and reported by a reliable source. If an indicator will be used to monitor change over time, it must be collectible over time.
- **Valid.** An indicator must be clearly relevant to the end state the analyst is trying to predict or assess, and it must be inconsistent with all or at least some of the alternative explanations or outcomes. It must accurately measure the concept or phenomenon at issue.
- **Unambiguous.** Data collection must be consistent when comparable methods are used. Those observing and collecting data must observe the same things. Reliability requires precise definition of the indicators.
- **Stable.** An indicator must be useful over time to allow comparisons and to track events. Ideally, the indicator should be observable early in the evolution of a development so that analysts and decision makers have time to react accordingly.
- **Unique.** An indicator should measure only one thing and, in combination with other indicators, should point only to the phenomenon being studied. Valuable indicators are those that are not only consistent with a specified scenario or hypothesis but are also inconsistent with all other alternative scenarios.

### Opportunities Incubator™

Having developed the indicators, the final step in the process was for the Strategic Analysis team to explore how the impact of increased Russian influence in the region described in each scenario could be countered or mitigated. The structured technique chosen for conducting this analysis was the Opportunities Incubator™.

The Opportunities Incubator™ is a two-step framing technique that gives decision makers a sense of developing trends and scenarios. It can be used to explore what strategies would be most effective in taking advantage of good outcomes and

mitigating bad outcomes. The technique has proven effective in linking Foresight analysis to decision making by converting theoretical scenarios into actionable plans for policymakers.

The first question the team addressed was whether their client wanted the scenario to emerge or would be alarmed if the selected scenario came to pass. The scale they employed as shown below asked how the client is most likely to respond to the scenario:

- Strongly Positive
- Positive
- Neutral
- Negative
- Strongly Negative

In this case, the Arctic Eight countries (excluding Russia) would undoubtedly object strongly to each scenario:

- **Red Ice.** The non-Russian members of the Arctic Eight would strongly object to Russian military-backed dominance over the region.
- **Corporate Coldbox.** The non-Russian members of the Arctic Eight (and most nation states) would strongly object to such blatant violations of international law and national sovereignty as well as the kleptocrats' ability to exclude or limit the access of others to the region.
- **Wild, Wild North.** The instability in the Arctic would present major challenges to many members of the Arctic Eight who seek to maintain the rule of law and equitable access to Arctic resources.

In applying the technique, the next step for the team was to identify the primary actors:

- Nation states
- Members of the Arctic Eight
- China
- International Organizations
- Arctic Council
- NATO
- EU
- Global Corporations
- Russian Kleptocrats
- Major Global Oil Companies
- Wealthy individuals willing to partner with Russian Kleptocrats

The team then assessed how much each actor might care about the scenario's projected outcome because of its positive or negative effect on the actor's livelihood, status, or prospects. The assessments considered how motivated the actors

Actor Assessment					Driver(s)	Client Strategy
Primary Actors	Level of Interest	Capability	Intent	Priority Tier		
		H/M/L	H/M/L	1-5		
Russia	DD	H	H	1	High demand for resources	Increased security presence in region; extraction of resources
United States	UU	M	H	2	Desire to maintain balance of power in the region	Build ice breakers to increase military capabilities
Banking Industry	UU	L	H	3	Economic Opportunity	Finance projects in Arctic
Insurance Industry	U	M	H	5	Lack of regional governance	Push for Arctic Council engagement
EU	U	M	M	5	Desire to maintain balance of power in the region	Press for stronger role for Arctic Eight and supporting states to counter Russian influence
Preference Legend: DD = Very Desirable; D = Desirable; N = Neutral; U = Undesirable; UU = Very Undesirable						

**Fig. 6.27** Red ice: limit Russian hegemony. (Source: Copyright 2024 Pherson. All Rights Reserved)

were to act, not whether the actors were likely to act. The team assigned a rating for each actor using the following scale:

- Very Desirable (DD)
- Desirable (D)
- Neutral (N)
- Undesirable (U)
- Very Undesirable (UU)

The team continued to employ the technique, using the following steps:

1. Assess each actor’s capability or resources to respond to the scenario, i.e., arms, political organization, control of press, etc. Assign a rating of High (H), Medium (M), or Low (L).
2. Assess each actor’s intent to respond to the scenario. Assign a rating of High (H), Medium (M), or Low (L).

Based on the assigned ratings for Level of Interest, Capability, and Intent, the team assigned a priority to each actor using the below tiers:

- First Tier: “DD” or “UU” Level of Interest rating plus High Ratings in both Capability and Intent.
- Second Tier: High Rankings in Capability and Intent.

Actor	Level of Interest	Capability	Intent	Priority Tier	Driver(s)	Client Strategy
		H/M/L	H/M/L	1-5		
EU	UU	M	H	3	Need to defend nation state sovereignty; ensure rule of law	Impose sanctions; eliminate dependence on fossil fuels
Banking Industry	D	H	M	3	Desire to establish new markets	Offer good deals for investors
Insurance Industry	D	H	M	3	Opportunity to secure new clients	Publicize need to protect investments in volatile environment
United States	UU	M	M	5	Need to defend nation state sovereignty; ensure rule of law	Impose sanctions; mobilize Arctic Eight -1 to impose rule of law
China	N	M	L	5	Desire to expand Belt and Road initiatives into the region	Seek opportunities to partner with key players

**Fig. 6.28** Corporate Coldbox: oppose violations of law and limits to access. (Source: Copyright 2024 Pherson. All Rights Reserved)

Primary Actors	Level of Interest	Capability	Intent	Priority Tier	Driver(s)	Client Strategy
		H/M/L	H/M/L	1-5		
Russia	DD	H	H	1	Desire to optimize exploitation of oil and gas resources	Increase security presence in region; encourage foreign investment
United States	UU	M	H	2	Desire to create environment allowing free and safe access to region	Mobilize Arctic Eight to increase security presence, establish standards, and impose rule of law
Banking Industry	UU	L	H	3	Desire to establish new markets	Launch massive internet/ social media advertising campaign
Insurance Industry	U	M	H	5	Lack of regional governance	Push for Arctic Council engagement
EU	U	M	M	5	Desire to create environment allowing free and safe access to region	Organize task force on how best to increase security presence, establish standards, and impose rule of law
China	U	L	H	5	Desire to expand Belt and Road initiatives into the region	Seek contracts to establish presence (ports, infrastructure, workers) at sea gateways to Arctic Ocean

**Fig. 6.29** Wild, wild north: maintain the status quo. (Source: Copyright 2024 Pherson. All Rights Reserved)

- Third Tier: “DD” or “UU” Level of Interest rating plus a High Rating in either Capability or Intent.
- Fourth Tier: High Rating in either Capability or Intent.
- Fifth Tier: All other actors.

Once the rating process was completed, only three tasks remained:

1. Reorder the rows in the matrix so that the actors are listed from first to fifth tier.
2. Record the 2 or 3 Key Drivers that would most likely influence or affect each actor or the actor's response.
3. Generate ideas on how the client could best deter the evolution of each scenario (see Figs. 6.27, 6.28, and 6.29).

The Strategic Analysis team presented their key findings to their supervisors who were impressed by both the rigor and the creativity of the analysis. They asked the team to track the indicators and report back monthly on which scenarios might be emerging and would deserve the attention of senior policymakers.





# Optimizing the Impact of Your Product

# 7

## Abstract

Organizing and crafting an analytic product is an acquired skill that requires hard work and purposeful attention, and it takes time to develop. The investment in time and energy, however, will pay dividends throughout your professional and personal life. Strong writing skills will serve you well; they are the gift that keeps on giving!

An overview of the process of generating a high quality analytic product is presented in Fig. 7.1, The Analyst's Seven-Step Roadmap. The Roadmap provides a useful guide of which processes, tools, and techniques the analyst should consider undertaking as appropriate in the process of crafting an analytic product. It has been used by law enforcement analysts in Germany with good results. As a skilled writer, incorporating these techniques into your production process will enable you to translate your thoughts onto paper faster. Your supervisor will take less time to review your papers, and your drafts will be returned to you and published more quickly.

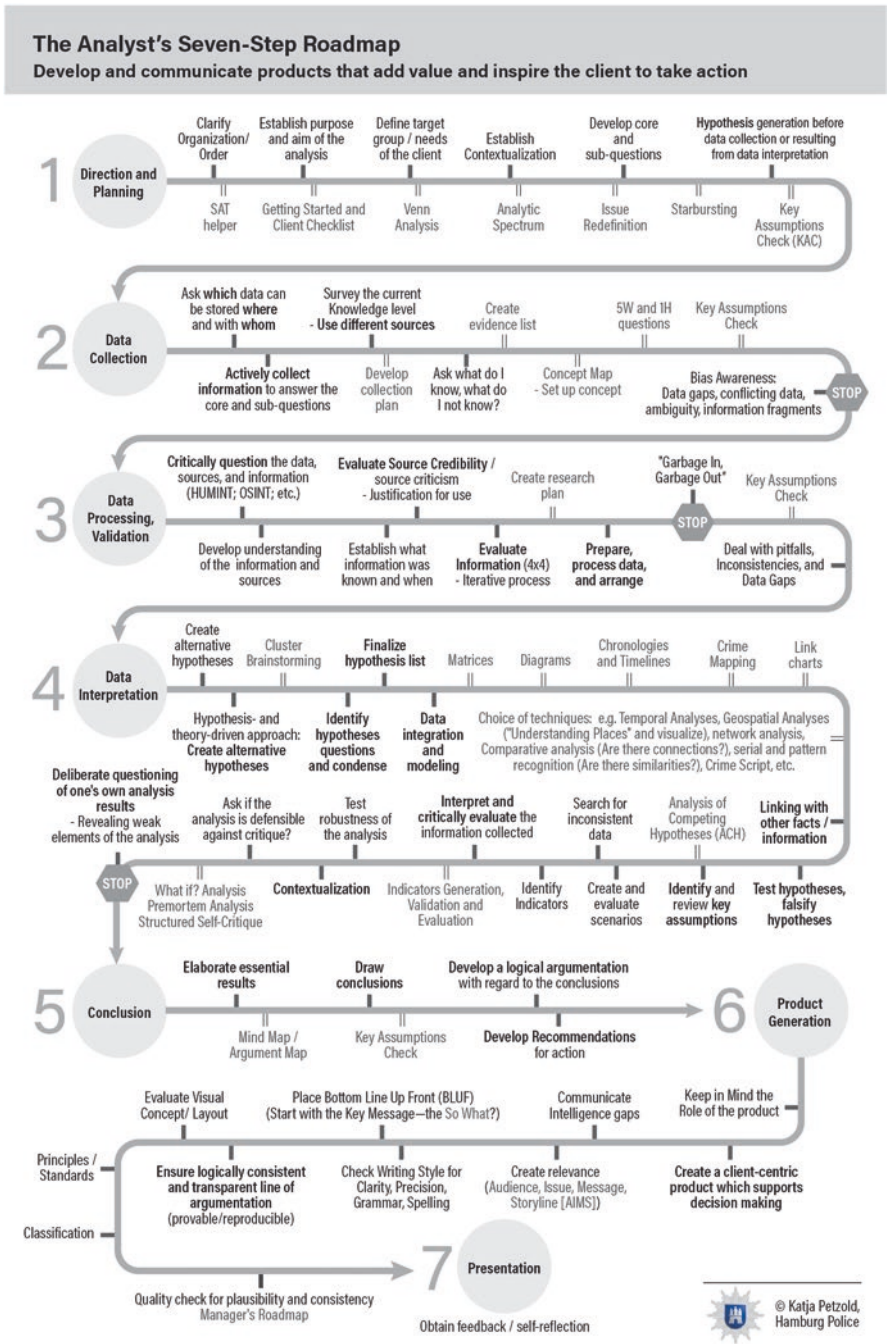


Fig. 7.1 The analyst's seven-step roadmap. (Source: Katja Petzold, Hamburg Police)

7.1 Organizing Your Product

The basic precepts are easy to grasp (see Fig. 7.2). If you can establish a set of benchmarks to organize your flow of ideas and information based on your clients’ needs, your paper or presentation will be tightly focused. Include only information that is key to supporting the main points of the analysis. The fundamental task is to present ideas and information in a way that enables the target audience to process the information and conclusions quickly.

As you begin your project, a good question to ask is: “Do I need to reach out beyond my computer to tap the knowledge of colleagues and specialized experts?” Often a short meeting or even a phone call can save an author countless hours of research because the expert can quickly provide the information needed to assess a new development or can suggest untapped sources.

At the start of a project, also decide what Structured Analytic Techniques you will use and when. Techniques such as Circleboarding™, Mind Maps, and Cluster Brainstorming help an analyst assimilate data quickly and comprehensively and identify key gaps in the assembled information. For longer assessments, a Key Assumptions Check should almost always be scheduled early in the process. A Premortem Analysis and Structured Self Critique should occur about two thirds of



Fig. 7.2 Nine principles of effective writing. (Source: Copyright 2024 Pherson. All Rights Reserved)

the way through the project when the research is completed, the bottom line is established, and the hard work of crafting the product begins.<sup>1</sup>

## 7.2 Determine the AIMS of Your Product

An easy way to conceptualize the structure of your paper or digital product is to first work your way through the product's AIMS – specifically, the Audience, Issue or Intelligence Question, Message, and Storyline (see Fig. 7.3). Dedicate time and attention up front to identify the intended audience; precisely define the major questions and issues that you – or your team – will address; determine the product's key message; and organize the data, argumentation, and visuals into a smooth presentation that tells a compelling story.

**Audience** Senior corporate, organizational, and government officials are busy people. Many are in meetings most of their workday and process new information during small windows of time. They often have strong views about the topic you are addressing. In some cases, they may personally know the actors at the center of the development highlighted in your product or have just spoken to them on the phone. In addition, in today's era of rapid communication, they may have already read the report or reports that are the cornerstones of your product and have drawn their own conclusions.

The first step in generating your product is to determine who is the primary audience.

- Is it a short, focused, written article for a senior client or a longer piece with more detail that will serve a less strategic and a more tactical or operational customer set?



**Fig. 7.3** Determining the AIMS of your product. (Source: Copyright 2024 Pherson. All Rights Reserved)

<sup>1</sup> A discussion of when and how to employ these techniques can be found in Pherson's *Handbook of Analytic Tools and Techniques*, 5th ed. (2019) and Pherson and Heuer's *Structured Analytic Techniques for Intelligence Analysis*, 3rd ed. (2021).

- Is it intended for a broader audience accessing it on the web?
- Is there more than one primary client? If so, then a conscious decision can be made about writing two different products.

In general, resourcing, drafting, and sourcing different products for each client can be accomplished most efficiently as a parallel process. By generating more than one product, the author can address the specific – and often unique – needs of each client.

By focusing on the needs of the primary client or consumer set, you can adjust the level of detail that is needed to support your arguments. Is this a topic the client follows closely and on which the client is well informed, or are you introducing a new issue to the client that justifies including background information to provide context and perspective?

For this busy and knowledgeable target audience to read your paper or digital presentation, the product must be relevant to what they are trying to accomplish, well written from beginning to end, and totally credible without any signs of bias or incompetence. If your target audience perceives that you have not met their standard for these three objectives, they are likely to stop reading and move on to another task.

**Issue or Intelligence Question** Identifying the key issue or issues the presentation will address serves as a lens through which you maintain the focus of your draft as you proceed. You cannot present a compelling argument if you have not thought through all the ramifications of the issues under consideration. You need to consider five possible questions or components for every analytic problem.

- The “what?”: The development or event that has occurred.
- The “why now?”: The explanation for why the development has occurred now, focusing on the motivations of the main actor(s) in your product. What are the forces or factors driving the issue?
- The impact so far: What has changed because of the development?
- The “what next?” or outlook: Where the development is likely to go or could go.
- Last, the implications: What does it mean for your target audience? Does it help them make better decisions? Does it present opportunities to exploit or dangers to avoid? Does it identify levers that the readers can bring to bear to influence an issue? Does it illuminate what one can do, and what will prevent others from acting?

Most poorly written analysis lacks focus. The reader is left wondering, “What is the point of the product? Where are we going with this story? What is the thesis or the key argument?” A well-crafted analysis is tightly focused on a single primary message. The best way to formulate that message is to ensure that it responds to your clients’ needs, answering thought-provoking questions that they are – or should be – asking.

Questions stimulate and guide the analytic process, engaging and enabling interaction among analysts, reviewers, and clients to develop a message that will hit the

target. Quite simply, questions beg for answers. Chapter 3 provides guidance on how to use questions to conceptualize your topic and specifies the key elements of good questions.

Articles on fast-breaking events should be directed to answering a single key intelligence or policy question. More extensive and less time-sensitive articles should be designed to answer a key question and several closely related subsidiary questions. In the US Intelligence Community, Key Intelligence Questions (KIQs) guide analysts in their research, monitoring, and analytic production. These questions usually are more general and overarching than the ones you will generate to focus your products because they are used for a variety of purposes, including resource allocation and collection priorities. Nonetheless, they provide a good starting point for developing the questions and issues that you will address in your products. In business, analytic products should focus on a specific, well-defined issue.

*In order for answers to become clear, the questions have to be clear.* –Abdulkarim Soroush, Islamic Philosopher<sup>2</sup>

Often the key intelligence or policy question is provided by the client or your boss. In this case, you must understand exactly what is needed. Do not be shy about seeking clarification if the question appears overly broad or poorly formulated. For example, a question that asks for “everything you know” about a particular subject is a disservice to both the analyst and the requester. These questions usually mask much more specific needs, but the requester has not had the time or does not have the knowledge to research, think, or articulate these needs.

You can save yourself, the requester, and all the editors substantial time over the long term by going back to determine exactly what these needs may be. Formulating a choice of questions that you believe might be applicable can spur requesters’ thinking; yes-or-no answers are much easier to elicit than waiting for clients to have time to work their way through the problem themselves.

In some circumstances, you will find the question is specific, but the assumptions driving the question are unsupported. This places the analyst in a more difficult position. For example, prior to the US invasion of Iraq in 2003, intelligence analysts were frequently asked, “Where are the weapons of mass destruction (WMD) hidden in Iraq?” This question assumed that the weapons did exist – an assumption that later proved to be false. If, in this instance, the analyst was uncertain the weapons existed, the best strategy would have been to place the original question in a broader context by rephrasing the question to read, “What is the status of the WMD program in Iraq?” In this way, the analyst still responds to the question posed by the requester but does so in a way that offers additional perspective on the issue.

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<sup>2</sup>Ali Asghar Seyyedabadi, “The Muddled Dream of Returning to Tradition: An Interview With Abdulkarim Soroush,” *E’temad-e Melli*, November 19, 2006, translated from Persian by Nilou Mobasser, [www.dr.soroush.com](http://www.dr.soroush.com)

**Refining the Question** Helping clients frame their question to inform their decision making is a key analytic task.<sup>3</sup> If the analyst does not understand exactly what information is being sought by the client and interprets the question too broadly, then substantial resources will be wasted, and the client will be disappointed with the response. Analysts should consider the following questions when framing a question prior to crafting their product:

Is it clear what would constitute an answer to the question?

Is it obvious what information is needed to answer the question? If not, try to clarify exactly what information or analytic judgment the client seeks.

Is the client really interested in something else but has cast the question too broadly or narrowly, assuming the analyst knows what is being sought?

Are there any hidden assumptions underlying the question?

Does the client's decision depend on whether the answer meets a threshold or a set of thresholds rather than a precise answer? If so, frame your response appropriately.

For open-ended questions, some of the best techniques to use in preparing a response are Multiple Hypothesis Generation, Quadrant Crunching™, What If? Analysis, and Foresight analysis. For yes-or-no questions, techniques to consider include the Key Assumptions Check, Structured Analogies, and Analysis of Competing Hypotheses.

**The Five W's and an H** A highly effective strategy for identifying the key intelligence or policy question is to ask the six questions often used by journalists: Who, What, When, Where, Why, and How. Practical experience in using this strategy has shown that a better order for asking these questions is Who, What, How, When, Where, and Why. We recommend changing the order for two reasons: (1) The new order best follows the structure of a standard English sentence, and (2) the "What" and the "How" often overlap or are used to describe similar aspects of the issue.

Techniques that use the so-called Five Ws and an H strategy include Circleboarding™, Starbursting, and Mind Mapping.<sup>4</sup> Each technique enables you to explore all aspects of a problem or an issue. Jot down two or three responses to each of the questions and then go back and assess which set of responses is most deserving of attention. Prioritize the six sets of responses and reframe the original question to address the set of responses that was given the highest priority.

The Circleboarding™ technique adds a seventh question: "So What?" (see Fig. 7.4). The inclusion of this question stimulates discussion beyond just

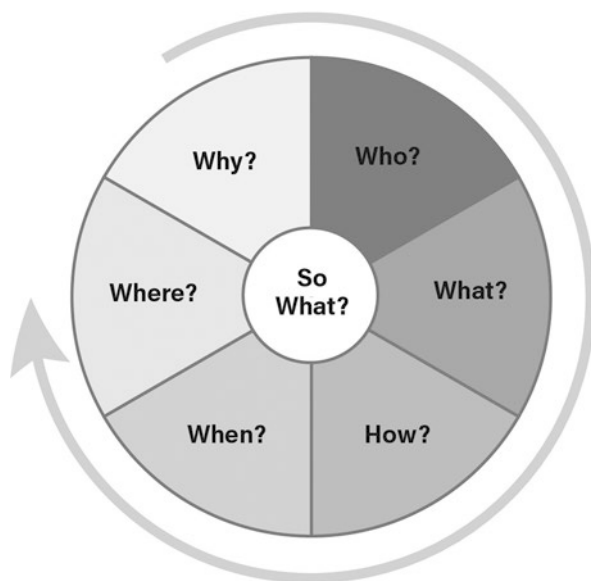
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<sup>3</sup>Much of the information for this section was taken from "Selecting an Analytic Technique or Approach, Step One: Refining the Question," distributed by the UK's Professional Head of Defence Intelligence Analysis, UK Ministry of Defence. The material is used with their permission.

<sup>4</sup>The Circleboarding™ technique is discussed in Pherson and Heuer, *Structured Analytic Techniques*, 101–103. Starbursting is discussed on 104–106. Mapping is discussed on 106–112.



**Fig. 7.4** The Circleboarding™ technique. (Source: Copyright 2024 Pherson. All Rights Reserved)



consolidating what is known by spurring the analyst to identify weak points in the group's knowledge and encouraging discussion of what assumptions are being made.

These processes are particularly helpful when the question asked by your client appears too broad or too encompassing. In conducting this simple exercise, note what types of information are available to answer each question. Also consider whether any major information gaps exist that would require more research or the tasking of others to collect more information.

**The Question Method** The Question Method (see Fig. 7.5) is another simple technique analysts can use to organize a long-term research project or a short-fused memo.<sup>5</sup> It helps analysts structure a paper by focusing first on the question of greatest interest to the client or customer set and then on subsequent questions in descending order of priority.

One of the greatest strengths of the Question Method is that it eliminates inclusion of any information that is not deemed to be of direct interest to the client. By organizing the paper around a small number of key questions, the time needed to edit and review the paper is significantly reduced.

Key issues to remember when using questions to organize your analytic product are:

A well-crafted analytic product contains a single, primary message that answers a key intelligence or policy question.

<sup>5</sup>This technique was first developed by David Terry; it was revised by Randolph H. Pherson in 2010 and was incorporated in Pherson Associates and Globalytica course materials used to train analysts in the United States and overseas.



1. Identify the key issue or problem your principal client or client set is currently wrestling with or likely to confront in the near future.
  - Remember that clients at different levels are likely to be dealing with different types of decisions on the issue.
2. Brainstorm a list of *focused* key questions relating to that topic that the client is likely to ask or that the client anticipates will be asked of her or him.
  - Answering a focused question that clients are currently asking increases the chances your product will be useful. It will have immediate appeal.
  - Answering a set of focused questions is easier than generating an overall assessment on a topic from scratch.
3. Add any questions to the list that the client may not be asking but probably should be.
  - Draw on your expertise and analytic tools to add any questions that the client—because of more limited time and knowledge of the topic—has not thought about yet.
4. Select the questions on the list that you can answer or to which you can contribute a useful perspective.
  - If you cannot answer an essential question, consider starting work to get the answer.
  - If you have received a direct question from a client, be sure to include this question near the top of your list.
5. Prioritize and organize the list of questions to guide your collection, collaboration, and research—and the outline of the finished product.
  - Organize (order) the questions into a story line that will most effectively present the information and analysis, starting with the issues of greatest concern or interest to the client.
  - Your organized set of questions now becomes the outline to begin researching and drafting the finished product.
  - Remember that the questions may change as your research and drafting progresses.

**Fig. 7.5** Using key questions to organize your product. (Source: Copyright 2024 Pherson. All Rights Reserved)

Analysts can help clients by using questions as a means of engagement to determine if they have correctly determined their needs. A Red Hat Analysis is one technique that enables analysts to put themselves “in the client’s shoes.”

Analysts can best prepare for an effective Red Hat Analysis by asking “essential” and “building-block” questions to frame the analytic need; scanning the environment to understand what others think about the issue; identifying trends from available data; engaging in Outside-In Thinking; considering the “white space” of what is missing, poorly articulated, or not yet defined; and brainstorming key questions with colleagues.

A good intelligence or policy question is relevant, timely, precisely worded, actionable, and answerable in more than one way.

The journalists' list of Who, What, How, When, Where, Why, and our addition of the question "So What?" provides an efficient schema for exploring the key intelligence or policy questions on which to focus an analytic product.

The Question Method is a fast and effective technique for organizing a paper that addresses a client's key concerns in priority order.

**Message** What is the bottom line that you want to convey to your client in one sentence? What is your key point or the "elevator speech" you would relate to the client if you had a minute together between floors on an elevator? If you do not know your bottom line, you could find yourself:

- Launching into background details that consume your 1 min before you ever get to the main takeaway, explaining how your target audience might be affected.
- Telling a company executive that developments in a certain industry are going to raise the price of a commodity in which her company has little interest.
- Describing to a policymaker what research you have conducted instead of listing the implications of your findings for your country's national interests.

This bottom line is the lens through which you maintain the focus of your draft as you proceed. It will form the keystone around which all the elements of your draft come together. You can increase the odds that your analysis will have impact by having a clear, focused message – preferably up front – that is relevant to your clients' needs and useful in helping them meet their objectives. You should put a lot of thought into your message or mission statement because it helps you decide which issues you will discuss and which you will not.

Your message is not a cast-in-stone contract; you should modify it as your analysis changes during drafting or as you acquire new information. Without a message, you might easily add irrelevant material or veer off course, ending with analysis that has no clear focus.

**Storyline** After you have defined the key issue and have a clear-cut message in mind, the next step is to create a product with a succinct line of argumentation that flows logically from paragraph to paragraph and tells a compelling story. Can you present the message in a simple and direct way to the client? If the line of analysis has changed from previous products, be clear about what is different and why.

A key element for presenting a persuasive analysis is to accompany it with graphics that present the main line of argument in a visual format.<sup>6</sup> Graphics or visuals serve two main functions:

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<sup>6</sup>A discussion of the Do's and Don'ts when using graphics and traps to avoid can be found in Pherson and Pherson, *Critical Thinking for Strategic Intelligence*, 3rd ed. (2021), Chapter 18. How Can Graphics Support My Analysis?, p. 254.

- Summarizing data so that the reader can more easily absorb it.
- Showing relationships that add meaning to the data.

Can you illustrate the story line with equally compelling pictures, videos, or other graphics? Can you summarize the basic message of your product or a key component of your argument in a single infographic? Can you capture key supporting data in a matrix or better illustrate your point by inserting an image or a video? In a digital format, can the data be sorted or manipulated by the reader?

The growing demand for graphics and other visualizations is requiring analysts to develop new online presentational tradecraft skills that compellingly frame their analysis so consumers can quickly grasp the contents. Modern-day drafters of any type of analysis – strategic, tactical, or competitive business intelligence – must develop presentational tradecraft skills that focus on three elements:

- **How an analytic product looks.** Do the images help convey the meaning of the story and does the writing accommodate typical online reader behavior?
- **How a piece of analysis comes to the user.** Where does the analysis fit in the continuous stream of information available to the user and the user's capacity to access that material?
- **How a product is organized or “unfolds.”** Is the “key analytic judgment” up front and supported with data and solid evidence? Does the line of argumentation flow smoothly?

Analysts must learn to plan a product with visuals, links, and interactive elements from the start, rather than adding illustrative material as an afterthought. Analysts should focus on the clients' needs and package the story for maximum relevance, retention, and retrieval. This can be accomplished by writing in “user-driven” rather than “user-absorption” formats and finding the right balance between too many and too few layers of information.

If the AIMS of the article or assessment are not considered before drafting, your product will be less effective in meeting the needs of your clients. In fact, chances are it will take more time to reach publication and could languish in the editing and coordination process. This impacts its timeliness and relevance to your client, who may decide not to read it even if it eventually reaches his or her desk.

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### 7.3 Use a Checklist to Get Started

The Getting Started Checklist (see Fig. 7.6) is another tool analysts can use to launch a new paper or project. By getting the fundamentals right at the start, analysts can ensure that their research and analysis is focused on what matters the most to their client or key consumers.

For short papers, taking a few minutes to review some of these basic questions will make the process more efficient. It helps the drafter, supervisor, and others

### Getting Started Checklist

- ✓ What has prompted the need for the analysis? For example, was it a news report, a new development, a new intelligence report, a perception of change, or a client request?
- ✓ What is the key intelligence, policy, or business question that needs to be addressed? Are we answering the right question?
- ✓ Why is this issue important, and how can you make a unique and meaningful contribution?
- ✓ Has this question or a similar question already been answered by you or someone else, and what was said? To whom was that analysis delivered, and what has changed since then?
- ✓ Who are the principal clients or consumer sets? Are their needs well understood?
- ✓ Are there any other stakeholders who would have an interest in the answer? Would any of them prefer that a different question be answered?
- ✓ How soon is an answer needed to the question? How much time do we have to conduct the research, draft the paper, review it, and deliver our response?
- ✓ What are all the possible answers to the question? What alternative explanations or outcomes should be considered before making an analytic judgment on the issue?
- ✓ What Structured Analytic Techniques would help us the most in generating our analysis?
- ✓ What potential sources or streams of information would be most useful—and efficient—to exploit to learn more about this topic or question?
- ✓ Where should we reach out for expertise, information, or assistance within our organization or outside our unit?
- ✓ Should we convene an initial brainstorming session to identify and challenge key assumptions, examine key information, identify key drivers and important players, explore alternative explanations, generate alternative hypotheses, and decide on what graphics to incorporate into the product?

**Fig. 7.6** Getting started checklist. (Source: Copyright 2024 Pherson. All Rights Reserved)

involved in the project focus on exactly what needs to be done and how quickly. Sample questions to address up front include the following:

- What is the deadline?
- Who is the primary consumer?
- Do we need to seek any additional information or insight before drafting?
- Is there a need to alert someone or issue an immediate warning?

A longer checklist will help analysts develop a strategy for crafting medium- and longer-term papers or digital products. It will spur them to think about how to obtain the best information, tap the best expertise, and incorporate the right techniques in the most efficient way possible. For example, by asking if a paper has already been written on the topic or a similar topic, the analyst can avoid spending hours or days doing unnecessary research and drafting.

Analysts can use Structured Analytic Techniques to help them identify what data are needed, analyze the data, and portray the data in a compelling way. Figure 7.7 summarizes how well 15 structured techniques perform these three functions. Argument Maps and Link Charts, for example, perform all three functions well but most others are stronger in some areas and weaker in others.

Structured Analytic Technique	Value of Using the Technique to:		
	Identify What Data Are Needed	Analyze the Data	Publish the Data Visually
Key Assumption Check	H	L	L
Mind Maps	H	L	L
Circleboarding™	H	L	L
Cluster Brainstorming	H	M	L
Chronologies	H	M	L
Timelines	H	M	M
Matrix	H	M	M
Argument Maps	H	H	M
Starbursting	M	H	L
Analysis of Competing Hypotheses	M	H	L
Inconsistency Finder™	L	H	M
Link Charts	M	H	H
Venn Diagrams	M	M	H
Gantt Charts	M	M	H
Flow Charts	L	M	H
H = High, M = Medium, L = Low			

**Fig. 7.7** Assessing the value of SATs to extract, analyze, and present data. (Source: Copyright 2024 Pherson. All Rights Reserved)

### 7.4 Refining Your Draft

A good way to assess whether your draft is going to “hit the mark” is to put yourself in your requester’s or your primary audience’s shoes. Although you might have done this already in conceptualizing your product, a good check on your draft is to write down the answers to the questions below and then ask a disinterested observer or someone who was not involved in the drafting process to review your draft and answer the questions as well. Ideally, your reviewer’s answers and your answers should be similar. This step is not the same as the formal review process nor is it a check of your grammar, spelling, and vocabulary.

- **What is your key audience's role?** Your audience's responsibilities are the most important input to determining the analytic products that will help them do their jobs. What kind of analysis are they looking for - a compendium of facts, an evaluation of developments, or a projection of future trends? Who do they report to, what decisions must they make, and who do they serve?
- **What are their interests?** Look for indicators of your audience's most pressing interests in your interactions, meetings, and readings. Are your clients seeking specific data that support their current policies or are they asking you to frame the problem for them? After you know the decision-maker's interest, you can determine whether the issue is an opportunity, a threat, or a decision point; and how best to shape your response.
- **What is their expertise?** Understanding the depth of your audience's knowledge of the topic is critical in crafting analytic responses. This level of knowledge will determine whether terms need definition, how much evidence is needed to support claims and judgments, whether historical details should be included, and how much context is necessary. Informing the policymaker or decision maker about unknowns, uncertainties, and contradictory information also is essential to meeting the client's needs.
- **How do they absorb information?** Does the client prefer to receive information written, orally, on the computer, or through infographics? Should the product be short or long, in paragraphs or bullets, with few or many graphics, delivered in hard copy or digitally?
- **What is the interaction with your organization?** Did the client ask a question? Are you trying to educate, convince, or alert? Is there an action to be taken or options to be considered? Are requesters seeking to learn more about a new situation, or are they already well informed and just checking to ensure they have full command of the most recent facts and analysis before making a decision?
- **What other sources of information do they consult?** Do the clients read specific publications or watch certain news channels? To which blogs or news feeds do they subscribe? Do they have experts on their staff who filter or explain your analysis for them? Do you need to explain why your point of view or analysis has changed? Do you need to clarify how your view differs from that of other commentators or experts? Do you need to acknowledge the point of view of other sources?
- **What will your client do with your information and insights?** Imagine what reactions you would have if you were receiving your analysis and consider what actions you might take. Your understanding of the broader context within which you perform your analysis will improve your ability to empathize with your clients and craft products that respond directly to their needs.
- **Can you bound the problem?** Do you tell clients what they do not need to worry about? Analysts often ignore the value of telling clients what for them is not important. Busy people benefit from being told what issues will not require

### Knowing Your Client Needs Checklist

The following questions will help you explore how best to serve your ultimate client:

1. Who is the key person for whom the product is being developed?
2. Will this product answer the question the client asked? Did the client ask the right question or is it more important to place your answer in a broader context?
3. What is the most important message to give this client? What value-added contribution can you make?
4. How is the client expected to use this information?
5. How much time does the client have to digest your product?
6. What format would convey the information most effectively?
7. Is it possible to capture the essence of your message in one or a few key graphics?
8. What is the client's level of tolerance for technical language and detail? Can you provide details in backup materials, graphics, or an annex?
9. Does distribution of this document need to be restricted? What classification or handling caveats are most appropriate? Should you prepare different products at different levels of restriction?
10. Would the client expect you to reach out to other experts for assistance in answering this question? If so, how would you flag their contribution in presenting your product?

**Fig. 7.8** Knowing your client needs checklist. (Source: Copyright 2024 Pherson. All Rights Reserved)

their attention. Some of the most positive feedback the authors received from senior policymakers came when a policymaker was told a situation was unlikely to devolve into a crisis.

Figure 7.8 provides a simple Knowing Your Client Checklist that analysts can use to ensure they have considered all aspects of a client's needs. The checklist also helps focus attention on what matters most.

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## 7.5 One More Look

All good analysts know they are not finished when the product is completed. Before the product is finalized for presentation, it must also undergo a substantive review and self-editing. Your credibility rests on being able to catch gaps in logic, errors in fact, errors in analysis, misspellings, and grammatical mistakes. The first step is to conduct a solid self-edit. Go back and review the organization and flow of the product, the conciseness of language, and misspellings and grammatical errors. Even minor mistakes and typographical errors will prompt the reader to question the seriousness of the analysis.



Another way to complete an effective review is to put yourself in the shoes of the client, which we have discussed earlier in this chapter. A good way to start is to adopt a strategic perspective. Ask yourself three questions:

- What are the AIMS (Audience, Issue, Message, and Storyline) of the paper or digital presentation? Are they clearly articulated?
- Is the product client-focused and persuasive?
- Is the product packaged and presented well?

Review can be a time-consuming process, especially for a longer paper. Plan on several iterations. Allot time for review and a Premortem Analysis exercise in your production schedule. The review should be a multi-step process involving several stages or “sweeps.”

Most organizations have developed checklists that supervisors and editors rely on to conduct a comprehensive review of a product.<sup>7</sup> A good writer will use these checklists to conduct a self-edit of the paper before delivering it to his or her boss. Above all, make sure the product is well-supported by sufficient reasoning and compelling evidence.

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<sup>7</sup>A good place to start your review is with the *Analytic Writer's Checklist* which asks 14 basic questions. For short papers drafted against tight deadlines the *Four Golden Questions Checklist* works well. For longer assessments or estimates, the authors recommend the *Evaluating Major Assessments Checklist*. All three checklists can be found in the *Analytic Writing Guide* by Louis M. Kaiser and Randolph H. Pherson (2021), Reston, VA: Pherson Associates, LLC.



## Abstract

This book provides a comprehensive overview of the importance of utilizing Structured Analytic Techniques and Strategic Foresight Analysis in making informed decisions. By exploring Kahneman's System 1 and System 2 thinking and the biases, heuristics, and intuitive traps that can arise, readers hopefully gained a deeper understanding of the limitations of human reasoning and the value of employing structured techniques in avoiding common cognitive pitfalls. The five families of Structured Analytic Techniques presented in Appendix B offer a rich toolbox for approaching real-life problems, as demonstrated in the three case studies in Chaps. 4, 5, and 6.

As we look to the future, it is clear that the importance of Strategic Foresight and Structured Analytic Techniques will continue to grow. In an increasingly complex and rapidly changing world, the need for effective decision-making is greater than ever. By using structured analytical methods, decision makers can ensure that their decisions are based on a comprehensive understanding of the situation and that potential cognitive pitfalls are mitigated.

The utilization of Strategic Foresight and Structured Analytic Techniques will become increasingly essential in a range of industries, from government and military to business and finance. As technology continues to advance and the pace of change continues to accelerate, the need for informed, evidence-based decision-making will only grow.

In conclusion, we hope to have provided a valuable guide for those looking to improve the quality of decision-making and achieve better policy outcomes. With a focus on avoiding cognitive pitfalls and utilizing Structured Analytic Techniques,

you hopefully will be better equipped to navigate the complexities of the modern world and achieve success in your endeavors.

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## Appendix A: Selected Cognitive Biases, Misapplied Heuristics, and Intuitive Traps

### Cognitive Biases

#### Confirmation Bias

##### *Definition*

Confirmation Bias describes the phenomenon of processing only information that is consistent with the preferred hypothesis or judgment or conclusion.<sup>1</sup>

##### *Explanation*

The more we know about a particular subject or topic, the faster we can access the content stored in our memory about that subject. However, it also becomes increasingly difficult to break out of the thought patterns established in this way. This finding applies both in the proverbial sense and in the concrete physical sense. This also makes it difficult to illuminate a known fact from a different perspective. This occurs when new and perhaps even contrary information emerges over time.<sup>2</sup> In this regard, Richards Heuer notes:

*When information doesn't match what people know or think they know, they have great difficulty processing that information.*<sup>3</sup>

Processing in this context refers to both the **perception** of the information by the sensory memory, the correct **contextualization** in short-term memory, and the **transformation** of the information into long-term memory. All of this takes place either not at all, with difficulty, or incorrectly.<sup>4</sup> As a result, information that confirms one's own world view is processed preferentially. This leads to a tendency to verify preferred hypotheses, judgments, or conclusions instead of falsifying them. However, Heuer points out that verifying evidence can never completely prove a hypothesis. The reason for this is that even an extensive body of evidence could be consistent with a whole host of **other** hypotheses.<sup>5</sup>

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<sup>1</sup> Definition based on: Pherson, Randolph H.: *Handbook of Analytic Tools & Techniques*, 5th ed., Pherson Associates, LLC, 2018. Original: "Seeking only the information that is consistent with the lead hypothesis, judgment, or conclusion."

<sup>2</sup> Cf. Heuer, loc. cit. p. 20 f.

<sup>3</sup> Heuer, op. cit., p. 23, own translation.

<sup>4</sup> Cf. Heuer, *ibid.*, p. 22 ff.

<sup>5</sup> Cf. Heuer, *ibid.*, p. 46 ff.

### Example

An everyday example of **anticipated** Confirmation Bias is the phenomenon of filter bubbles in social networks, some of which are also evaluated by analysts:

*The filter bubble [...] or information bubble is a term used in media science [...]. [Filter bubbles occur] because websites try to algorithmically predict what information the user wants to find – this is based on the available information about the user (for example, the user's location, search history and click behavior). This results in isolation from information that does not match the user's point of view.<sup>6</sup>*

The filter bubble is a technically programmed reaction to the fact that users of social networks prefer to read opinions or follow, click on, or “like” people and posts that correspond to their own world view. The algorithm thus confronts us primarily with what corresponds to our own worldview and hides contradictory messages.

But even without the support of an algorithm, we look for what confirms our worldview. Thus, the analyst also runs the risk of using sources and looking for information that correspond to his own worldview or his current working hypothesis and ignoring other perhaps better sources and contradictory information or data inconsistent with the analyst's lead hypothesis.

## Hindsight Bias

### Definition

Hindsight Bias is the assessment and assertion that key information, events, drivers, actors, or factors that caused or influenced a future development could have been easily identified and accounted for.<sup>7</sup>

### Explanation

Individuals investigating *intelligence failures*<sup>8</sup> or individuals retrospectively evaluating the usefulness of intelligence reports typically overestimate the degree of predictability for the events under investigation or how much they learned from reading the intelligence reports they read.<sup>9</sup>

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<sup>6</sup>Wikipedia: Filter Bubbles, Online: <https://de.wikipedia.org/wiki/Filterblase> [Accessed 22 Aug. 2019].

<sup>7</sup>Translation based on Pherson/Heuer, op. cit., p. 24.

<sup>8</sup>*Intelligence failure* can essentially be understood as the failure to foresee a specific event of major significance. In the U.S. intelligence community, classic intelligence failures are, for example, 9/11 or the analyses in the run-up to the U.S. invasion of Iraq in 2003 (keyword: Saddam Hussein's alleged weapons of mass destruction). For intelligence failures in the U.S. intelligence community, see for example: Hedley, John Hollister, Learning from Intelligence Failures, *International Journal of Intelligence and CounterIntelligence*, 18: 3, 2005, pp. 435–450. For another approach and handling of intelligence failures (the critical thinking approach), see for example: Moore, David T.: *Critical Thinking and Intelligence Analysis*, National Defense Intelligence College, Occasional Paper Number 14, Washington DC: 2007, pp. 20 ff.

<sup>9</sup>Cf. Heuer, op. cit. p. 161.

Heuer posits that the reason for this “look-back error” is because of the difference between two different modes: looking-ahead and looking-back. Foresight or looking ahead, a core area of work for many analysts, attempts to formulate a statement about possible future developments on the basis of incomplete and contradictory information (*intelligence estimates*). Analysts, when doing so, select different information usually from a large corpus of information and form statements that correspond to the selected data. In hindsight, i.e., after a certain event has occurred, abstract as well as concrete physical changes occur in one’s personal knowledge. The brain consists of millions of neurons and connections between them. If we learn something, it changes which neurons are connected to each other and how. When we take in new knowledge, the mental image of the object about which we have learned something changes: in this case, about the event that has occurred. This process occurs unconsciously, and thus changes the way we think about that object as a whole.

Information that has to do with this object, and that previously may have seemed just as important or less important than others, suddenly takes on greater significance. This is because, in retrospect, the new information clearly points to the event that has occurred. However, this perception ignores the fact that this information was previously only part of a larger background *noise* in the information space. This is the essential difference between foresight and hindsight.

We now know that it is not possible for us to put ourselves into the same cognitive state **after** we know about an event that has occurred as before. The physical structure of our brain has already changed, and this change cannot be reset. This is why intelligence failures, for example, regularly appear to investigators in retrospect as if the events that were missed or ignored had been easier to predict than they actually were.<sup>10</sup> Consumers of intelligence products, when asked, believe they learned less from reading the relevant products than may actually have been the case.<sup>11</sup>

## Mirror Imaging

### Definition

The assumption that others would act in the same way as we do under the same circumstances.<sup>12</sup>

### Explanation

First, it is difficult to comprehend another actor to correctly classify his actions within his or her own environment. To do so accurately, one would have to understand this actor and all his or her values, assumptions, and misperceptions.<sup>13</sup> Because it is rare to have sufficient information to do so, the observer typically fills gaps in

<sup>10</sup> Cf. Heuer, loc. cit. p. 161 ff.

<sup>11</sup> Cf. Heuer, *ibid.*, p. 165 ff.

<sup>12</sup> Translation based on Pherson/Heuer, op. cit., p. 24.

<sup>13</sup> Cf. Heuer, op. cit. p. 33.

knowledge – consciously or unconsciously – with what is known. If, for example, we do not know how an actor evaluates a recent event, we (unconsciously) assume the actor would evaluate it as we would evaluate it in the same situation. A good indicator that one is subject to mirror imaging is an evaluation that another actor would act “irrationally.” This conclusion usually only indicates that the other actor’s rationale is not fully understood.

### ***Example***

Let us assume that prior to important negotiations with another state, analysts are asked to assess the probability that this state will conduct a missile test with long-range missiles. The state in question is already highly isolated internationally due to its missile program and would have the opportunity to overcome this isolation at least partially during the upcoming negotiations. In such a situation, the analysts may underestimate the likelihood of missile tests if they have a predisposition for balance and harmony. The (unconscious) rationale behind this might be: If I were in the place of the leadership of this country, I would not lose the chance for rapprochement by conducting another missile test beforehand.

## **Vividness Bias**

### ***Definition***

Vividness Bias is the phenomenon that information that is vivid, concrete, and pictorial is absorbed, processed, stored, and remembered significantly better than abstract information.

### ***Explanation***

The vividness bias implies that information that we have taken in with our own eyes and ears, or that we have received directly from friends or informants, has a greater influence on our judgment than abstract or statistical information. And this despite the fact that the latter probably have a greater explanatory power. If two pieces of information are opposed to each other, this means that the more pictorial and vivid information is more likely to be used as a basis for judgment than statistical information that refutes this more vivid information.<sup>14</sup>

### ***Example***

If an analyst in a crisis country is to assess the likelihood of an attack in an area assigned to him, it is highly likely to have an effect if he has witnessed an attack himself in the past. The reason for this is the high recall speed with which the analyst can recall vivid, clear, and descriptive images of an attack in his associative memory. This bias escapes conscious control: it springs from the unconscious.

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<sup>14</sup>Cf. Heuer, loc. cit. p. 118 f.

## Misapplied Heuristics

### Affect Heuristic

#### *Definition*

The Affect Heuristic describes the phenomenon that judgments and decisions are made based on emotions about the object in question.

#### *Explanation*

*The affect heuristic is a case of substitution, in which the answer to an easy question (What feelings does this arouse in me?) serves as the answer to a much more difficult question ("What do I think about this?").<sup>15</sup>*

Thus, likes and dislikes determine the worldview. In the context of System 1 and System 2, it is the case that System 1 generates impressions, feelings, and inclinations. If System 2 adopts these, they become beliefs and attitudes. This adoption by System 2 is the rule. Only rarely are the impressions, feelings, and inclinations that arise in System 1 criticized or a reevaluation demanded. A review by System 2 thus rarely takes place.<sup>16</sup>

*An active System 1 striving for coherence proposes solutions to an undemanding System 2.<sup>17</sup>*

#### *Example*

If an analyst is to assess the threat posed by Russian forces in Kaliningrad Oblast, then that assessment may depend on whether the analyst is emotionally positive or negative about Russia. This influence does not necessarily happen consciously and intentionally and can nevertheless lead to the analysis process and the analysis result being influenced in an undue way. For example, the analyst unconsciously tends to preferentially process information that is critical of Russia or is pro-Russian depending on his or her attitude.

### Anchoring Effect

#### *Definition*

The Anchoring Effect is the tendency to anchor one's analysis to the first or earliest piece of information that was consciously or unconsciously perceived as important. Consequently, later adjustments of the initially completed conclusion are insufficiently adjusted and therefore remain too close to the original anchor.<sup>18</sup>

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<sup>15</sup> Kahneman, op. cit. p. 175.

<sup>16</sup> Cf. Kahneman, ibid, p. 133 ff.

<sup>17</sup> Kahneman, ibid, p. 134.

<sup>18</sup> Definition based on: Artner, Stephan et al.: Assessing the Value of Structured Analytic Techniques in the U.S. Intelligence Community, *RAND Corporation*, Research Report, 2016, p. 2.

***Explanation***

The Anchoring Effect occurs when people are asked to estimate numerical values or judge facts based on incomplete information. Numerical values can be probabilities, frequencies, or the present degree of uncertainty. If numerical values or factual assessments are already available from an older analysis, for example, or if the analyst makes an initial estimate, perhaps unconsciously, after reading a few pieces of information, then this estimate may serve as a cognitive anchor. The numerical value then estimated based on this anchor, or the factual assessment made, is an adjustment of the same based on available information. However, this adjustment is too strongly influenced by the anchor, leading the analyst or observer to make an insufficient adjustment, resulting in an incorrect estimate.<sup>19</sup>

***Example***

Any numerical value can, unconsciously, become an anchor. So, if an analyst has recently been confronted with numerical values, and these can be anything from 90% fat-free cheese, to 50% Arabica beans in a cup of coffee, to betting odds on the World Cup, then these extraneous values can become anchors, setting a baseline that low fat cheeses should be around 90 percent fat free. If an analyst is influenced by a corresponding anchor and then must evaluate how likely an actor under scrutiny is deliberately deceiving (*deception*) others, the anchor can influence the analyst's evaluation of probability or likelihood. This happens unconsciously and thus ultimately escapes one's own perception and thus one's own control.

**Availability Heuristic*****Definition***

The Availability Heuristic occurs when the estimation of the frequency or probability of an event or category is unconsciously made depending on how easy it is to retrieve corresponding outcomes or categories from memory.<sup>20</sup>

***Explanation***

The Availability Heuristic comes into play when people are asked to evaluate the probability or frequency of events. In the evaluation, people unconsciously resort to two strategies. First, they process how quickly they can recall as many similar events. If it is possible for them to remember many similar events with cognitive ease, the probability or frequency of the observed event is estimated to be high. However, this mental rule of thumb does not always apply. The speed of recall and the number of similar incidents to be recalled may be influenced by different factors that themselves have nothing to do with the correct probability or frequency, for example, if corresponding incidents occurred in the recent past, if the analyst may have been involved himself, and if vivid impressions are available to the analyst. As

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<sup>19</sup> Cf. Heuer, loc. cit. p. 150 ff.

<sup>20</sup> Definition based on Heuer/Pherson, op. cit. p. 24.

analysts are often involved in assessing probabilities, they need to recognize when they are in danger of assessing probabilities based on it.<sup>21</sup>

### **Example**

In a famous study, married couples were asked, ‘What was your personal contribution in cleaning up your joint home as a percentage?’ [...] As expected, the contributions added up to over 100%. The Availability Bias explains this phenomenon: both spouses remember their own efforts and contributions much more clearly than those of their respective partners, and this availability difference leads to a difference in judged frequency.<sup>22</sup>

## **Groupthink**

### **Definition**

Groupthink is defined as “A usually subliminal preference for in-group consensus. This preference discourages group members from expressing alternative perspectives and interpretations. Alternative perspectives and interpretations are understood as an effort to disrupt the group consensus that other group members prefer.”<sup>23</sup>

### **Explanation**

In highly functional groups, in groups with a hierarchy gap, and to some extent in new groups, each group participant tends to seek a group-wide consensus. This tendency is understandable against the background that no individual wants to be a spoilsport who “prevents” the group from reaching a result. When the group comes to a decision that is reasonably satisfactory to everyone involved, that result is likely to become the official group result. However, this outcome may be significantly worse than would have been potentially possible because a participant did not dare to contribute his or her suggestion and this suggestion would have led to a significantly better result.

### **Example**

The general attitude of the US Intelligence Community in the run-up to the US invasion of Iraq in 2003 can be assessed as a case of Groupthink. The following is an excerpt from the corresponding US Congressional investigative report of July 7, 2004:

*The Committee does not regard the analysis on Iraq’s aluminum tubes performed by CIA contractors as an attempt to challenge assumptions, but rather as an example of the collective rationalization that is indicative of ‘groupthink.’*<sup>24</sup>

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<sup>21</sup> Cf. Heuer, loc. cit. p. 147 ff.

<sup>22</sup> Kahneman, op. cit. p. 166.

<sup>23</sup> Artner, op. cit., p. 2.

<sup>24</sup> Senate Select Committee On Intelligence, Report on the U.S. Intelligence Community’s Prewar Intelligence Assessments on Iraq, *United States Senate*, 108th Congress, 7 July 2004, p. 21, online: <https://web.mit.edu/simsong/www/iraqreport2-textunder.pdf> [accessed 02 September 2019].



## Premature Closure

### *Definition*

Premature Closure is the tendency to stop the search for a cause or explanation as soon as a reasonably satisfactory answer has been found and before sufficient information has been collected and analyzed.<sup>25</sup>

### *Explanation*

Satisficing and Premature Closure are similar phenomena. However, in the case of Premature Closure, the analysis may stop later – but still prematurely – than in the case of Satisficing.

## Satisficing

### *Definition*

Satisficing describes picking the first answer that seems “good enough.”<sup>26</sup>

### *Explanation*

In “satisficing” [a combination of satisfy and suffice], the first hypothesis that appears to be coherent and plausible is selected. Subsequently, existing data are collected and processed in such a way that they support this hypothesis.<sup>27</sup> Premature Closure and Satisficing are closely linked, but, in the case of Satisficing, the analysis may stop even earlier than in the case of Premature Closure.

### *Example*

Under intense time pressure, an analyst newly transferred to the department is tasked with assessing whether Kremlin critic Navalny was poisoned at the behest of the Russian leadership. During his research, the analyst quickly comes across reports on the poisoning of Sergei Skripal and his daughter in England. This gives rise to the working hypothesis that the Nawalny case is similar, and that Russia may indeed be responsible for the poisoning of Nawalny. The analyst now compiles a coherent report from the two cases and submits it as an initial assessment to his superior without considering alternative hypotheses.

## Intuitive Traps

Analysts in the intelligence profession – and many other disciplines – often fall victim to mental mistakes or intuitive traps that are manifestations of more commonly recognized cognitive biases. Intuitive traps are shortcuts that practitioners make when conducting their business. Projecting Past Experiences, for example,

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<sup>25</sup> Globalytica, op. cit.

<sup>26</sup> Cf. Heuer, op. cit. p. 43.

<sup>27</sup> Cf. Heuer, op. cit. p. 44.

occurs when a police detective assumes that the next case, he or she is working on will be like the previous case.

### **Most Commonly Encountered Intuitive Traps**

**Favoring First Hand Information.** Allowing information we receive directly to have more impact than what we learn or are told second hand.

**Ignoring Inconsistent Evidence.** Discarding or ignoring information that is inconsistent with what the analyst expects to see.

**Ignoring the Absence of Information.** Not addressing the impact of the absence of information on analytic conclusions.

**Projecting Past Experiences.** Assuming the same dynamic is in play when something seems to accord with an analyst's past experiences.

**Presuming Patterns.** Believing that actions are the result of centralized planning or direction and finding patterns where they do not exist.

**Lacking Sufficient "Bins."** Failing to remember or factor something into the analysis because the analyst lacks an appropriate category or "bin" for that item of information.

**Over-interpreting Small Samples.** Overdrawing conclusions from a small sample of data that is consistent.

**Confusing Causality and Correlation.** Inferring causality inappropriately; assuming that correlation implies causation. Also referred to as Perceiving Cause and Effect.

**Expecting Marginal Change.** Focusing on a narrow range of alternatives representing marginal, not radical, change.

### **Additional Intuitive Traps**

**Assuming a Single Solution.** Thinking in terms of only one likely (and predictable) outcome instead of acknowledging that "the future is plural" and several possible outcomes should be considered.

**Assuming Inevitability.** Assuming that an event was more certain to occur than was the case. Also referred to as the Illusion of Inevitability.

**Relying on First Impressions.** Giving too much weight to first impressions or initial data, especially if they attract our attention and seem important at the time.

**Overrating Behavioral Factors.** Overrating the role of internal determinants of behavior (personality, attitudes, beliefs) and underestimating the importance of external or situational factors (constraints, forces, incentives). Often referred to as Fundamental Attribution Error.

**Judging by Emotion.** Accepting or rejecting everything another group member says because the analyst likes or dislikes everything about that person. Also referred to as the Halo Effect.

**Rejecting "Unimportant" Evidence.** Continuing to hold to an analytic judgment when confronted with a mounting list of evidence that contradicts the initial conclusion.

**Ignoring Base Rate Probabilities.** Failing to accurately assess the likelihood of an event when faced with statistical facts and ignoring prior probabilities or base rates.

**Misstating Probabilities.** Miscommunicating or misperceiving estimates of subjective probability (most likely, could, probable).

**Overestimating Probability.** Overestimating the probability of multiple independent events occurring for an event or attack to take place.

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## Appendix B. Five Families of Structured Analytic Techniques

This appendix introduces five families of Structured Analysis Techniques (SATs) that analysts can use to avoid, overcome, or at least reduce the impact of cognitive bias, misapplied heuristics, and intuitive traps. They also help analysts use imagination effectively and bring more rigor to their analysis.

The discussion of Structured Analytic Techniques first highlights the role they can play in mitigating the impact of biases, heuristics, and intuitive traps. We have included charts that map the 33 SATs to the biases, heuristics, and traps they are most effective in mitigating.

The practitioner's guide also consists of sections describing five families of techniques that track the analytic process. Some techniques can be used to support more than one function. For example, a Key Assumptions Check can play a role in virtually every family.

- Exploration
- Diagnostic
- Reframing
- Foresight
- Decision Support

In each of these sections, we provide a definition of the technique, discuss when best to use it, describe the value added to the analytic process by using it, and present step-by-step instructions for how to apply each method. A true understanding of the strengths and weaknesses of these techniques, however, will only come from using them on a regular basis.

We are often asked “Which SAT should I use?” We have sought to answer those questions with a summary chart at the end of this Appendix.

## Exploration Techniques: Energize Your Approach

Exploration Techniques help analysts get started by gathering and making sense of their data; expanding their thinking; and discovering gaps, linkages, and relationships.

A persistent debate in the field of intelligence is whether individuals with subject matter expertise or creative generalists with good critical thinking skills make the “best” analysts. The reality is that both do, but specialists with deep knowledge of a given subject tend to focus primarily on their domain, and generalists, who often move from one subject to another throughout their careers, can come across as “facile.” Yet both types of analysts are called upon to generate new or different thoughts, create new processes and procedures, and help clients avoid surprise.

Exploration Techniques help analysts create new approaches and transform existing ideas, knowledge, and insights into something novel but meaningful; identify potential new sources of information or reveal gaps in data or thinking; and provide a fresh perspective on longstanding issues.

Exploration Techniques are helpful in countering the impulse to provide quick answers to difficult questions (Mental Shotgun), select the first answer that is “good enough” (Satisficing), or let the coherence of the story become more important than the reliability of the data (Evidence Acceptance Bias). Exploration Techniques also help analysts avoid the traps of Lacking Sufficient Bins, Overinterpreting Small Samples, and Expecting Marginal Change.

This family includes seven techniques to help analysts expand their thinking and explore new ideas:

- **Simple and Cluster Brainstorming.** Multiple methods for idea generation for individuals or groups.
- **Circleboarding™ and Starbursting.** Idea generation using the Who, What, How, When, Where, and Why questions.
- **Mind Maps and Concept Maps.** A visual method of idea generation and relationship identification.
- **Venn Analysis.** A visual method of identifying relationships and checking logic and arguments.

Simple rules for conducting any group brainstorming or exploration exercise include:

- Be specific about the purpose and the topic of the brainstorming session. Announce the topic beforehand and ask participants to come to the session with some ideas or to forward them to the facilitator before the session.
- Never criticize an idea, no matter how weird, unconventional, or improbable it might sound. Instead, try to figure out how the idea might be applied to the task at hand.

- Allow only one conversation at a time; ensure that everyone has an opportunity to speak.
- Allocate enough time to complete the brainstorming session. It often takes one hour to set the rules of the game, get the group comfortable, and exhaust the conventional wisdom on the topic. Only then do truly creative ideas begin to emerge.
- Engage all participants in the discussion. Sometimes this might require “silent brainstorming” techniques such as asking everyone to be quiet for five minutes to write down their key ideas and then discuss as a group what everyone wrote down.
- Include one or more “outsiders” in the group to avoid Groupthink and stimulate divergent thinking.
- Write it down! Track the discussion by using a whiteboard, an easel, or sticky notes.
- Summarize key findings. Ask the participants to write down their key takeaway or the most important thing they learned on a 3 × 5 card as they depart the session. Then prepare a brief summary and distribute the list to the participants (who may add items to the list) and to others interested in the topic (including supervisors and those who could not attend) (Figs. [B.1](#) and [B.2](#)).

## Simple Brainstorming

Simple Brainstorming is an individual or group process designed to generate new ideas and concepts.

### When to Use It

Brainstorming is one of the most widely used analytic techniques. Analysts most often use it at the beginning of a project to identify a list of relevant variables, key drivers, alternative scenarios, key players or stakeholders, available evidence or sources of information, potential solutions to a problem, potential outcomes or scenarios, or all the forces and factors that may pertain to a given situation. Later in the process, it can be used to help break the team out of an analytic rut, stimulate new investigative leads, generate new research or collection requirements, and design new lines of argument or theories of a case.

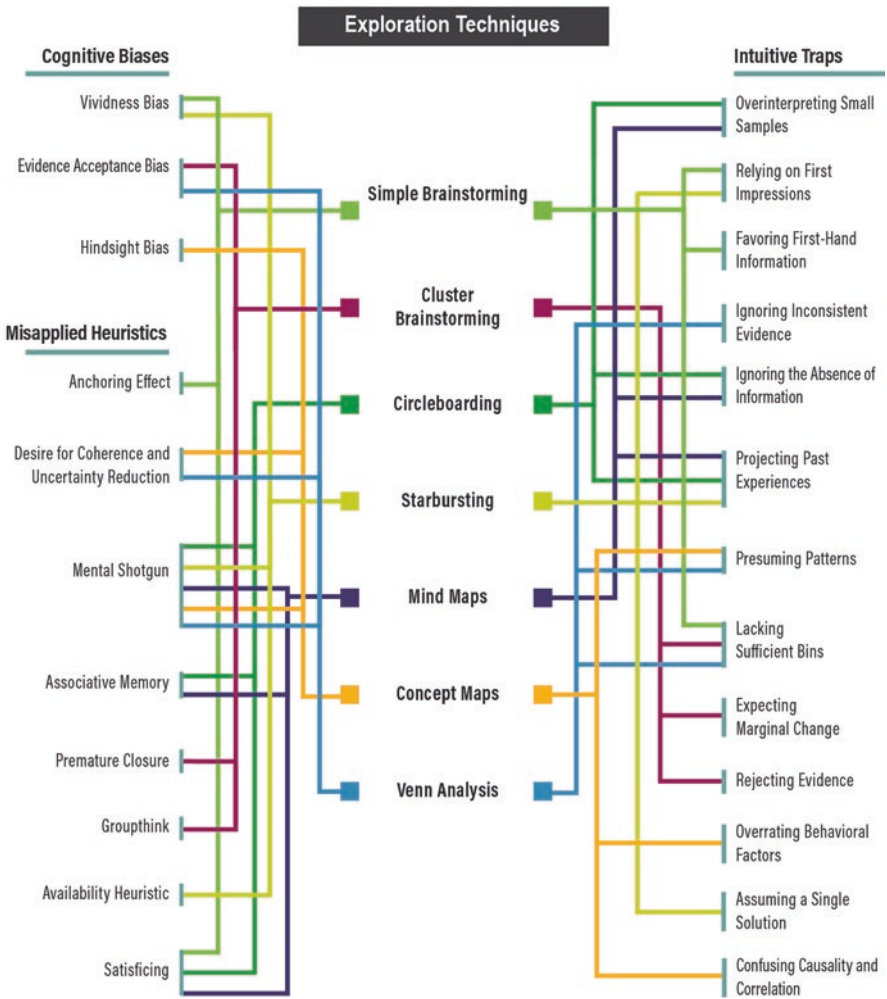
### Value Added

The goal of any type of Brainstorming is to generate as many ideas as possible to expand the range of possibilities and perspectives to consider. Brainstorming can involve any number of processes designed to enhance creativity but is most productive when it is structured. Intelligence analysts have found brainstorming particularly effective in helping mitigate the intuitive traps of giving too much weight to first impressions, lacking an appropriate category or bin for an item of information, allowing first-hand information to have too much impact, and expecting only marginal or incremental change.

<p><b>Cognitive Biases</b></p> <p>Selected cognitive biases that can impede analytic thinking:</p> <p><b>Evidence Acceptance Bias:</b> Accepting data as true without assessing its credibility because it helps create a more coherent story.</p> <p><b>Hindsight Bias:</b> Claiming the key items of information, events, drivers, forces, or factors that shaped a future outcome could have been easily identified.</p> <p><b>Vividness Bias:</b> Focusing attention on one vivid scenario while ignoring other possibilities or alternative hypotheses.</p> <p><b>Misapplied Heuristics</b></p> <p>Selected heuristics that—when misapplied—can impede analytic thinking:</p> <p><b>Anchoring Effect:</b> Accepting a given value of something unknown as a proper starting point for generating an assessment.</p> <p><b>Associative Memory:</b> Predicting rare events based on weak evidence or evidence that easily comes to mind.</p> <p><b>Availability Heuristic:</b> Judging the frequency of an event or category by the ease with which instances come to mind.</p> <p><b>Desire for Coherence and Uncertainty Reduction:</b> Seeing patterns in random events as systematic and part of a coherent world.</p> <p><b>Groupthink:</b> Choosing the option that the majority of the group agrees with or ignoring conflicts within the group due to a desire for consensus.</p> <p><b>Mental Shotgun:</b> Lacking precision and control while making assessments continuously; providing quick and easy answers to difficult questions.</p> <p><b>Premature Closure:</b> Stopping the search for a cause when a seemingly satisfactory answer is found before sufficient information is collected and proper analysis can be performed.</p> <p><b>Satisficing:</b> Selecting the first answer that appears “good enough.”</p>	<p><b>Intuitive Traps</b></p> <p>Selected examples of common mistakes made by practitioners.</p> <p><b>Confusing Causality and Correlation:</b> Inferring causality inappropriately; assuming that correlation implies causation. Also referred to as Perceiving Cause and Effect.</p> <p><b>Expecting Marginal Change:</b> Focusing on a narrow range of alternatives representing marginal, not radical, change.</p> <p><b>Favoring First-hand Information:</b> Allowing information we receive directly to have more impact than what we learn or are told secondhand.</p> <p><b>Ignoring the Absence of Information:</b> Not addressing the impact of the absence of information on analytic conclusions.</p> <p><b>Ignoring Inconsistent Evidence:</b> Discarding or ignoring information that is inconsistent with what one expects to see.</p> <p><b>Lacking Sufficient Bins:</b> Failing to remember or factor something into the analysis because the analyst lacks an appropriate category or “bin” for that item of information.</p> <p><b>Overinterpreting Small Samples:</b> Overdrawing conclusions from a small sample of data that is consistent.</p> <p><b>Overrating Behavioral Factors:</b> Overrating the role of internal determinants of behavior (personality, attitudes, beliefs) and underestimating the importance of external or situational factors (constraints, forces, incentives). Often referred to as Fundamental Attribution Error.</p> <p><b>Presuming Patterns:</b> Believing that actions are the result of centralized planning or direction and finding patterns where they do not exist.</p> <p><b>Projecting Past Experiences:</b> Assuming the same dynamic is in play when something appears to be in accord with an analyst’s past experiences.</p> <p><b>Rejecting Evidence:</b> Continuing to hold to a judgment when confronted with a mounting list of contradictory evidence.</p> <p><b>Relying on First Impressions:</b> Giving too much weight to first impressions or initial data, especially if they attract our attention and appear important at the time.</p>
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**Fig. B.1** Definitions of exploration biases, heuristics, and traps. (Source: Copyright 2024 Pherson. All Rights Reserved)

Brainstorming is conducted in many different ways. Several techniques you can use to brainstorm individually or in groups follow.



**Fig. B.2** Matching exploration techniques to biases, heuristics, and traps. (Source: Copyright 2024 Pherson. All Rights Reserved)

**Word or Visual Storming**

This method consists of selecting a random word or picture – related to the issue or not – and using that word or visual to “trigger” thoughts. Ideally, settle on a word or picture not related to the topic or issue because the “word” may force you to stretch your mind. An easy way to select a word is to open a dictionary or magazine and point your finger at the open page. Where your finger lands, that is the word or the picture on the page you opened that is the word or picture you use. After you select a word or picture, answer the following questions:



- What is the meaning of the word or what words come to mind when you look at the picture?
- With what is the word or picture associated? Or what is happening in the picture?
- How is the word used or what is a synonym for the word?

Ask yourself how the word or picture could be related to the issue or problem. For example, when considering who a newly elected Prime Minister or President might appoint to a particularly tough Cabinet job, the word “basketball” or a picture of a basketball court might generate ideas such as: team game, team player, assigned position, coaching, player development, winning, hoops and balls, time outs, periods of play, or winners and losers. Each of those words could trigger subsequent ideas about the type of official who would be “ideal” for the job.

A free-wheeling, informal group discussion session will often generate new ideas, but a structured group process is more likely to succeed in helping analysts overcome existing mindsets, “empty the bottom of the barrel of the obvious,” and produce fresh insights and ideas.

### **Paper Recording**

Paper Recording is a silent group technique that requires each participant to write down 1-4 ideas about the topic on a piece of paper initially distributed by the facilitator or organizer.

- After jotting down their ideas, participants place their papers in a central “pick-up point.” They select a piece of paper (not their own) from the “pick-up point” and add to the ideas on the paper.
- The process continues until participants run out of ideas. Participants can use a colored card to note when they have exhausted their ideas.
- A facilitator harvests and records the ideas.

### **Cluster Brainstorming: The Twelve Step Method**

Cluster Brainstorming allows group members to alternate between divergent and convergent thinking, thereby generating new ideas.

1. Distribute sticky notes, preferably large ones, and pens to all participants. A group of 10-12 works best.
2. Pose the topic in terms of a focus question and display it on a whiteboard or flipchart. Tell participants that only the facilitators can talk during the exercise.
3. Ask the participants to write one idea or phrase per sticky note and give it to a facilitator. Collect all these ideas and, after an initial pause of two minutes, begin reading the ideas out loud. Post the notes on a whiteboard as you collect them, treating all ideas the same.



4. When a pause occurs in the flow of ideas, wait a minute or two in silence for the group to dig deeper for new thoughts. End the “collection” stage after two or three pauses or after someone writes down “aliens” or “zombies.”
5. Ask participants (or a subset of participants if the group is large) to go to the board and silently re-arrange the notes according to their commonalities or similar concepts. Make a second copy of a note if it appears to belong to more than one group.
6. Select several sticky notes that appear to be outliers or provoked a laugh and give them to those not at the board. Ask them to relate the notes to the topic at hand. The facilitator ultimately collects the notes and posts them on the board.
7. Ask one of the participants or another group to provide a word or phrase that characterizes each grouping or cluster once the notes have been arranged into affinity groups.
8. Decide whether notes that do not fit in any cluster are irrelevant or introduce an idea that deserves further elaboration.
9. To identify the potentially most useful ideas, establish up to five criteria for judging the value of the ideas. Ask the participants to vote on what most deserves attention. Give each participant more than one vote so that a range of important and promising ideas emerges. A rough formula is 1 vote for every 3-4 topics on the list. People vote by marking the items or affinity groups on the whiteboard that they think are most important. Sometimes it is better to use a secret ballot, asking the participants to write down their votes or to provide them with a list to check off.
10. Stand back and assess what you have accomplished and what areas need more work or more brainstorming. Then ask the group: “What do you see that you did not think about before?” Review the ideas or concepts that have been identified as well as new areas that need more work or further brainstorming.
11. Tabulate the votes and set priorities based on the results.
12. Decide on the next steps for analysis and develop an action plan.

#### **Engaging Participants with 3 × 5 Cards**

Some participants prefer a quiet environment to generate ideas rather than a free-wheeling discussion. With this technique, each participant is given a 3 × 5 card and asked to write down several ideas on the card. The facilitator collects everyone’s cards and displays the contents on an easel or whiteboard. The group eliminates repetitive items and then clarifies, expands, and prioritizes the remaining points. This process can be repeated several times during the brainstorming session. It allows the “interior thinkers” in the group who spend most of their time listening to offer as many ideas as the “exterior thinkers” who usually do most of the talking.

Circleboarding

Circleboarding is a method for capturing the Who? What? How? When? Where? Why? and So What? of a topic.

Circleboarding™ is a simpler version of Starbursting that focuses on exploring the answers to – rather than generating questions related to – the journalist’s classic questions: Who, What, How, When, Where, Why, and So What? Circleboarding™ captures and visually depicts the known information about differing aspects of a topic of concern or interest (see Fig. B.3).

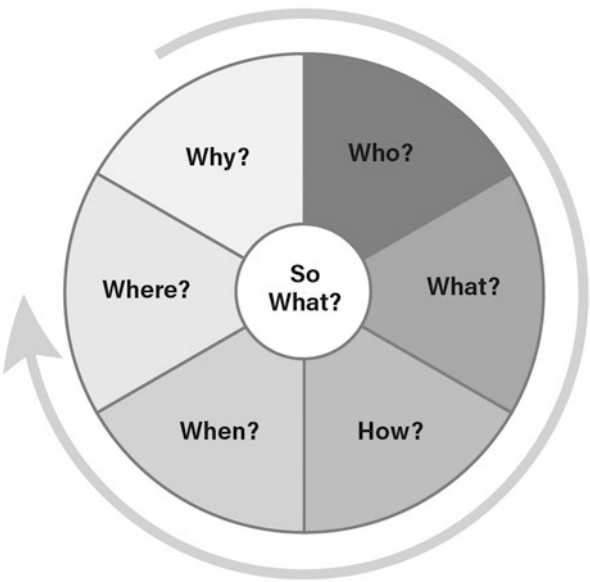
When to Use It

Use Circleboarding™ at the start of a project to gain a thorough, group-wide understanding of a topic. After deciding on the topic to be analyzed, assemble all researchers, investigators, or analytic contributors, and use Circleboarding™ to determine what is already known about each aspect of the subject. A facilitator is required to marshal the group through the process.

Value Added

Circleboarding™ provides a systematic overview of a topic or issue. The brainstorming process helps promote widespread, collaborative understanding of the topic for all those involved in an analysis or investigation, regardless of their specific area of research. The cooperative approach of Circleboarding™ also encourages investigators to combine ideas in new or diverse ways to imbue the analysis with increased rigor.

**Fig. B.3** Circleboarding™.  
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The technique can stimulate discussion beyond just consolidating known information by identifying gaps or weak points in the group's knowledge and encouraging discussion of what assumptions are being made and what further collection and research is needed to fill the gaps.

### The Method

- **Set-up.** Draw a circle and write the following words around the circle: Who, What, How, When, Where, and Why. The order follows how a declarative sentence is written in English (who did what, for what reason). The What and the How are next to each other because they often overlap conceptually. In the middle of the circle, write So What?
- **Define the Topic.** Begin by asking the group to validate the discussion topic and agree on the objectives of the session.
- **Seek Answers.** Systematically work through each question, asking the group to “shout out” what they know about the topic as it relates to each question. Write down the answers.
- **Reflect.** After going around the circle, ask the group to reflect on their responses and suggest which of the questions appear most important to the analysis.
- **Prioritize Results.** In some cases, highlight or prioritize the responses to the most important questions.
- **Ask So What?** Initiate a final discussion to explore the So What? question in the center of the circle.
- **Generate a Final Product.** Capture all the input on a single graphic and distribute it to participants and others interested in the topic for comment.

Circleboarding™ can also be used to generate indicators or generate a set of scenarios. Questions to consider when creating indicators include:

- Who could potentially emit an indicator?
- What indicator would they emit?
- How would this indicator manifest? How might we miss it?
- When would we be most likely to see this indicator?
- Where would we be most likely to see this indicator?
- Why is this indicator important?
- What do we want the indicators to tell us as a set?

Circleboarding™ promotes thorough investigation of a topic, producing better informed analysis. Detailed graphics can present the results of an exhaustive investigation in a crisp and easily digestible format.

## Starbursting

Starbursting is a form of brainstorming that focuses on generating questions rather than answers.

### When to Use It

Starbursting is an ideal technique to use at the start of a research project because it can help uncover questions that you might not have thought about when doing your research. After deciding on the idea, topic, or issue to be analyzed, it is relatively common to define a research agenda using some form of brainstorming to identify the questions that need to be investigated and answered.

### Value Added

Starbursting uses questions commonly asked by journalists: Who, What, How, When, Where, and Why? Starbursting forces you or your team to ask the questions that will inevitably arise as you present your findings or brief your clients. In thinking about the questions, you often will discover new and different ways of combining ideas.

### The Method

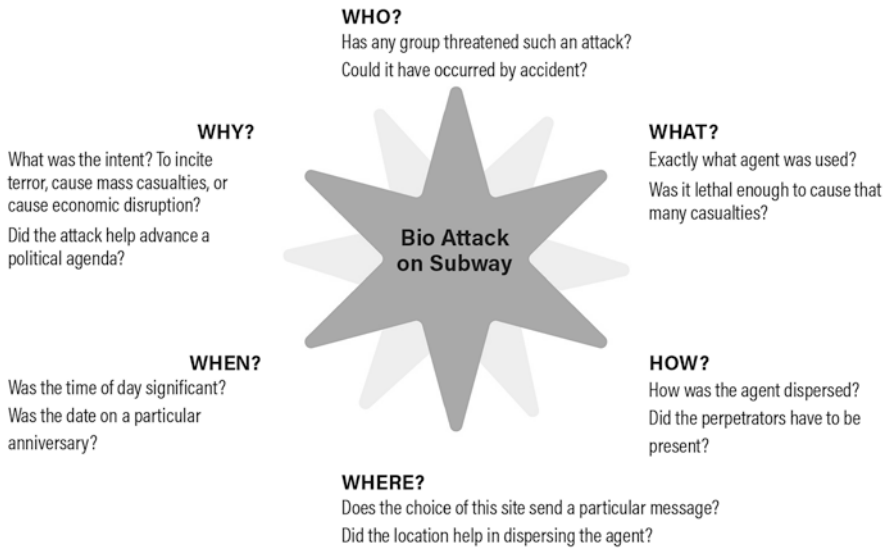
The term “Starbursting” comes from the image of a six-pointed star. To create a starburst design, begin by writing one of the following six words at each point of the star: Who, What, How, When, Where, and Why? Then begin brainstorming, using one of these words at a time to generate questions about the topic. Usually, it is best to discuss each question in the order provided here, in part because the order also approximates how English sentences are constructed. Sometimes only three or four of the words are directly relevant to the intelligence question or analytic issue. For some words (often When or Where) the answer may be apparent and not require further exploration (see Fig. B.4).

Do not try to answer the questions as they are identified; simply develop as many questions as possible. After generating questions that start with each of the six words, ask the group either to prioritize the questions to be answered or to sort the questions into logical categories.

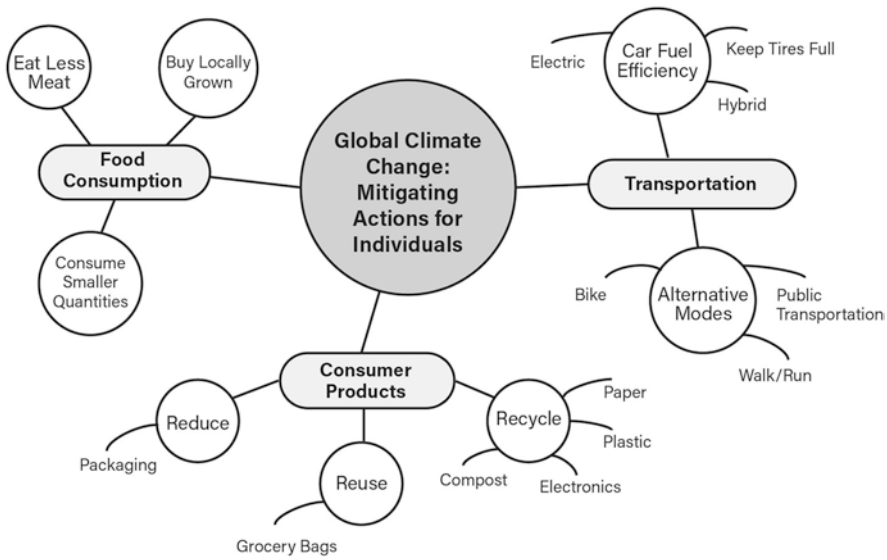
## Mind Maps

A Mind Map is a visual representation of all aspects of a topic, issue, or problem.

A Mind Map reflects in graphic format how an individual or a group thinks about a topic of interest. The diagrams have two elements: ideas that are judged relevant to the topic and lines that show the connections among the ideas (see Fig. B.5).



**Fig. B.4** Starbursting diagram of a lethal biological event. (Source: Copyright 2024 Pherson. All Rights Reserved)



**Fig. B.5** Mind map: global climate change. (Source: Copyright 2024 Pherson. All Rights Reserved)

### When to Use It

Whether trying to make a personal decision or analyze an intelligence issue, any thought process can be diagrammed using a Mind Map. They are most helpful for:

- Brainstorming to identify all the various aspects of an issue, sparking creativity and organizing thoughts.
- Capturing the relationships among the aspects of an issue.

The technique is used most effectively either at the beginning of a project to motivate creative thought and ensure that all team members have a shared understanding of the issue, or in the middle of a project to reinvigorate the study and identify any weak points in analysis. It stimulates questions such as: Are there additional categories or “spokes on the wheel” that we have not considered? How are the main actors connected? Does the diagram suggest a different context for understanding the problem?

A Mind Map helps spark spontaneous and creative thinking. Its visual flow can logically represent how an individual or a group thinks about a topic. The diagram is an effective vehicle for disseminating complex information quickly. Mind Maps are quick to construct, making them useful for taking notes during an oral briefing or lecture. Analysts can chart the flow or logic of a lecture as it unfolds, capturing all key elements of the subject in a concise, coherent page.

### Value Added

Mind Maps encourage analysts to re-conceptualize issues, which may help to produce creative solutions. The process of building a Mind Map leads analysts to identify all parts of a complex system and their relationships, produce new ideas, identify relevant bodies of knowledge, and uncover—and resolve—differences of opinion at the start of a project. Although the map produced from such collaboration may not be complete, the discussion will have given the group a common basis for discussion. Mind Maps also enable clear, visual communication of complex relationships in a short time.

### The Method

- Decide on a central idea or focal question to put in the center of the circle.
- List the concepts that relate to the focal question on a separate sheet or a whiteboard. Sort the concepts as spokes radiating outward from the central idea.
- Make links by drawing lines among the related concepts, starting with the most general.
- Look for crosslinks among concepts. Detailed concepts should radiate from the main concepts, which extend from the central idea. Some Mind Maps include images to convey concepts quickly.
- Reposition, refine, and expand the map structure.
- Study the map and assign research topics, define collection gaps, or otherwise identify tasks in priority order for members of the group to pursue.

## Concept Maps

A Concept Map is a cascading graphic representation of key concepts relating to a topic and how they are connected.

A Concept Map has two elements: objects that are judged relevant to the topic and lines that display, and briefly describe, the connections among the ideas.

### When to Use It

Concept Maps are most helpful when used as a collaborative tool by a group to:

- Organize thoughts and achieve a shared understanding of key concepts.
- Facilitate communication of a complex set of relationships.
- Display the logical flow of a complex argument in a visual and easily digestible format.

The technique is used most effectively at the beginning of a project. It can also be used in the middle of a project to identify gaps or weak points in the analysis or at the end to provide a visual aid for understanding a complex issue.

### Value Added

When constructed by a group, the Concept Map's principal value may be the process undertaken to create the map, rather than the map itself. Building a Concept Map leads groups to identify all parts of a complex system and their relationships, produce new ideas, clarify concepts, identify bodies of knowledge, and uncover—and resolve—differences of opinion at the start of a project. Creation of the map provides the group with a common lexicon for further discussion. After collaboration, the group should identify further research needs and prepare a report that represents the wisdom of the group.

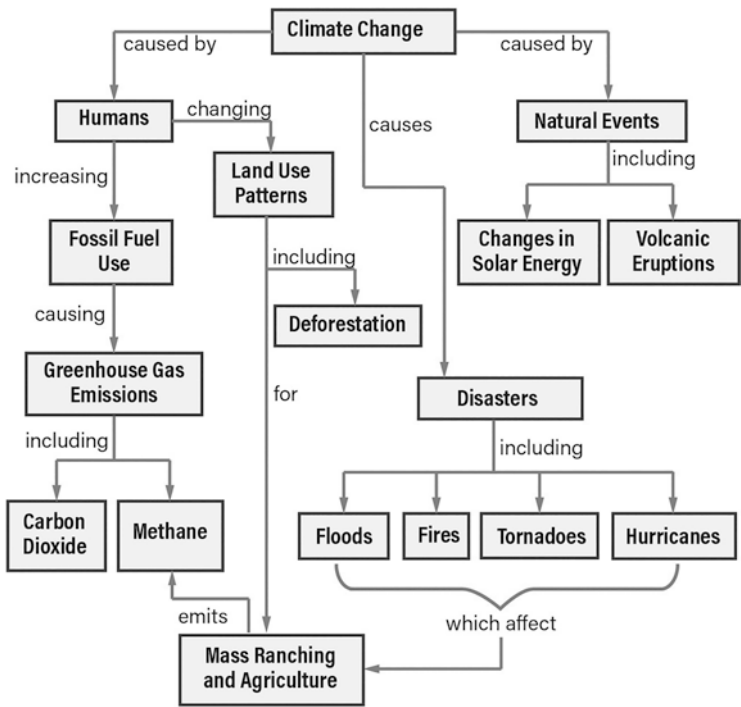
### The Method

Concept Maps can be created manually or with software tools to save time. Determine a central idea or topic and craft a focal question that defines what is to be included. The focal question may change throughout creation of the map, as the purpose is to start the conceptual process, not lock down the topic (see Fig. B.6).

- List concepts that relate to the focal question, then sort the concepts within the diagram space to present a logical progression of ideas. A Concept Map can be depicted as a network, a hierarchical structure, or a Mind Map.
- Establish links – notated using arrows – among the related concepts, starting with the most general. Choose the most appropriate words for describing the nature of each relationship. The lines may be labeled with words such as “causes,” “influences,” “leads to,” “results in,” “is required by,” or “contributes to.” Selecting good linking phrases is often the most difficult step.

**Focal Question:**

What are the causes and consequences of climate change?



**Fig. B.6** Concept map: causes and consequences of climate change. (Source: Copyright 2024 Pherson. All Rights Reserved)

- Look for and draw crosslinks among the concepts. Detailed concepts will flow from main concepts which extend from the main idea.
- Reposition, refine, and expand the map structure. Concept Maps can be highly complex, requiring their viewing on a large-format screen.

**Venn Analysis**

Venn Analysis is a visual technique that helps analysts explore the logic of arguments and illustrate sets of relationships in analytic arguments.

**When to Use It**

Venn Analysis is a simple process that can spark prolonged debate, particularly if many variables need to be reviewed. When applied to argumentation, the technique



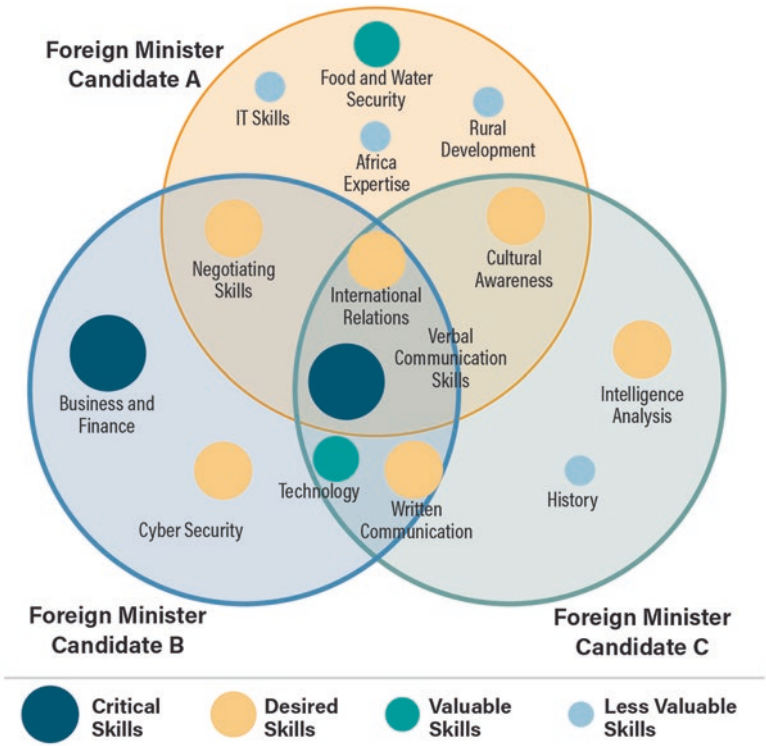
can reveal invalid reasoning by forcing analysts to state explicitly the elements of their argument and visually express how the elements are related.

Value Added

Venn Analysis helps analysts group variables or data points, identify subsets of variables, and look for correspondence or similarity among the data. Examining the relationships among the overlapping areas of a Venn diagram helps put things in perspective and often prompts new research or deeper inquiry. Care should be taken, however, not to make the diagram too complex by adding levels of precision that are unnecessary.

The Method

Venn diagrams consist of overlapping circles and are commonly used to teach set theory in mathematics. Each circle encompasses a distinct set of objects or data or variables; data points that are common to one or more circles are “mapped” in intersecting portions of the circles. Circles nested within one another represent subsets of the larger hierarchy of objects (see Fig. B.7).



**Fig. B.7** Venn analysis: which candidate should you choose? (Source: Copyright 2024 Pherson. All Rights Reserved)

- Use a large circle to represent a category or data set or the elements of an argument. If a large circle contains multiple elements of an argument or multiple types of data, represent each element or type of data with a circle and size each “circle-within-a-circle” according to the significance or size or importance of the element or data. Examine the boundaries of the circles. Does each circle represent a well-defined category or data set or set of objects? How are the elements within that circle determined, measured, or counted?
- Consider the impact of time. Might the circles or data sets grow or shrink with the passing of time? Would the circles have been the same size if this Venn diagram had been done five years ago? Would they be the same five years from now? The impact of time is especially important when looking at trends.
- Check the relative size and relationship of data within the circles and among the circles in the entire diagram. What assumptions are being made about the importance or significance of the circles?
- Ask whether any elements or data sets are missing. Do you need to move variables into overlapping circle elements to show relationships?
- Examine and compare overlapping circles. What is in each zone? What is significant about the size of each zone? Are these sizes likely to change over time?
- Report your conclusions.

## Diagnostic Techniques: Crack the Code

Diagnostic Techniques use data and logic to explain what has occurred or is happening; they can also offer alternatives when the data is insufficient to make a firm judgment.

Analysis conducted by the intelligence, law enforcement, and business communities will never achieve the accuracy and predictability of a true science because the information with which analysts must work is typically incomplete, ambiguous, and sometimes deceptive. The analytic process, however, can benefit from the lessons of science and adopt some of the elements of scientific reasoning.

The scientific process includes observing and categorizing information, generating hypotheses, and testing those hypotheses. This section focuses on several key techniques that relate to that process, including timelines and chronologies to organize information, challenging key assumptions about what the information reveals, developing alternative hypotheses, and testing the validity of hypotheses.

Practice in using the Key Assumptions Check, Multiple Hypothesis Generation, and Analysis of Competing Hypotheses will help analysts become proficient in the first three of the five habits of the master thinker: Challenging Assumptions, Generating Alternative Explanations, and Identifying Inconsistent Evidence.

In addition, the techniques provide a strong antidote to several cognitive pitfalls. They are particularly useful in reducing the influence of Confirmation Bias by requiring a critical evaluation of all the available information, guarding against Premature Closure, and mitigating the impact of Evidence Acceptance Bias. They also are a powerful counter weight to several intuitive traps, including Ignoring Inconsistent Evidence, Projecting Past Experiences, and Overinterpreting Small Samples.

This section discusses eight Diagnostic Techniques most often used by intelligence analysts:

- **Key Assumptions Check.** Makes explicit and questions the assumptions that guide an analyst's interpretation of evidence and the reasoning underlying any particular judgment or conclusion.
- **Multiple Hypothesis Generation.** Generates multiple alternatives for explaining an issue, activity, or event. It is done in a variety of ways, ranging from a form of structured brainstorming to the development of complex permutation trees.
- **Diagnostic Reasoning.** Applies hypothesis testing to the evaluation of significant new information in the context of all plausible explanations. It forces analysts to challenge their existing mental mindsets.
- **Analysis of Competing Hypotheses (ACH).** Applies Karl Popper's theory of science to intelligence analysis. It involves weighing the available information against a set of alternative explanations and selecting the explanation that fits best by focusing on the information that tends to disconfirm the other explanations.
- **Inconsistencies Finder™.** Uses a simplified version of ACH that evaluates the relative credibility of a set of hypotheses based on the amount of disconfirming information that has been identified.
- **Deception Detection.** Employs a set of checklists analysts can use to determine when to anticipate deception, the actual presence of disinformation and deception, and what to do to avoid being deceived.
- **Chronologies and Timelines.** Organizes data on events or actions when it is important to understand the timing and sequence of relevant events or identify key gaps (Figs. [B.8](#) and [B.9](#)).

Diagnostic Techniques help analysts:

- Escape established mindsets
- Identify gaps in data or logic
- Challenge long-held beliefs
- Generate alternative explanations
- Test competing hypotheses
- Look for disconfirming or inconsistent data

Cognitive Biases

Selected cognitive biases that can impede analytic thinking:

- Confirmation Bias:** Seeking only the information that is consistent with the lead hypothesis, judgment, or conclusion.
- Evidence Acceptance Bias:** Accepting data as true without assessing its credibility because it helps create a more coherent story.
- Vividness Bias:** Focusing attention on one vivid scenario while ignoring other possibilities or alternative hypotheses.

Misapplied Heuristics

Selected heuristics that—when misapplied—can impede analytic thinking:

- Anchoring Effect:** Accepting a given value of something unknown as a proper starting point for generating an assessment.
- Availability Heuristic:** Judging the frequency of an event or category by the ease with which instances come to mind.
- Desire for Coherence and Uncertainty Reduction:** Seeing patterns in random events as systematic and part of a coherent world.
- Mental Shotgun:** Lacking precision and control while making assessments continuously; providing quick and easy answers to difficult questions.
- Premature Closure:** Stopping the search for a cause when a seemingly satisfactory answer is found before sufficient information is collected and proper analysis can be performed.
- Satisficing:** Selecting the first answer that appears “good enough.”

Intuitive Traps

Selected examples of common mistakes made by practitioners.

- Assuming a Single Solution:** Thinking of only one likely (and predictable) outcome instead of acknowledging “the future is plural” and several outcomes should be considered.
- Ignoring the Absence of Information:** Not addressing the impact of the absence of information on analytic conclusions.
- Ignoring Inconsistent Evidence:** Discarding or ignoring information that is inconsistent with what one expects to see.
- Judging by Emotion:** Accepting or rejecting everything another person says because the analyst strongly likes or dislikes the person. Also referred to as the Halo Effect.
- Lacking Sufficient Bins:** Failing to remember or factor something into the analysis because the analyst lacks an appropriate category or “bin” for that item of information.
- Overinterpreting Small Samples:** Overdrawing conclusions from a small sample of data that is consistent.
- Projecting Past Experiences:** Assuming the same dynamic is in play when something appears to be in accord with an analyst’s past experiences.
- Rejecting Evidence:** Continuing to hold to a judgment when confronted with a mounting list of contradictory evidence.
- Relying on First Impressions:** Giving too much weight to first impressions or initial data, especially if they attract our attention and appear important at the time.

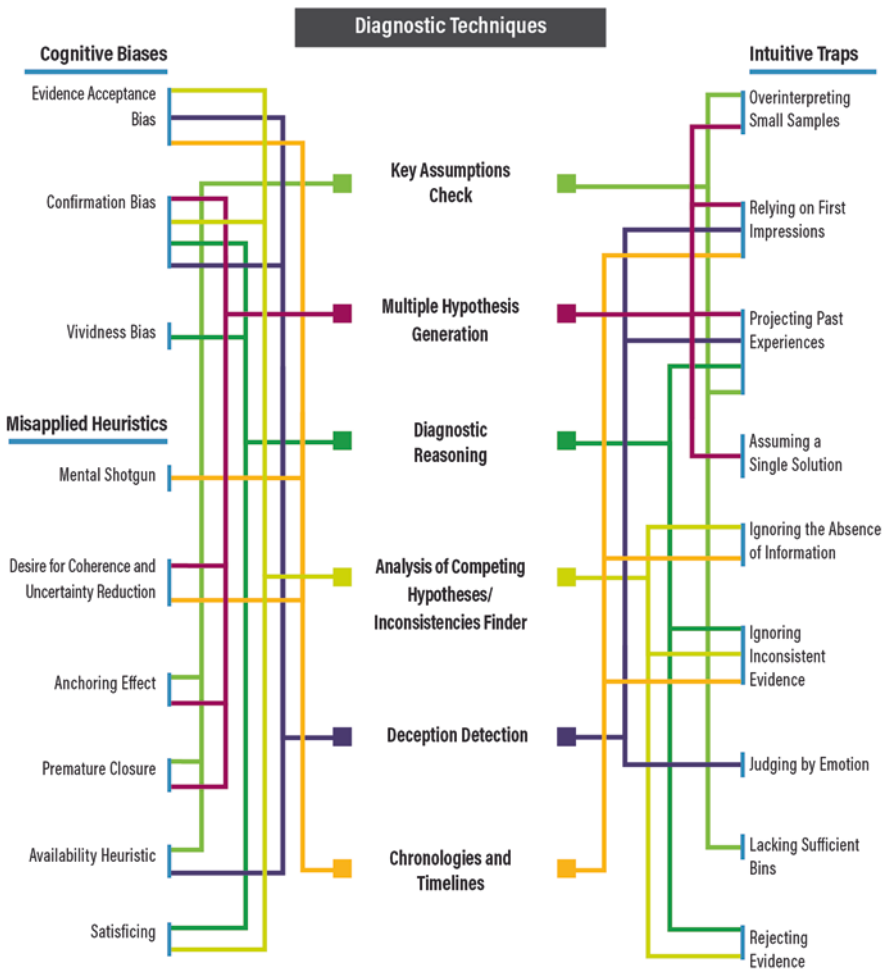
**Fig. B.8** Definitions of diagnostic biases, heuristics, and traps. (Source: Copyright 2024 Pherson. All Rights Reserved)

Key Assumptions Check

A Key Assumptions Check is an exercise to explicitly list and challenge the key working assumptions that underlie the basic analysis.

When to Use It

Any explanation of current events or estimate of future developments requires the interpretation of evidence. If the available evidence is incomplete or ambiguous,



**Fig. B.9** Matching diagnostic techniques to biases, heuristics, and traps. (Source: Copyright 2024 Pherson. All Rights Reserved)

this interpretation is influenced by assumptions about how things work. These assumptions should be made explicit early in the analytic process. If the Key Assumptions Check is done early in the process, be sure to review the assumptions later to determine if they remain valid.

**Value Added**

Preparing a written list of one’s working assumptions at the beginning of any project helps analysts:

- Identify the specific assumptions that underpin the basic analytic line.
- Achieve a better understanding of the most important dynamics at play.

- Gain a broader perspective and stimulate new thinking about an issue.
- Discover hidden relationships and links between key factors.
- Identify what developments would call a key assumption into question.
- Avoid surprise should new information render old assumptions invalid.

#### **Key Assumptions Check: A Key Safeguard for Analysts**

A Key Assumptions Check safeguards an analyst against several classic mental mistakes, including the tendency to overdraw conclusions, give too much weight to first impressions, and fail to address the absence of evidence.

### **The Method**

The process of conducting a Key Assumptions Check is relatively straightforward in concept but can be challenging in practice. Experience has taught that about one in four assumptions collapses on careful examination.

- Gather a small group of individuals who are working the issue along with a few “outsiders” who can bring other perspectives. Ideally, the sponsor or organizer of the gathering should notify participants about the topic beforehand and ask them to bring a list of assumptions they make about the topic to the meeting. If they do not do so beforehand, ask participants to write down several assumptions on 3 × 5 cards provided at the gathering.
- Record the assumptions on a whiteboard or easel.
- Elicit additional assumptions. Use various devices to prod participants’ thinking, like the journalists’ questions: Who, What, When, Where, Why, and How?
  - Use of phrases such as “will always,” “will never,” or “would have to be” suggests that an idea is not being challenged. Perhaps it should be.
  - Use of phrases such as “based on” or “generally the case” suggests that a challengeable assumption is being made.
- After developing a full set of assumptions, critically examine each assumption and ask:
  - Why am I confident the assumption is correct?
  - In what circumstances might it be untrue?
  - Could it have been true in the past but no longer be true today?
  - How much confidence do I have that the assumption is valid?
  - If it turns out to be invalid, how much impact would this have on the analysis?
- Place each assumption in one of three categories:
  - Basically supported or solid (S).
  - Correct with some caveats (C).
  - Unsupported or questionable—the “key uncertainties” (U).
- Redefine the list, deleting those assumptions that do not hold up to scrutiny and adding new ones that emerge from the discussion.
- Consider whether key uncertainties should be converted into intelligence collection requirements or research topics.

## Multiple Hypothesis Generation

Multiple Hypothesis Generation is a technique for developing multiple alternatives to explain a particular issue, activity, or behavior.

### When to Use It

In its broadest terms, a hypothesis is a potential explanation or conclusion that is to be tested by collecting and interrogating evidence. It is a declarative statement that has not been established as true – an “educated guess” based on observation to be supported or refuted by more observation or thorough experimentation.

Gaining confidence in a hypothesis is not a function solely of accumulating evidence in its favor, but in showing that situations that could establish its falsity do not, in fact, happen. Analysts should develop multiple hypotheses at the start of a project when:

- Many factors are involved in the analysis.
- A high level of uncertainty exists about the outcome.
- Analysts or decision makers hold competing views.

### Value Added

Generating multiple hypotheses at the start of a project helps analysts avoid:

- Coming to premature closure.
- Being overly influenced by first impressions.
- Selecting the first answer that appears “good enough.”
- Focusing on a narrow range of alternatives that represent marginal, not radical, change.
- Opting for what elicits the most agreement or is desired by the boss.
- Selecting the alternative that avoids a previous error or replicates a past success.

A good hypothesis:

- Is written as a statement, not as a question.
- Is based on observations and knowledge.
- Is testable and falsifiable.
- States the anticipated results clearly.
- Allows the independent variable to do the explaining.

### The Method

Several methods can be used to generate hypotheses. The most common are:

- **Situational logic.** Representing all the known facts and an understanding of the underlying forces at work at that particular time and place.
- **Applying theory.** Drawing from the study of many examples of the same phenomenon.
- **Comparison with historical analogies.** Comparing current events to historical precedents.

Different situations will require different methods. Permutation trees are often used to generate an extensive list of mutually exclusive possibilities. If the problem can be confined to two dimensions, use of a  $2 \times 2$  matrix and four quadrants works best. Cluster Brainstorming helps you capture all three methods.

- Gather a diverse group to review the available evidence and explanations for a given issue, activity, or behavior.
- Ask each member of the group to write down on a  $3 \times 5$  card one to three alternative explanations or hypotheses using the three methods outlined above.
- Collect the cards, display the results on a whiteboard, and consolidate the list to avoid duplication.
- Employ group and individual brainstorming techniques to identify key forces and factors.
- Aggregate the identified forces and factors into affinity groups and label each group.
- Use problem restatement and “considering the opposite” to develop new ideas.
- Update the list of alternative hypotheses. Strive to keep them mutually exclusive.
- Select the most promising hypotheses for testing.

## Diagnostic Reasoning

Diagnostic Reasoning is the application of hypothesis testing to a new development, a single new item of information or intelligence, or the reliability of a source.

Diagnostic Reasoning differs from Analysis of Competing Hypotheses (ACH) in that it is used to evaluate a single item of relevant information or a single source, while ACH deals with an entire range of hypotheses and multiple items of relevant information.

### When to Use It

Analysts should use the technique if they find themselves making a snap intuitive judgment while assessing the meaning of a new development, the significance of a new report, or the reliability of a reporting stream from a new source. Often, much of the information used to support one’s lead hypothesis turns out to be consistent



with alternative hypotheses as well. In such cases, the new information should not – and cannot – be used as evidence to support the prevailing view or lead hypothesis. The technique also helps reduce the chances of being caught by surprise; it ensures that the analyst or decision maker will have given at least some consideration to alternative explanations.

### **Value Added**

Diagnostic Reasoning helps analysts balance their natural tendency to interpret new information as consistent with their existing understanding of what is happening – that is, the analyst’s mental model. The technique helps analysts identify and focus on the information that is most needed to make a decision or to bolster an analytic judgment and to avoid the mistake of discarding or ignoring information that is inconsistent with what the analyst expects to see.

### **The Method**

- When a new and potentially significant item of information is collected or received, make a mental note of the significance of that item of information or what it seems to mean. For example, how does it help us understand why something happened or what it is likely to portend for the future? This quick, intuitive judgment will be based on the mental model that currently frames the analyst’s thought processes.
- Organize a Diagnostic Reasoning brainstorming session. Begin the discussion with questions like:
  - Are there alternative explanations for the lead hypothesis (defined as...) that would also be consistent with the new information, new development, or new source of reporting?
  - Is there a reason other than the lead hypothesis that...?
- Brainstorm, either alone or in a small group, the alternative judgments that another analyst with a different perspective might reasonably argue. Make a list of these alternatives.
- For each alternative, ask the following question: If this alternative were true or accurate, how likely is it that I would see this new information?
- Make a tentative judgment based on consideration of these alternatives.
  - If the new information is equally likely with each of the alternatives, then the information has no diagnostic value and analysts should consider whether to ignore it.
  - If the information is clearly inconsistent with one or more alternatives, those alternatives might be ruled out.
- Follow this mode of thinking for each of the alternatives and decide which alternatives need further attention and which can be dropped from consideration or put aside until new information surfaces.
- Proceed by seeking additional evidence to refute the remaining alternatives rather than to confirm them.

## Analysis of Competing Hypotheses

### Analysis of Competing Hypotheses Turning Conventional Approaches Upside Down

Analysis of Competing Hypotheses (ACH) is a tool to aid judgment on issues requiring careful weighing of alternative explanations or conclusions. ACH involves the identification of a complete set of alternative explanations (presented as hypotheses), the systematic evaluation of each, and the selection of the hypothesis or hypotheses that fit best by focusing on evidence that tends to disconfirm rather than to confirm each of the hypotheses.

### When to Use It

ACH is appropriate for almost any analysis where alternative explanations are needed for what has happened, is happening, or is likely to happen. It is particularly appropriate for controversial issues when analysts want to leave an audit trail to show what they considered and how they arrived at their judgments. If others, including decision makers, disagree with the analyst's conclusions, an ACH matrix can be used to identify the precise area of disagreement. Subsequent discussion can then focus on the most important substantive differences.

ACH is especially effective when there is a robust flow of data to absorb and evaluate. It is well-suited for dealing with technical issues and can be used to address questions such as: "For which weapons system is this part most likely being imported?" It is useful for managing criminal investigations and determining which line of analysis is correct. ACH also is helpful in dealing with the potential for denial and deception: It was initially developed for that purpose.

The technique can be used by a single analyst but is most effective with a small team that can challenge one another's evaluation of the evidence. The exercise requires a commitment of time; once all the evidence has been collected, it usually takes several hours to fill out the matrix and work through all the stages of the analytic process before writing up the conclusions. Usually, a facilitator or colleague previously trained in the technique is needed to guide analysts through the process, especially if it is the first time the group has used ACH.

### Value Added

Analysis of Competing Hypotheses helps analysts overcome several cognitive biases and intuitive traps that can lead to intelligence failures or analytic mistakes:

- Succumbing to the tendency to select the first answer that appears "good enough" (Satisficing).
- Failing to generate a full set of explanations or hypotheses at the outset of a project.

- Ignoring or discounting information that does not fit the preferred explanation.
- Relying on evidence to support one's favored hypothesis that also is consistent with other hypotheses and, therefore, has no diagnostic value in assessing the relative likelihood of the hypotheses.

ACH can help overcome what is called Confirmation Bias – the tendency to search for or interpret new information in a way that confirms one's preconceptions and avoids interpretations that contradict prior beliefs. A word of caution, however: ACH works only when the analyst approaches the issue with an open mind. An analyst who is already committed to a specific conclusion will find a way to interpret the evidence as consistent with that belief.

ACH ensures that all analysts are working from the same evidence, arguments, and assumptions. It gives each member of the team an opportunity to express his or her view on how that information relates to the likelihood of each hypothesis. Users of ACH report that it helps them gain a better understanding of the differences of opinion with other analysts. Review of the ACH matrix provides a systematic basis for identification and discussion of differences between two or more analysts. Analysts also report that reference to the matrix helps depersonalize the argument when serious differences of opinion are present.

Simultaneous evaluation of competing hypotheses is challenging to do. The human brain has difficulty trying to retain as many as seven numbers – or hypotheses – in working memory and note how each item of information fits into each hypothesis. It takes far greater mental agility than listing evidence supporting a single hypothesis that was pre-judged as the most likely answer. ACH overcomes these obstacles by using a matrix to make it easier to enter and sort the data.

#### **ACH Is a Thinking Tool**

Remember! ACH is a thinking tool. Its function is to help analysts think through an issue, not to predict an outcome.

### **The Method**

ACH involves a simple eight-stage process (see Fig. [B.10](#)):

1. Identify all possible hypotheses that should be considered. Hypotheses should be mutually exclusive; that is, if one hypothesis is true, all others must be false.
  - Use a group of analysts with different perspectives to brainstorm all plausible hypotheses. Include a deception hypothesis if appropriate.
2. Make a list of significant evidence or relevant information (including arguments and assumptions) that are helpful in evaluating the hypotheses.
  - Remember to include the absence of things one would expect to see if a hypothesis were true.

Relevant Information	Credibility Rating	Hypothesis		
		1	2	3
Statement	H	C	I	II
Report	M	I	C	I
Assumption	H	CC	I	I
Report	M	C	II	C
Statement	L	C	C	II
Absence of Evidence	H	C	CC	I
Report	M	I	C	C
Assumption	M	CC	C	CC
Report	H	CC	C	C
Inconsistency Score		2	4	7

**Fig. B.10** Analysis of competing hypotheses sample matrix. (Source: Copyright 2024 Pherson. All Rights Reserved)

3. Analyze the “diagnosticity” of the evidence and arguments to identify which points are most influential in judging the relative likelihood of the hypotheses.
  - To facilitate this analysis, fill out a matrix with hypotheses across the top and relevant information down the side. Assess each input by working across the matrix. Ask yourself “Is this piece of evidence consistent with the hypothesis, inconsistent with the hypothesis, neutral, or is the question not relevant?” If it is consistent, place a “C” in the box; if inconsistent, place an “I”; if neutral or not applicable, place a “NA”. If a specific item of relevant information is compelling, place a “CC”; if it strongly undercuts the hypothesis, place an “II”.
4. Refine the matrix.
  - Reconsider the hypotheses. You may want to combine two hypotheses into one or add a new hypothesis. You can include additional evidence or argumentation at any time. If you add hypotheses, go back and evaluate all the evidence for each new hypothesis.
5. Draw tentative conclusions about the relative likelihood of each hypothesis.

- Proceed by trying to refute hypotheses rather than confirm them. Assess each hypothesis. As a first cut, examine the total number of “I” or “II” ratings in each column. The hypotheses with the fewest “I” or “II” ratings are the most likely. The ones with the most are the least likely explanations.
6. Analyze the sensitivity of your conclusion to a few critical items of evidence.
    - Identify the most diagnostic evidence that drives your conclusion. For example, look for evidence that has a “C” for the lead hypothesis but an “I” for all other hypotheses. Evaluate the importance and credibility of those reports, arguments, or assumptions that garnered a “C”. Consider the consequences for the analysis if that item were wrong or misleading or subject to a different interpretation. If all the evidence earns a “C” for each hypothesis, then none of the evidence is particularly diagnostic.
  7. Report your conclusions.
    - Discuss the likelihood of all the hypotheses, not just the most likely one. State which evidence was most diagnostic and how compelling a case it makes in distinguishing the most likely hypothesis(es) from the others.
  8. Identify indicators for future observation.

Generate two lists: one focusing on future events that would substantiate your analytic judgment and a second that would suggest your judgment is less likely to be correct. Monitor both lists on a regular basis, remaining alert to whether new information strengthens or weakens your case.

### **Inconsistencies Finder™**

The Inconsistencies Finder™ is a simpler version of Analysis of Competing Hypotheses that focuses attention on relevant information that is inconsistent with a hypothesis, helping to disconfirm its validity.

#### **When to Use It**

The Inconsistencies Finder™ technique can be used whenever a set of alternative hypotheses exists, or has recently been identified, and analysts need to:

- Carefully weigh the credibility of multiple explanations, or alternative hypotheses, explaining what has happened, is happening, or is likely to happen.
- Evaluate the validity of a large amount of data as it relates to each hypothesis.
- Challenge their current interpretation of the evidence (or, alternatively, the interpretation of the group).
- Create an audit trail.

### Value Added

The process of systematically reviewing the relevant information and identifying which information or evidence is inconsistent with each hypothesis helps analysts:

- Identify the most diagnostic information.
- Focus on the disconfirming evidence.
- Dismiss those hypotheses with compelling inconsistent information.
- Flag areas of agreement and disagreement.
- Highlight the potential for disinformation or deception.

Instead of building a case to justify a preferred solution or answer, the Inconsistencies Finder™ technique helps analysts easily dismiss those hypotheses with compelling inconsistent information and focus attention on those with the least disconfirming information. An analytic case can then be built that supports the most likely hypothesis – or hypotheses.

The technique is not an answer generator. It should be viewed as a thinking tool that helps you frame a problem more efficiently. Unlike ACH, this technique does not help analysts identify the most diagnostic information for making their case.

### The Method

1. Create a matrix with all the hypotheses under consideration listed in separate boxes along the top of the matrix. Make a list of all the relevant information (including significant evidence, arguments, assumptions, and the absence of things) that would be helpful in evaluating the given set of hypotheses. Put each piece of information in a separate box down the left side of the matrix.
2. Working in small teams, analyze the diagnosticity of the relevant information. Look for information that is inconsistent with each hypothesis. Review each piece of information against each hypothesis. Place an “I” in the box that represents the convergence of information/hypothesis if you would not expect to see that item of information if the hypothesis were true. Place an “II” in the box if the presence of the information makes a compelling case that the hypothesis cannot be true. For example, if a suspect had an unassailable alibi proving he or she was at a different location at the time a crime was committed, then he or she could not be the perpetrator.
3. Add up all the “I’s” (Inconsistent ratings) in each hypothesis column. Assign one point to one Inconsistent rating “I” and two points to two Inconsistent ratings “II”.
4. Rank order the credibility of the hypotheses based on the total number of “I’s” each hypothesis receives. The more “I’s” in a column, the less likely the hypothesis.
5. Assess if the “I’s” noted in each column make a compelling case to discount that hypothesis. Work your way through the “I’s”, beginning with the hypothesis with the most “I’s” and proceeding through to the hypothesis with the fewest or no “I’s”.

**Adopting the ACH Technique When Pressed for Time**

The Inconsistencies Finder™ technique aids the production of high-quality analysis by helping an analyst:

- Avoid leaping to conclusions
- Move beyond “first impressions”
- Challenge preconceived ideas
- Uncover unknowns and uncertainties

6. Identify the hypothesis(es) with the least inconsistent information and make a case for that hypothesis(es) being true.

**Deception Detection**

Deception Detection is a set of checklists analysts can use to help them determine when to look for deception, whether deception actually is present, and what to do to avoid being deceived.

Deception is an action intended by an adversary to influence the perceptions, decisions, or actions of another to the advantage of the deceiver. But detecting deception is not an easy task: As Robert Jervis notes:

*It is very hard to deal with deception when you are really just trying to get a sense of what is going on, and there is so much noise in the system, so much overload, and so much ambiguity. When you layer deception schemes on top of that, it erodes your ability to act.*

—Robert Jervis, *Signaling and Perception in the Information Age*

**When to Use It**

Analysts should be concerned about the possibility of deception when:

- The potential deceiver has a history of conducting deception.
- Key information is received at a critical time – that is, when either the recipient or the potential deceiver has a great deal to gain or to lose.
- Information is received from a source whose bona fides are questionable.
- Analysis hinges on a single critical piece of information or reporting.
- Accepting new information would require the analyst to alter a key assumption or judgment.
- Accepting new information would cause the recipient to extend or divert significant resources.
- The potential deceiver may have a feedback channel that illuminates whether and how the deception information is being processed and to what effect.

### Value Added

Most analysts know not to assume that everything that arrives in their inbox is valid, but few know how to factor such concerns effectively into their daily work practices. Considering the deception hypothesis puts a considerable cognitive burden on the analyst. If the analyst accepts the possibility that some of the information may be deceptive, then all the evidence is open to question and no valid inferences can be drawn from the reporting. This fundamental dilemma can paralyze analysis unless the analyst uses practical tools to determine when it is appropriate to worry about deception, how best to detect it in the reporting, and what to do in the future to guard against being deceived. As Heuer states:

*The accurate perception of deception in counterintelligence analysis is extraordinarily difficult. If deception is done well, the analyst should not expect to see any evidence of it. If, on the other hand, it is expected, the analyst will find evidence of deception even when it is not there.*

—Richards J. Heuer Jr., *Cognitive Factors in Deception and Counterdeception*

### Deception Checklists

If the possibility of deception is a concern, the analyst, or preferably a small group of analysts, should assess the key reporting based on four sets of criteria:

- Does the potential deceiver have Motive, Opportunity, and Means (MOM) to deceive?
- Would this deception be consistent with Past Opposition Practices (POP)?
- Do we have cause for concern regarding the Manipulability of Sources (MOSES)?
- What can we learn from our Evaluation of the Evidence (EVE)?

#### **Motive, Opportunity, and Means (MOM)**

- **Motive:** What are the goals and motives of the potential deceiver?
- **Channels:** What means are available to the potential deceiver to feed information to us?
- **Risks:** What consequences would the adversary suffer if such a deception were revealed?
- **Costs:** Would the potential deceiver need to sacrifice sensitive information to establish the credibility of the deception channel?
- **Feedback:** Does the potential deceiver have a feedback mechanism to monitor the impact of the deception operation?

#### **Past Opposition Practices (POP)**

- Does the adversary have a history of engaging in deception?
- Does the current circumstance fit the pattern of past deceptions?
- If not, are there other historical precedents?



- If not, are there changed circumstances that would explain using this form of deception?

### **Manipulability of Sources (MOSES)**

- What is the basis for judging the source to be reliable?
- Does the source have direct access or only indirect access to the information?
- How good is the source's track record or reporting?
- Is the source vulnerable to control or manipulation by the potential deceiver?

### **Evaluation of Evidence (EVE)**

- How accurate is the source's reporting? Has the whole chain of evidence, including translations, been checked?
- Does the critical evidence check out? Remember, the sub-source can be more critical than the source.
- Does evidence from one human source or stream of reporting conflict with that coming from another human source or stream of reporting?
- Do the other sources of information provide corroborating evidence?
- Is any information one would expect to see noteworthy by its absence?

## **Avoiding Deception**

Analysts have found the following "rules of the road" helpful for dealing with deception. They are taken from Richards J. Heuer Jr. in "Cognitive Factors in Deception and Counterdeception," *Strategic Military Deception* (1982) and Michael I. Handel (ed.), *Strategic and Operational Deception in the Second World War* (1987).

- Avoid over-reliance on one source of information.
- Seek the opinion of those closest to the reporting.
- Be suspicious of human sources or human sub-sources who have not been seen or when it is unclear how they obtained the information.
- Do not rely exclusively on what someone says (verbal intelligence). Look for material evidence: documents, pictures, an address, a phone number, or some other form of concrete, verifiable information.
- Be suspicious of information that plays strongly to your own known biases and preferences.
- Look for a pattern of a source's reporting initially appearing correct but later turning out to be wrong and the source invariably offering a plausible, albeit weak, explanation for the discrepancy.
- At the onset of a project, generate and evaluate a full set of plausible hypotheses – including a deception hypothesis, if appropriate.
- Know the limitations as well as the capabilities of the potential deceiver.

## Chronologies and Timelines

Chronologies list events in the order of their occurrence, usually in narrative or bulleted format. Timelines arrange information graphically along a chronological spectrum. Information can be presented visually by categorizing the data and displaying it above and below the line.

### When to Use It

Chronologies and Timelines aid in organizing events or actions. Use them whenever it is important to understand the timing and sequence of relevant events or to identify key events and gaps. The events may or may not have a cause-and-effect relationship.

### Value Added

Chronologies and Timelines help an analyst identify patterns and correlations among events. Analysts can use them to relate seemingly disconnected events to the big picture; to highlight or identify significant changes; or to assist in the discovery of trends, developing issues, or anomalies. They can serve as a catch-all for raw data when the meaning of the data has not yet been identified. Multiple-level Timelines allow analysts to track concurrent events that may affect one another. Chronologies and Timelines are usually developed at the onset of a task but can be used in post-mortems to break down the stream of reporting, find the causes for analytic failures, and highlight significant events after an intelligence or business surprise.

The activities on a Timeline can lead an analyst to hypothesize the existence of previously unknown events. In other words, the series of known events may make sense only if other previously unknown events had occurred. The analyst can then look for other indicators of those missing events. Chronologies and Timelines are also useful for organizing information in a format readily understood in a briefing.

### The Method

Chronologies and Timelines are effective yet simple ways to order incoming information when processing daily message traffic. An Excel spreadsheet or even a Word document can be used to log the results of research and marshal evidence.

Tools such as the Excel drawing function or Analyst's Notebook can be used to draw the Timeline. Follow these steps:

- When researching the problem, ensure the relevant information is listed with the date or order in which it occurred. Make sure the data are properly referenced.
- Review the Chronology or Timeline by asking the following questions:
  - What are the temporal distances between key events? If “lengthy,” what explains the gap? Are there missing pieces of data?
  - Was information overlooked that may have had an impact on or be related to the events?

- Conversely, if events seem to have happened more rapidly than expected, or if not, all events appear to be related, could the information be related to multiple event Timelines?
- Does the Timeline have all the critical events that are necessary for the outcome to occur?
- What are the information or intelligence gaps?
- What events outside the Timeline could have influenced the activities?
- If preparing a Timeline, use the space on both sides of the line to highlight important analytic points. For example, place facts above the line and commentary below the line. Alternatively, contrast the activities of groups, organizations, or streams of information by placement above or below the line. If multiple actors are involved, use multiple lines.
- Look for patterns in the data connecting persons, places, organizations, and other activities. Identify gaps or unexplained time periods and consider the implications of the absence of evidence. Prepare a summary chart detailing key events and key analytic points in an annotated Timeline.

## Reframing Techniques: Consider the Alternatives

Reframing Techniques spur analysts to rethink an issue from a different point of view and challenge existing mindsets.

Students of the intelligence profession have long recognized that failure to challenge a consensus judgment or a well-established mental model has been a consistent feature of most major intelligence failures. The postmortem analysis of virtually every major US intelligence failure since Pearl Harbor has identified an analytic mental model or mindset as a key factor contributing to the failure.

In the wake of al-Qa'eda's attack on the United States on September 11, 2001 and the erroneous 2002 National Intelligence Estimate on Iraq's weapons of mass destruction, the US intelligence community came under justified criticism, accompanied by demands that it improve its analytic methods to mitigate the potential for future intelligence failures. For the most part, critics, especially in the US Congress, focused on the need for "alternative analysis" or techniques that challenged conventional wisdom by identifying potential alternative outcomes. Such techniques carried many labels, including challenge analysis, contrarian analysis, and red hat or red cell analysis.

US intelligence agencies responded by developing and propagating techniques such as Red Team Analysis, Team A-Team B Analysis, Team A-Team B Debate, and Devil's Advocacy. Use of such techniques had both pluses and minuses. The techniques forced analysts to consider alternative explanations and explore how their key conclusions could be undermined. A major drawback, however, was that the

discussions carried with them an emotional component. No one wants to be told they did something wrong, and it is hard not to take such criticism personally. A more significant concern was that when analysts found themselves defending their positions, their key judgments and mindsets tended to become even more engrained.

One promising solution to this dilemma has been to develop and propagate Reframing Techniques that hopefully accomplish the same objective while neutralizing the emotional component. The goal is to find ways to look at a problem from multiple perspectives while avoiding the emotional pitfalls of an us-versus-them approach. Reframing Techniques are particularly helpful in minimizing the impact of Mirror Imaging and the tendency to confuse the frequency of an event with what most easily comes to mind. The techniques also help analysts avoid the intuitive traps of Relying on First Impressions, Assuming a Single Solution, and Ignoring the Absence of Information.

This section describes eight different ways analysts can reframe their analysis:

- **Outside-In Thinking.** Focuses on the broader forces that can influence an issue of concern.
- **Structured Analogies.** Applies analytic rigor to reasoning by analogy.
- **High Impact /Low Probability Analysis.** Warns a decision maker of the possibility a low probability event may happen even if the evidential base for making such a conclusion is weak.
- **What If? Analysis.** Alerts a decision maker to an event that could happen, or could be happening, even if it may seem unlikely at the time.
- **Classic Quadrant Crunching.** Uses key assumptions and their opposites as a starting point for systematically identifying and considering all possible relationships in a multidimensional, highly complex, and usually nonquantifiable problem space.
- **Premortem Analysis.** Reduces the risk of analytic failure by identifying and analyzing a potential failure before it occurs.
- **Structured Self-Critique.** Employs a checklist process to review all the possible ways an analysis could turn out to be incorrect.
- **Red Hat Analysis.** Marshals the expertise, culture, and analytic skills required for a team to explore how an adversary or competitor would think about an issue (Figs. B.11 and B.12).

## Outside-In Thinking

Outside-In Thinking is used to identify the broad range of global, political, economic, military, environmental, technological, psychological, legal, or social forces and trends that are outside the analysts' areas of expertise but may profoundly shape the issue, allowing them to incorporate this broader conceptual framework into their analysis.

Cognitive Biases

Selected cognitive biases that can impede analytic thinking:

- Confirmation Bias:** Seeking only the information that is consistent with the lead hypothesis, judgment, or conclusion.
- Evidence Acceptance Bias:** Accepting data as true without assessing its credibility because it helps create a more coherent story.
- Mirror Imaging:** Assuming others will act in the same way we would, given similar circumstances.
- Vividness Bias:** Focusing attention on one vivid scenario while ignoring other possibilities or alternative hypotheses.

Misapplied Heuristics

Selected heuristics that—when misapplied—can impede analytic thinking:

- Anchoring Effect:** Accepting a given value of something unknown as a proper starting point for generating an assessment.
- Associative Memory:** Predicting rare events based on weak evidence or evidence that easily comes to mind.
- Availability Heuristic:** Judging the frequency of an event or category by the ease with which instances come to mind.
- Desire for Coherence and Uncertainty Reduction:** Seeing patterns in random events as systematic and part of a coherent world.
- Groupthink:** Choosing the option that the majority of the group agrees with or ignoring conflicts within the group due to a desire for consensus.
- Mental Shotgun:** Lacking precision and control while making assessments continuously; providing quick and easy answers to difficult questions.
- Premature Closure:** Stopping the search for a cause when a seemingly satisfactory answer is found before sufficient information is collected and proper analysis can be performed.
- Satisficing:** Selecting the first answer that appears “good enough.”

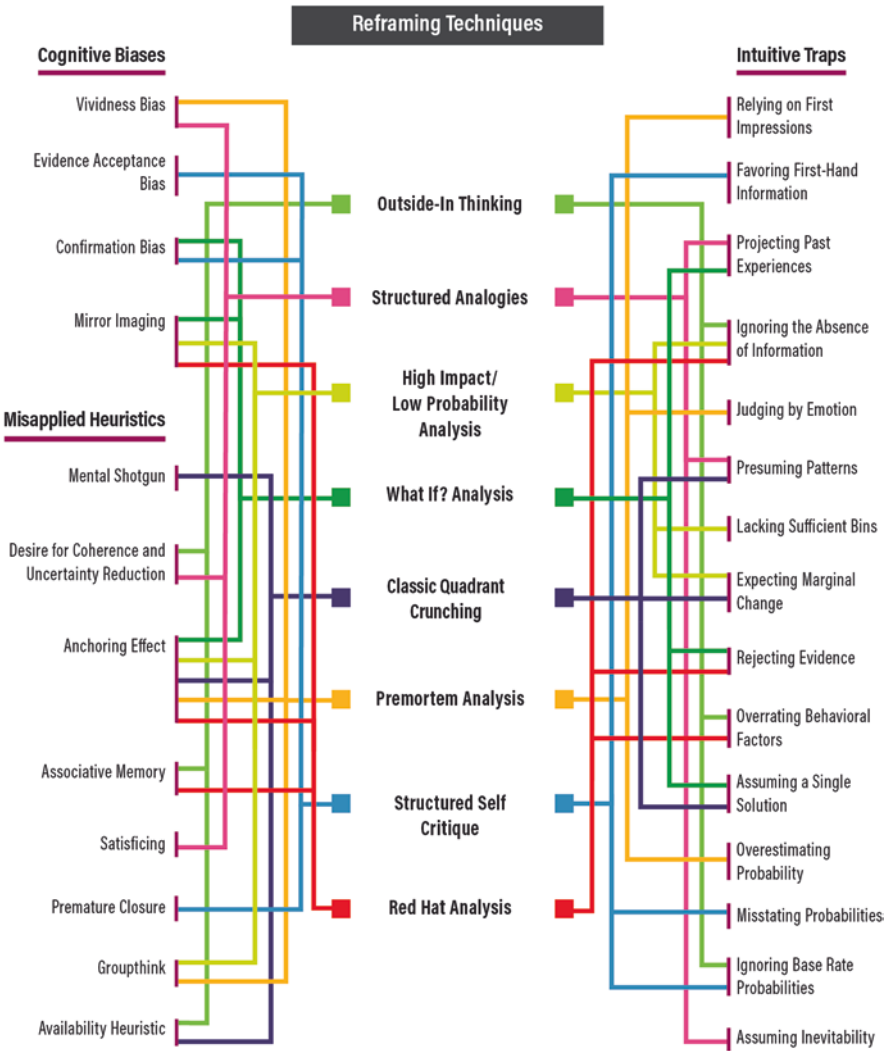
Intuitive Traps

Selected examples of common mistakes made by practitioners.

- Assuming Inevitability:** Assuming an event was more certain to occur than actually was the case. Also referred to as the Illusion of Inevitability.

- Assuming a Single Solution:** Thinking of only one likely (and predictable) outcome instead of acknowledging “the future is plural” and several outcomes should be considered.
- Expecting Marginal Change:** Focusing on a narrow range of alternatives representing marginal, not radical, change.
- Favoring First-hand Information:** Allowing information we receive directly to have more impact than what we learn or are told secondhand.
- Ignoring the Absence of Information:** Not addressing the impact of the absence of information on analytic conclusions.
- Ignoring Base Rate Probabilities:** Failing to accurately assess the likelihood of an event when faced with statistical facts and ignoring prior probabilities or base rates.
- Judging by Emotion:** Accepting or rejecting everything another person says because the analyst strongly likes or dislikes the person. Also referred to as the Halo Effect.
- Lacking Sufficient Bins:** Failing to remember or factor something into the analysis because the analyst lacks an appropriate category or “bin” for that item of information.
- Misstating Probabilities:** Miscommunicating or misperceiving estimates of subjective probability (most likely, could, probably).
- Overestimating Probability:** Overestimating the probability of multiple independent events occurring for an event or attack to take place.
- Overrating Behavioral Factors:** Overrating the role of internal determinants of behavior (personality, attitudes, beliefs) and underestimating the importance of external or situational factors (constraints, forces, incentives). Often referred to as Fundamental Attribution Error.
- Presuming Patterns:** Believing that actions are the result of centralized planning or direction and finding patterns where they do not exist.
- Projecting Past Experiences:** Assuming the same dynamic is in play when something appears to be in accord with an analyst’s past experiences.
- Rejecting Evidence:** Continuing to hold to a judgment when confronted with a mounting list of contradictory evidence.
- Relying on First Impressions:** Giving too much weight to first impressions or initial data, especially if they attract our attention and appear important at the time.

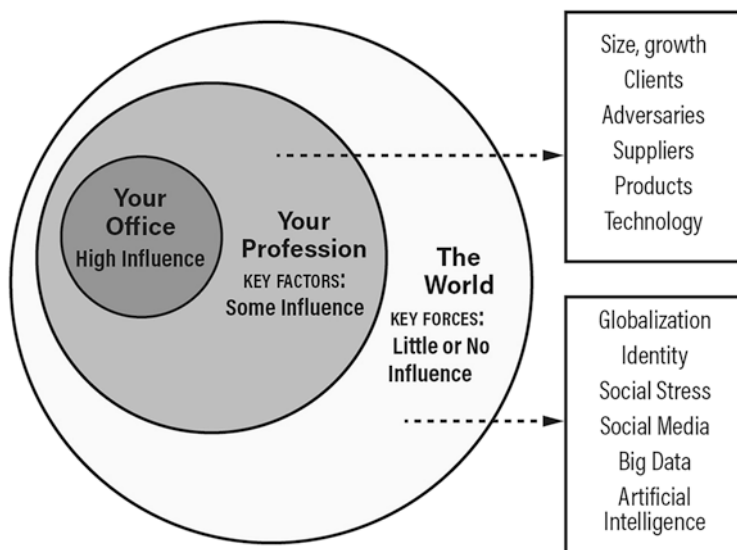
**Fig. B.11** Definitions of reframing biases, heuristics, and traps. (Source: Copyright 2024 Pherson. All Rights Reserved)



**Fig. B.12** Matching reframing techniques to biases, heuristics, and traps. (Source: Copyright 2024 Pherson. All Rights Reserved)

**When to Use It**

Outside-In Thinking is most useful in the early stages of the analytic process when analysts need to identify all the critical factors that could influence how a situation will develop. The technique is also useful if a large database is being assembled, and analysts want to ensure they have not forgotten to include important fields in the database architecture. For most analysts, important categories of information (or database fields) are easily identifiable early in a research effort but invariably one or two fields emerge after one is well into the project, forcing the analyst to go back and review all previous files and recode for that entry.



**Fig. B.13** The outside-in approach. (Source: Copyright 2024 Pherson. All Rights Reserved)

### Value Added

Many analysts tend to think from the inside out, focusing on factors in their specific area of responsibility with which they are most familiar. We live in a complex and interrelated world, however. Events in our niche of that world are often affected by forces in the broader environment over which we have no control. The goal of Outside-In Thinking is to help analysts see the entire picture, not just that part of the picture with which they are already familiar (see Fig. B.13).

Outside-In Thinking reduces the risk of missing important variables early in the analytic process by focusing on a narrow range of alternatives representing only marginal change. It encourages analysts to rethink a problem or an issue while employing a broader conceptual framework.

The technique is particularly effective in countering the tendency of analysts to predict events based on weak evidence, judge the frequency of an event based on how quickly it comes to mind, and see patterns in random events. In addition, it protects analysts against ignoring the absence of information, ignoring prior probabilities or base rates for events, and overrating behavioral factors while underestimating situational factors.

### The Method

- Generate a generic description of the problem or phenomenon to be studied.
- Form a group to brainstorm all the key forces and factors that could have an impact on the topic but over which the subject can exert little or no influence, such as globalization, the emergence of new technologies, historical precedent, and the growth of the internet.



- Employ the mnemonic STEMPLES+ (Social, Technological, Economic, Military, Political, Legal, Environmental, Security + Psychological, Demographic, etc.) to structure the discussion.
- Assess specifically how each of these forces and factors might have an impact on the problem.
- Assess whether there is expertise available for each factor or category.
- Ascertain whether these forces and factors have an impact on the issue at hand based on the available evidence.
- Generate new collection tasking or research priorities to fill in information gaps.

### Getting Ahead of the Curve

Counterterrorist analysts constantly ask: “What technologies might the terrorists be employing to conceal their communications with each other?” The Inside-Out approach would be to monitor all-source reporting to detect any tip-offs, lead information, or evidence of new systems or techniques being used. The Outside-In approach would begin by brainstorming what new technologies are emerging that could be used by terrorists (such as Voice Over Internet Protocol (VOIP) or ChatGPT—a natural language processing tool driven by AI technology). Analysts would explore how each of these technologies might be used, by whom, and under what circumstances. Once actual capabilities and vulnerabilities are determined, analysts would task collectors to find evidence that such techniques were being employed.

## Structured Analogies

Structured Analogies compares a topic under study with similar historical or generic examples to derive shared attributes, theories, models, and indicators.

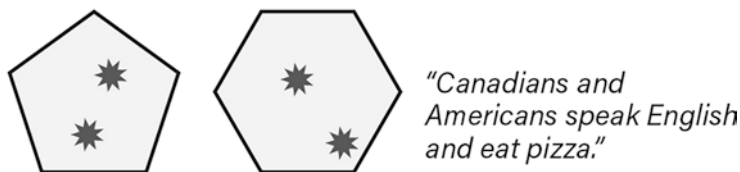
Analogies compare two situations to elicit and provoke ideas, help solve problems, and suggest indicators (see Fig. B.14). The technique applies increased rigor to analogical reasoning by systematically comparing an issue of concern with one or more analogies.

### When to Use It

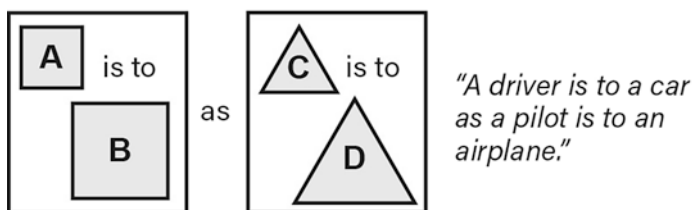
In daily life, people recognize patterns of events or similar situations, then take actions that were successful in a previous experience or avoid actions that were previously unsuccessful. Analysts can use this technique to gain insights from past, similar situations, often in unfamiliar situations where the available information is inadequate for any other approach. Structured Analogies also can be used to generate indicators.



### Analogy based on shared attributes:



### Analogy based on function or relation:



**Fig. B.14** Two types of structured analogies. (Source: Copyright 2024 Pherson. All Rights Reserved)

### Value Added

Reasoning by analogy helps achieve understanding by reducing the unfamiliar to the familiar. In the absence of data required for a full understanding of the current situation, analogical reasoning may be the only forecasting option. Structured Analogies decreases the significant potential for error inherent in analogical reasoning by helping protect analysts from making the mental mistakes of overdrawing conclusions from a small set of data and assuming the same dynamic is in play when, at first glance, something seems to accord with their past experiences.

Structured Analogies helps analysts avoid the tendency to fasten on a single analogy and focus only on evidence that supports that analogy.

### The Method

- Describe the issue and the judgment or decision that needs to be made.
- Identify experts with diverse and broad backgrounds that enable them to identify analogous situations.
- Brainstorm as many analogies as possible without focusing on how similar they are to the current situation. Decide which should be examined.
- Write an account of each selected analogy, focusing on both aspects that are closest to the issue and those that are different.
- Examine the nature of the similarities and trace these critical aspects back to root causes.
- Distribute the analogies to the experts.

- Evaluate the analogies, rating the similarities and root causes of each to the issue of concern on a scale of 0 to 10, where 0 = not at all similar and 10 = very similar.
- Relate the highest-ranked analogies to the issue of concern. Discuss key findings and draw on the analogies to forecast an expected outcome.
- When appropriate, use the analogous cases to identify drivers or policy actions that might influence the outcome of the current situation.

If using Structured Analogies to generate indicators, consider the highest-ranked analogies and ask if the previous actions and events are happening now or have happened. Also ask what actions have not happened or are not happening and assess the implications.

### **High Impact/Low Probability Analysis**

High Impact/Low Probability Analysis provides decision makers with early warning that a seemingly unlikely event that would have major policy and resource repercussions might occur.

#### **When to Use It**

High Impact/Low Probability Analysis should be used when one wants to alert decision makers to the potential that a seemingly long-shot development that would have a major policy or resource impact may be more likely than previously anticipated. Events that would have merited such treatment before they occurred include the 2008 global economic crisis, the rapid rise of the Islamic State in Iraq and Syria (ISIS), the 6 January 2021 insurrectionist attack on the US Capitol, and the accelerating impact of global climate change. A High Impact/Low Probability study most often is initiated when some new and often fragmentary evidence suggests that an unanticipated event might be more likely than thought previously. For example, a tip-off warning of a major information warfare attack or a serious terrorist attack on a major national holiday should be passed to decision makers even though solid evidence is lacking.

#### **Value Added**

The High Impact/Low Probability Analysis format allows analysts to explore the consequences of an event—particularly one not deemed likely by conventional wisdom—without having to challenge the judgment or to argue with others about how likely an event is to happen. The analytic focus is not on whether something will happen but to take as a given that an event could happen that would have a major impact. The objective is to posit whether an increasingly credible case can be made for an unlikely event occurring that could pose a major danger—or offer great opportunities. The more nuanced and concrete the analyst's depiction of the plausible paths to danger, the easier it is for a decision maker to develop a package of policies to protect or advance the vital interests of his or her country or business.

The technique helps protect analysts against some of the most common cognitive biases and misapplied heuristics including Mirror Imaging, Groupthink, and the Anchoring Effect. It also helps mitigate against intuitive traps such as Expecting Marginal Change and Lacking Sufficient Bins.

### **The Method**

An effective High Impact/Low Probability Analysis involves these steps:

- Clearly describe the unlikely event.
- Define the high impact outcome precisely if this event occurs. Consider both the actual event and the secondary effects of the event.
- Identify recent information or reporting that suggests that the possibility of the unlikely event occurring may be increasing.
- Postulate additional triggers that would propel events in this unlikely direction or factors that would greatly accelerate timetables, such as a botched government response, the rise of an energetic challenger, or a major terrorist attack.
- Develop one or more plausible pathways that would explain how this seemingly unlikely event could unfold. Focus on the specifics of what must happen at each stage of the process for the chain of events to play out.
- Generate a list of indicators that would help analysts and decision makers anticipate which way events were beginning to unfold.
- Identify factors that would deflect a bad outcome or encourage a positive outcome.
  - Periodically review the indicators.
  - Report on whether the proposed scenario may be emerging and why. Be alert to events once considered too unlikely to merit serious attention beginning to emerge as increasingly likely.

### **What If? Analysis**

What If? Analysis posits that an event has occurred with the potential for a major positive or negative impact and then, with the benefit of “hindsight,” explains how this event could come about.

### **When to Use It**

This technique should be in every analyst’s toolkit. It is an important technique for alerting decision makers to an event that could happen. What If? Analysis is most appropriate when:

- A mental model is well-engrained within the analytic or the client community that a certain event will not happen.

- The issue is highly contentious within the analytic community or among decision makers, and no one is focusing on what actions need to be considered to deal with or prevent the event.
- Analysts perceive a need for others to focus on the possibility this event could happen and to consider the consequences if it does occur.

### **Value Added**

Shifting the focus from asking whether an event will occur to imagining that it has occurred and then explaining how it might have happened opens the mind to think in different ways. What If? Analysis shifts the discussion to these questions:

- How could it possibly come about? Could it come about in more than one way?
- What would be the impact?
- Has the possibility of the event happening increased?

The technique also gives decision makers:

- A better sense of what they might be able to do today to prevent an untoward development from occurring or leverage an opportunity to advance their interests.
- A list of specific indicators to monitor and determine if a development may soon occur.

### **The Method**

Individuals or groups can carry out What If? Analysis.

- Begin by assuming what could happen has occurred.
  - Pose the issue as: “We’ve learned yesterday that...”
  - Be precise in defining the event and its impact.
  - Posit a triggering event if needed.
- Develop a chain of argumentation – based on evidence and logic – to explain how this event could have come about. Work backwards from the event to the present day.
- Envision several scenarios or chains of argument.
- Generate a list of indicators for each scenario.
- Identify which scenarios deserve the most attention by taking into consideration the difficulty of implementation and the potential impact.
- Assess the level of damage for a negative scenario and how difficult it would be to overcome.
- Assess the overall impact of a positive scenario and how best it could be enabled.
- Monitor the indicators on a periodic basis.

**How Does High Impact/Low Probability Analysis Differ from What If? Analysis?**

High-Impact/Low Probability Analysis is primarily a vehicle for warning decision makers that recent, unanticipated developments suggest that an event previously deemed highly unlikely may occur. It projects forward, extrapolating from recent evidence or information.

What If? Analysis, in contrast, usually does not require new evidence or anomalous information to serve as a trigger. It posits a surprising outcome and then looks backwards, mapping several credible ways that outcome could come about.

**Classic Quadrant Crunching™**

Classic Quadrant Crunching™ is a technique for systematically challenging assumptions, exploring the implications of contrary assumptions, and discovering “unknown unknowns.”

**When to Use It**

Classic Quadrant Crunching™ is most useful for dealing with highly ambiguous situations for which little data is available and the chances for surprise are great. The technique initially was developed to help counterterrorism analysts discover all the ways radical extremists might mount a terrorist attack. But analysts can apply it more broadly to generate a wide range of potential outcomes – many of which have not previously been contemplated. The reframing technique forces analysts to rethink an issue from a broad range of perspectives and systematically challenge all the assumptions that underlie their lead hypothesis. As a result, analysts can be more confident that they have considered all possible permutations for a particularly complex and ambiguous situation. In so doing, they are more likely to anticipate all the ways a situation can develop and spot lead indicators that signal a specific scenario is starting to develop.

**Value Added**

Classic Quadrant Crunching™ combines the methodology of a Key Assumptions Check with Multiple Scenarios Generation. It greatly reduces the potential for surprise by providing a structured framework with which the analyst can generate an extensive array of alternative scenarios or stories (see Fig. B.15).

Classic Quadrant Crunching™ requires analysts to identify and challenge all their key assumptions. By critically examining each assumption and how contrary assumptions might play out, analysts can better assess their confidence in their predictions, the strength of their lead hypothesis, and the likelihood of their scenarios. The process helps decision makers focus on what actions need to be undertaken today to be best prepared for events that could transpire in the future.

Number of Spectrums	Number of Matrices Generated	Total Number of "Stories" (4 per Matrix)
3	3	12
4	6	24
5	10	40
6	15	60

**Fig. B.15** Creating a robust set of stories. (Source: Copyright 2024 Pherson. All Rights Reserved)

By generating an extensive list of potential scenarios, decision makers are in a better position to select those that appear most credible or most deserve attention. They then can take the necessary actions to avoid or mitigate the impact of bad scenarios and help foster preferred outcomes. The technique also can be used to sensitize decision makers to potential “wild cards” or “nightmare scenarios” that could have significant policy or resource implications.

**The Method**

Classic Quadrant Crunching™ is often described as a Key Assumptions Check on steroids. The basic process is to:

- State your lead hypothesis or key assumption.
- Break down the lead hypothesis or key assumption into its component parts or key dimensions.
- Identify contrary assertions or assumptions for each dimension.
- Array combinations of these contrary assertions or assumptions in a set of 2 × 2 matrices.
- Generate alternative hypotheses or scenarios for each quadrant.
- Select the alternative hypotheses or scenarios most deserving of attention.
- Develop indicators that would suggest whether the selected hypotheses or scenarios are becoming more or less likely.

The technique can be illustrated by exploring the question: “How might terrorists attack our domestic water system?”

- Define the conventional wisdom for the most likely way this terrorist attack might be launched. For example: “a terrorist group or its affiliates would contaminate the public reservoir causing mass casualties.”
- Break down this statement into its component parts.
- Posit a contrary assertion or assumption.
- Identify at least two dimensions of that contrary assertion or assumption (see Fig. B.16).

Lead Hypothesis or Key Assumption	Contrary Assertion or Assumption	Contrary Dimensions
Single Attack	Multiple Attacks	Simultaneous Cascading
Contamination	Other Strategies	Denial of Service Water as a Weapon
Drinking Water	Waste Water	Treatment Plants Sewage Pipes
Outsider	Insider	Staff Employees Contractors/Visitors
Major Casualties	Minor Casualties	Terrorize Population Economic Disruption

**Fig. B.16** Classic Quadrant Crunching™: reversing assertions or assumptions. (Source: Copyright 2024 Pherson. All Rights Reserved)

Multiple / Insider		Multiple / Casualties	
Simultaneous Staff Employee	Simultaneous Contractor or Visitor	Simultaneous Spark Terror	Simultaneous Economic Disruption
Cascading Staff Employee	Cascading Contractor or Visitor	Cascading Spark Terror	Cascading Economic Disruption

**Fig. B.17** Classic Quadrant Crunching™: sample matrices. (Source: Copyright 2024 Pherson. All Rights Reserved)

- Array pairs of contrary dimensions into sets of 2 × 2 matrices. In this case, ten different 2 × 2 matrices would be created. Two examples are provided in Fig. B.17.
- For each cell in each matrix, generate one or more examples of how terrorists might launch an attack. In some cases, the scenarios might have already been imagined, others will stretch analysts’ thinking, and a few will not make much sense at all.
- Review all the scenarios or stories generated and select three or four most deserving of attention based on a pre-established set of criteria (see Fig. B.18). In this example, possible criteria would be which scenarios are most likely to:
  - Cause the most damage; have the most impact.
  - Be the hardest to detect or prevent.
  - Pose the greatest challenge for consequence management.



**Fig. B.18** Classic Quadrant Crunching™: selecting scenarios. (Source: Copyright 2024 Pherson. All Rights Reserved)

- If appropriate, identify a fourth “Nightmare” or “Wild Card” scenario that could have a major impact but also a low probability of occurring.
- Consider what decision makers might do to prevent bad scenarios from happening, mitigate their impact, and/or deal with their consequences.
- Generate a list of key indicators to help assess which scenario is beginning to emerge.

The Classic Quadrant Crunching™ technique can be modified to conduct Foresight analysis by treating the elements of the lead hypothesis as another contrary assumption. This more comprehensive method is called Foresight Quadrant Crunching™. Foresight Quadrant Crunching™ is a systematic procedure to develop a comprehensive set of potential alternative futures by identifying all the feasible combinations among several sets of variables.

**Premortem Analysis and Structured Self-Critique<sup>28</sup>**

Premortem Analysis and Structured Self-Critique are conducted prior to finalizing an analysis or a decision to assess how a key analytic judgment, decision, or plan of action could go spectacularly wrong.

**When to Use It**

These techniques should be used by analysts who can devote a few hours to challenging their own analytic conclusions about the future to see where they might be wrong. It is much easier to influence people’s decisions before they make up their mind than after when they have a personal investment in that decision. For this reason, analysts should use Premortem Analysis and Structured Self-Critique just

<sup>28</sup> The term premortem was first used in the context of testing a business plan by Gary Klein in his 1998 book, *Sources of Power: How People Make Decisions*. Pherson Associates has operationalized the concept into the Premortem Analysis and Structured Self-Critique. Phase One is similar to Klein’s concept of a premortem brainstorming session and Phase Two draws from Richards J. Heuer Jr.’s Structured Self-Critique, a reframing technique he considers distinct from Klein’s premortem.



before finalizing their key analytic judgments. If it is a team assessment, the process should be initiated as soon as the group starts to coalesce to a consensus position.

### Value Added

The primary goal of these two techniques is to reduce the risk of surprise and the subsequent need for a post-mortem investigation. The techniques help analysts identify potential causes of error that previously had been overlooked. Two creative processes are at work here.

- **The questions are reframed.** This exercise typically elicits responses that are different from the original ones. Asking questions about the same topic, but from a different perspective, opens new pathways in the brain.
- **Dissent is legitimized.** For various reasons, including the desire for consensus, individual egos and group dynamics can suppress dissenting opinions, leading to a premature selection. Members go along with the group leader, with the first to stake out a position, or with an emerging majority viewpoint. In a Premortem Analysis, all participants are asked to make a positive contribution to group goals by identifying weaknesses in the previous analysis.

### The Method: Premortem Analysis

Conduct the Premortem Analysis shortly after the group has reached a conclusion on an action plan but before any serious drafting of the report is done. If the group members are not already familiar with the technique, the group leader, another group member, or a facilitator steps up and makes a statement along the following lines: “Okay, we now think we know the right answer, but we need to double-check this. To free up our minds to consider other possibilities, let us imagine we have made this judgment, our report has gone forward and been accepted, and now, x months or years later, we learn that our analysis was wrong, and things turned out much differently than we expected. Now, working from that perspective in the future, let us put our imaginations to work and brainstorm what could have possibly happened to cause our analysis to be spectacularly wrong.”

Ideally, a second meeting should be held for the actual brainstorming session to give participants time prior to the meeting to think about what might have happened to cause the analytic judgment to be wrong. They should bring to the meeting a list of things that might have gone differently than expected.

To set the tone for the Premortem Analysis, analysts should be encouraged to look at the situation from the perspective of their own life experiences. They should think about how fast the world is changing, how many of their organization’s programs are unsuccessful or have unintended consequences, or how difficult it is to see things from the perspective of a foreign culture or a competitor. This may activate a different part of their brains as they are mulling over what could have gone wrong with the analysis.

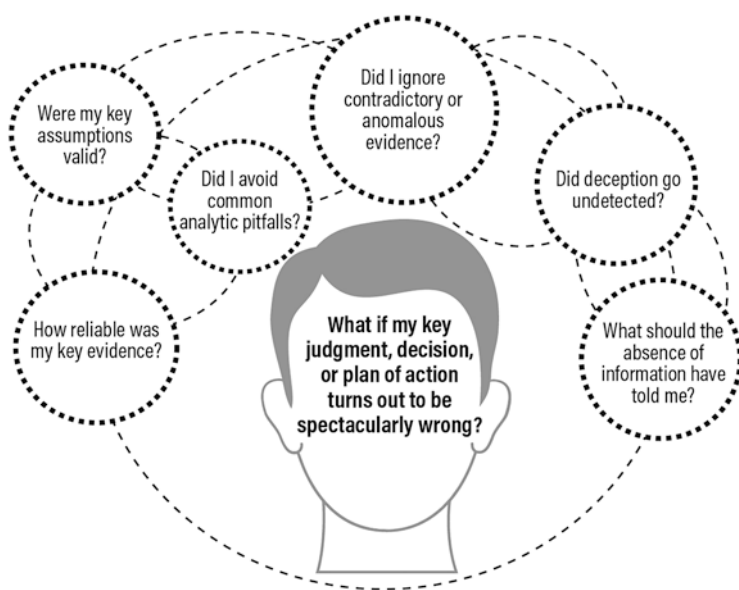
A major benefit of the approach is that it empowers those who have unspoken reservations about the team consensus to participate in a way that is consistent with perceived group goals. The approach provides two methods to explore all the ways an analysis could turn out to be wrong – both a totally unbounded and a highly structured mechanism.

At the brainstorming session, the facilitator writes the ideas brought to the session on a whiteboard or flip chart. To ensure that no single person dominates the presentation of ideas, the facilitator could employ a version of brainstorming whereby the facilitator goes around the room in round-robin fashion, taking one idea from each participant until all have presented every idea on their lists. After all ideas are posted on the board and made visible to all, the group discusses what it has learned from the exercise, and what action, if any, the group should take. This generation and initial discussion of ideas can often be accomplished in a single two-hour meeting, which is a small investment of time to undertake a systematic challenge to the group's thinking.

### The Method: Structured Self-Critique

Reemphasize that all analysts in the group are now wearing a black hat. They are now critics, not advocates, and will be judged by their ability to find weaknesses in the previous analysis as they review the following topics or questions (see Fig. B.19):

- **Sources of uncertainty.** Should one expect to find a single correct answer, a most likely answer with some alternatives, or several credible explanations? Is



**Fig. B.19** Structured self-critique: sample questions. (Source: Copyright 2024 Pherson. All Rights Reserved)

the question being analyzed a puzzle or a mystery? Is it a stable situation or one undergoing change?

- **Analytic process.** Were alternative hypotheses considered and key assumptions identified? Were diverse opinions elicited?
- **Critical assumptions.** Which assumptions would have the greatest impact on the analysis if they turned out to be wrong? Was a Key Assumptions Check done?
- **Key evidence.** What is the quality and timeliness of the key evidence? What diagnostic evidence would enable the team to reject alternative hypotheses?
- **Information gaps.** Are there gaps? Is some information so dated as to not be valid? Is the absence of information readily explainable?
- **Missing evidence.** Is there evidence one would expect to see in the reporting if the judgment were correct, but it is not there?
- **Anomalous evidence.** Was evidence rejected because it was not believed significant at the time?
- **Changes in the broad environment.** How might social, technical, economic, environmental, and political changes affect what is happening?
- **Alternative decision models.** Are other models applicable, reflecting bargaining between bureaucratic forces, standard organizational processes, or the whim of an authoritarian leader?
- **Cultural expertise.** Does the team require more cultural expertise on this topic?
- **Deception.** Does anyone have a motive, opportunity, or means to engage in deception?

After responding to these questions, analysts should take off their black hats and, based on both exercises, reconsider the team's previous judgments and levels of confidence. Analysts should ask: Which previous judgments were reaffirmed, and which need to be modified? What should be done to address any of the weaknesses that were identified? Do we need to reconsider our levels of confidence?

#### A Third Approach to Premortem Analysis

Another way to develop a Structured Self-Critique checklist is to capture all examples of past errors or near misses to remind yourself never to make those mistakes again!

### Red Hat Analysis

Red Hat Analysis is anticipating the behavior of another individual or group by trying to replicate how they think.

#### When to Use It

Red Hat Analysis works best when you are trying to anticipate the behavior of a specific person who has the authority to make decisions. For example, authoritarian

leaders; small, cohesive groups such as terrorist cells; and tightly controlled, hierarchical organizations. In law enforcement, it can be used to simulate the behavior of a criminal or a drug lord.

### **Value Added**

Red Hat Analysis is a reframing technique that requires the analyst to change his or her point of reference from that of someone observing or anticipating an adversary's or competitor's behavior to someone who must make decisions within an existing operational culture. The technique introduces new and different stimuli that might not have been factored into traditional analysis, such as the target's familial ties.

The technique introduces more human factors into the analysis, such as "Who can I count on (e.g., do I have relatives, friends, or business associates) to help me out?" or "Is that operation within my capabilities?" It also protects analysts against the pitfalls of the Anchoring Effect, Ignoring the Absence of Information, Overrating Behavioral Factors, and predicting events based on readily available evidence.

From a presentational perspective, Red Hat papers can often be a compelling art form because they:

- Provide direct answers. Red Hat papers are often drafted in first person and, as a result, phrases such as "probably" or "most likely" are less common.
- Are authored by an individual, not a committee. This often generates a more coherent and straight-forward, albeit less nuanced, argument.
- Are rarely coordinated. The purpose of the technique is to generate a single person's perspective.
- Generate specific predictions, not an array of possible courses of action.

Red Hat Analysis should not be used if the participants:

- Lack a sophisticated grounding in the culture and operating environment of their subjects.
- Cannot avoid mirror imaging. The question is not: "What would you do if you were that person?"
- Fail to track future outcomes with validated indicators to assess whether the players have behaved as predicted.

### **The Method**

Gather a group of experts with in-depth knowledge of the operating environment and the target's personality, motives, and style of thinking. Include people who understand the target's culture, speak the same language, share the same ethnic background, or have lived in the target's country.

- Present the experts with a situation or stimulus and ask them what they would do to establish a baseline.

- Ask them to explain why they would behave that way. What core values or assumptions were motivating their actions?
- Next, ask them to try to simulate how they think the target would respond. How would the target's values, motives, assumptions, or methods of operation differ from yours?
- Emphasize the need to avoid mirror imaging. The question is not "What would you do if you were in their shoes?" but "How would this person most likely think/ behave/ respond to the stimulus?"
- Capture the most likely outcome by:
  - Drafting a document (military orders, instructions) that the adversary would likely generate.
  - Describing a hypothetical conversation where the leader and other players talk in the first person.

## Foresight Techniques: Anticipate the Future

Foresight techniques help analysts anticipate and track future scenarios to gain early warning, minimize bad outcomes, and seize emerging opportunities.

Anticipating future developments and implementing future-oriented policies is particularly challenging because of the increasing complexity of problems, the expanding number of stakeholders, and the growing interdependence among various actors, institutions, and events. Senior officials in the government and private sector expect analysts to alert them to emerging trends and unanticipated developments and events such as the Brexit vote in the UK and the outcome of the 2016 US Presidential election.

Analysts can best perform this function by using Foresight techniques—a family of imaginative, reframing techniques that infuse creativity into the analytic process. The techniques help decision makers better structure a problem and begin to anticipate the unanticipated. When scenarios are matched with Indicators, Foresight techniques can help warn of coming dangers or expose new ways of responding to opportunities.

Figure B.20 below contains a list of ten Foresight techniques. The techniques serve as powerful tools for countering Groupthink and the Anchoring Effect. Indicators specifically provide a strong antidote to Hindsight Bias. They also mitigate against the failure to factor something into the analysis as well as the tendency to Assume a Single Solution and Expect Marginal Change.

The time required to use the techniques ranges from a few hours to several days, depending on the complexity of the problem and the number of participants involved in the process. Most of the techniques involve several stages of analysis that employ

Projected Endpoint of Analysis	Simple Situation	Complex Situation	Primary Objective
Short Time Frame (< 1 to 2 years)	Cluster Brainstorming Reversing Assumptions	Simple Scenarios Cone of Plausibility Classic Quadrant Crunching™	Avoiding Surprise Anticipating the Unanticipated
Long Time Frame (2 - 10 years)	Alternative Futures Analysis What If? Analysis	Multiple Scenarios Generation Foresight Quadrant Crunching™ Analysis by Contrasting Narratives Counterfactual Reasoning	Mapping the Future Finding Opportunities

**Fig. B.20** Taxonomy of foresight analysis techniques. (Source: Copyright 2024 Pherson. All Rights Reserved)

different structured techniques to identify key drivers, generate permutations to reframe how the topic could evolve, establish indicators for assessing the potential for each proposed alternative trajectory, and employ a decision support tool to help policymakers or decision makers shape an action agenda.

The techniques help analysts manage complexity and uncertainty by adding rigor to the foresight process. They are based on the premise that generating numerous stories about how the future will evolve will increase the practitioner’s sensitivity to outlier scenarios, reveal new opportunities, and reduce the chances of surprise (Figs. B.21 and B.22).

**Key Uncertainties Finder™**

The Key Uncertainties Finder™ transforms the results of a Key Assumptions Check exercise into a list of candidate key drivers needed to conduct a Foresight Analysis exercise.

**When to Use It**

The Key Uncertainties Finder™ should be used at the start of a Foresight Analysis exercise to assist in the creation of a list of key drivers. In the business world, a key driver is defined as a basic force or factor affecting performance. The definition used in intelligence analysis is broader: Basic forces and factors (economic growth, popular support, conflict vs. cooperation, globalization) that affect behavior, performance, or strategy now or in the future. Key drivers are not nations, regions, or labels, such as Russia, Europe, cyber, or increased military spending.

When compiling a list of key drivers, the list should reflect the following characteristics:

- Mutually Exclusive—each key driver does not share the same basic dynamic as another.
- Fundamental—each key driver affects performance, behavior, or strategy.

Cognitive Biases

Selected cognitive biases that can impede analytic thinking:

**Hindsight Bias:** Claiming the key items of information, events, drivers, forces, or factors that shaped a future outcome could have been easily identified.

Misapplied Heuristics

Selected heuristics that—when misapplied—can impede analytic thinking:

- Anchoring Effect:** Accepting a given value of something unknown as a proper starting point for generating an assessment.
- Associative Memory:** Predicting rare events based on weak evidence or evidence that easily comes to mind.
- Availability Heuristic:** Judging the frequency of an event or category by the ease with which instances come to mind.
- Grouphink:** Choosing the option that the majority of the group agrees with or ignoring conflicts within the group due to a desire for consensus.
- Premature Closure:** Stopping the search for a cause when a seemingly satisfactory answer is found before sufficient information is collected and proper analysis can be performed.

Intuitive Traps

Selected examples of common mistakes made by practitioners.

- Assuming Inevitability:** Assuming an event was more certain to occur than actually was the case. Also referred to as the Illusion of Inevitability.
- Assuming a Single Solution:** Thinking of only one likely (and predictable) outcome instead of acknowledging “the future is plural” and several outcomes should be considered.
- Expecting Marginal Change:** Focusing on a narrow range of alternatives representing marginal, not radical, change.
- Ignoring Base Rate Probabilities:** Failing to accurately assess the likelihood of an event when faced with statistical facts and ignoring prior probabilities or base rates.
- Ignoring Inconsistent Evidence:** Discarding or ignoring information that is inconsistent with what one expects to see.
- Lacking Sufficient Bins:** Failing to remember or factor something into the analysis because the analyst lacks an appropriate category or “bin” for that item of information.
- Misstating Probabilities:** Miscommunicating or misperceiving estimates of subjective probability (most likely, could, probably).
- Overrating Behavioral Factors:** Overrating the role of internal determinants of behavior (personality, attitudes, beliefs) and underestimating the importance of external or situational factors (constraints, forces, incentives). Often referred to as Fundamental Attribution Error.
- Rejecting Evidence:** Continuing to hold to a judgment when confronted with a mounting list of contradictory evidence.

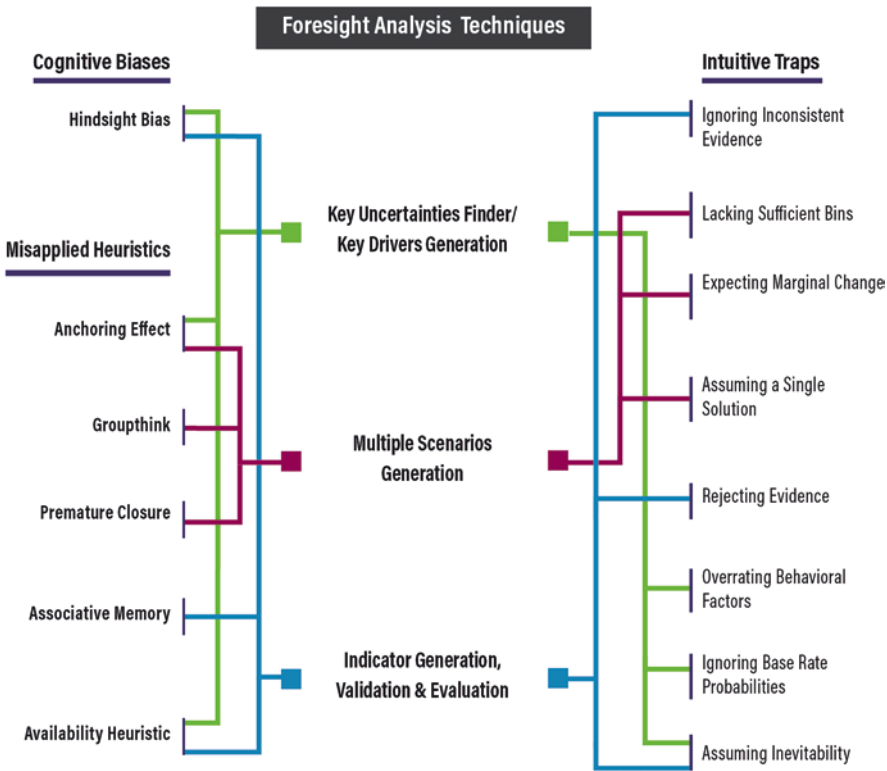
**Fig. B.21** Definitions of Foresight Biases, Heuristics, and Traps. (Source: Copyright 2024 Pherson. All Rights Reserved)

- Non-obvious—at least one listed key driver illustrates a dynamic that is not immediately obvious.

Value Added

The technique adapts elements of the Key Assumptions Check to generate a list of key drivers to be used in Foresight Analysis. It is often paired with Key Drivers Generation™ which uses the Cluster Brainstorming technique.

With a Key Assumptions Check, some unsupported assumptions often turn out to be Key Uncertainties – things we initially thought to be true but are not when



**Fig. B.22** Matching foresight techniques to biases, heuristics, and traps. (Source: Copyright 2024 Pherson. All Rights Reserved)

subjected to examination. Such Key Uncertainties can also be described as critical variables in determining how a situation might evolve or what trajectory might be taken over time.

**The Method**

**Stage I: Conduct a Key Assumptions Check Exercise**

*(See the description of the Key Assumptions Check for more detailed instructions).*

- Gather a small group working on the issue along with a few “outsiders” who can provide an independent perspective.
- Review the definition of a key assumption: A supposition of something to be true or a fact or statement that analysts may take for granted.
- List all the key assumptions participants generate about the topic and critically examine each assumption.

**Stage II: Find the Key Uncertainties**

- Identify the unsupported assumptions on the list; ask if they can be characterized as Key Uncertainties.



- Review the Key Uncertainties and ask if they could also be described as critical variables.

### **Stage III: Convert Key Uncertainties into Key Drivers**

- Identify four to five Key Uncertainties that would best serve as key drivers in a Foresight Analysis exercise.
- If the group has also conducted a Key Drivers Generation exercise, compare both sets of key drivers and meld them into a single list of four to five drivers.
- Determine if the final list of key drivers meet the following requirements. Are they:
  - Mutually exclusive.
  - Comprehensive. Do they cover most, if not all, of the STEMPLES criteria (Social, Technical, Economic, Military, Political, Legal, Environmental, and Security).
- Revise the list and add a new driver if a major dimension is not covered.

### **Key Drivers Generation™**

Key Drivers Generation™ uses the Cluster Brainstorming technique to generate a list of candidate key drivers needed to conduct a Foresight Analysis exercise.

#### **When to Use It**

Key Drivers Generation™ should be used at the start of a Foresight Analysis exercise to assist in the creation of key drivers. A key driver is defined as a basic force or factor, such as economic growth, popular support, conflict versus cooperation, or globalization, which affects behavior, performance, or strategy now or in the future. Items on the list of key drivers should be mutually exclusive, fundamental to the issue or problem, and non-obvious to the uninformed.

#### **Value Added**

Key Drivers Generation™ uses the Cluster Brainstorming technique to generate key drivers needed for conducting a Foresight Analysis. It is one of two techniques that have proved helpful in developing rigorous lists of key drivers. The other technique is the Key Uncertainties Finder™ that adapts elements of the Key Assumptions Check.

#### **The Method**

Key Drivers Generation™ follows specific rules and procedures to stimulate new ideas and concepts, emphasizing the use of silence and “kinetic brainstorming” with sticky notes.

**Stage I: Cluster Brainstorming Exercise** (see the description of Cluster Brainstorming for more detailed instructions). A facilitator:

- Gathers a small group, virtually or in person, of individuals who are working on the issue along with a few “outsiders” who bring an independent perspective.

- Passes out sticky notes and marker pens. No one is allowed to speak except the facilitator during the exercise.
- Formulates the question and write it on the whiteboard or easel. A Key Drivers Generation™ focal question usually begins with: “What are all the (things/forces/factors/circumstances) that would help explain ...” ?
- Asks the participants to write down their brief responses on a sticky note and give it to the facilitator who reads them out loud.
- Posts the notes on the wall or whiteboard. Participants are urged to build on one another’s ideas.
- After several pauses in idea generation, asks three to five participants to arrange the sticky notes into affinity groups (basically grouping similar ideas or concepts). Group members do not talk while doing this.
- If the topic is sufficiently complex, ask a second small group to rearrange the notes into a more coherent pattern. They cannot speak.
- Instructs this group – or a third group – to pick a word or label that best describes each grouping.
- Leads participants in a group discussion of which affinity groups are the best candidates for conversion to key drivers.

## Stage II: Find the Key Drivers

- Identify which affinity groups represent or suggest a critical variable – something that is certain to influence how the situation under consideration would evolve over time.
- Make a list of four to six critical variables that would best serve as key drivers to use in conducting a Foresight exercise.
- If the group has also conducted a Key Inconsistencies Finder™ exercise, examine both sets of key drivers and meld them into a single list of four or five drivers.
- Determine if the final list of key drivers meets the following requirements. Are they:
  - Mutually exclusive – items do not overlap or are not variants of the same issue?
  - Comprehensive. Cover most, if not all, of the STEMPLES criteria (Social, Technical, Economic, Military, Political, Legal, Environmental, and Security)?
- Revise the list as appropriate and add a new driver if a major dimension of the problem is not covered by the list of drivers.

## Multiple Scenarios Generation

Multiple Scenarios Generation is a systematic method for brainstorming multiple explanations of how a situation may develop when considerable uncertainty and several underlying key drivers are present.

### When to Use It

Multiple Scenarios Generation is a useful technique for exploring the many ways a situation might evolve, anticipating surprise developments, and generating field requirements when dealing with little concrete information and/or a highly ambiguous or uncertain threat. In counterterrorism, analysts can use it to identify new vulnerabilities and assess, anticipate, and prioritize possible attacks and attack methods. It also can be used as an investigative tool, providing an ideal framework for developing indicators and formulating requirements for field collectors and researchers.

### Value Added

The Multiple Scenarios Generation process helps analysts and decision makers expand their imagination and avoid surprise by generating large numbers of potential scenarios. This sensitizes them to possible new outcomes and makes them more likely to consider outlying data that suggests events are unfolding in a way not previously imagined. As the father on Alternative Scenarios analysis noted when scenarios analysis was first being introduced:

What has not been imagined will not be foreseen...in time.  
—Peter Schwartz, *The Art of the Long View*

The challenge for the analyst is to identify just three or four major themes that emerge from the process. Thus, the true value of the technique is to provide a palette of ideas from which to develop attention-deserving themes.

### The Method

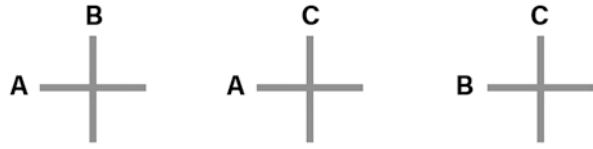
Multiple Scenarios Generation applies the collective knowledge and imagination of a group of experts to identify a set of key drivers (forces, factors, or events) that are likely to shape an issue and arrays them in different paired combinations to generate robust sets of potential scenarios. The basic steps are:

- Identify the focal issue either from intelligence requirements or by interviewing experts and officials who are most knowledgeable about the topic.
- Generate a list of forces or factors that will influence how the situation is most likely to evolve. From these, identify several key driving forces. It would be useful to have several experts participate in the creation of these key drivers.
- Define the two ends of the spectrum for each driver.
- Pair the drivers in a series of  $2 \times 2$  matrices.
- Develop a “story” or two for each cell of each  $2 \times 2$  matrix.
- Select from all the generated scenarios those most deserving of attention because they illustrate compelling and challenging futures not now being considered.
- Refine the list of key drivers.
- Develop indicators that could be tracked to determine whether the selected scenario is or is not developing.

**Fig. B.23** The future of the Ukraine War: defining key drivers. (Source: Copyright 2024 Pherson. All Rights Reserved)

**Key Drivers:**

- A. Capability of Russian Military forces.
- B. Level of support of NATO states.
- C. Resiliency of Ukrainian population.



The technique can be illustrated using the question: “What is the future of the war in the Ukraine?”

- Convene a group of experts (including some creative thinkers who can challenge the group’s mindsets) to brainstorm all the forces and factors that are most likely to determine how the conflict evolves and how it might be resolved.<sup>29</sup>
- Select from this list those factors or drivers whose outcome is the hardest to predict or for which analysts cannot confidently assess how the driver will influence future events. In this example, three drivers that meet these criteria are:
  - The capability of Russian military forces.
  - The level of support of NATO states.
  - The persistence and resiliency of the Ukrainian population.
- Define the ends of the spectrum for each driver. For example, the NATO states could be united and supportive at one end of the spectrum and divided and less supportive at the other end.
- Pair the drivers in a series of  $2 \times 2$  matrices (see Fig. B.23).

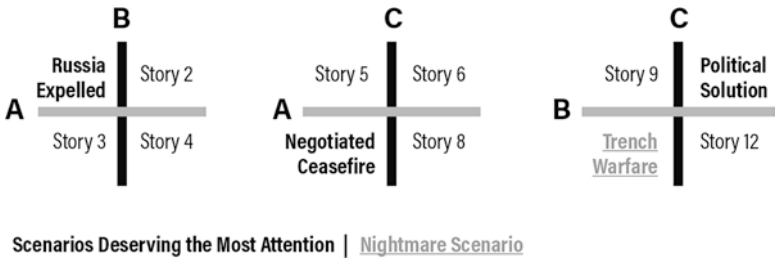
Develop a “story” or “stories” describing how events are most likely to unfold in each cell of the  $2 \times 2$  matrix. For example, in the  $2 \times 2$  matrix that is defined by the role of NATO states and the capability of Russian military forces, the criteria in the left quadrant would be united and supportive NATO states but ineffective Russian military capabilities. In this “world,” one might imagine Russian forces being expelled from all of Ukraine. (see Fig. B.24).

- Review all the scenarios or stories generated and select three or four that are most deserving of attention (see Fig. B.25) based on criteria such as which scenarios:
  - Present the greatest challenges to Ukraine and NATO policymakers and decision makers.
  - Raise particular concerns that have not been anticipated.
  - Uncover new dynamics that should be addressed.
  - Suggest new collection needs.

<sup>29</sup>This multiple scenarios illustration is drawn from a report prepared by PolicyFutures, LLC: “Scenarios for the Insurgency in Iraq”, *The United States Institute of Peace* (Special Report 174, October 2006).



**Fig. B.24** The future of the Ukraine War: using spectrums to define outcomes. (Source: Copyright 2024 Pherson. All Rights Reserved)



**Fig. B.25** The future of the Ukraine War: selecting scenarios. (Source: Copyright 2024 Pherson. All Rights Reserved)

- If appropriate, identify an additional “Nightmare” scenario or a “Wild Card” that could have a major impact but also a low probability of occurring. The Wildcard could be presented either as a fourth scenario or in an accompanying textbox.
- Consider what policymakers or decision makers might do to:
  - Prevent bad scenarios from occurring.
  - Enable good scenarios to develop.
- Generate a list of key indicators to help monitor which scenario or story best describes how events are beginning to play out.

## Indicators Generation and Validation

Indicators are a pre-established set of observable phenomena that are periodically reviewed to track events, spot emerging trends, validate a hypothesis, and warn of unexpected change.

### When to Use It

The identification and monitoring of indicators are fundamental tasks of analysts, as they are the principal means of avoiding surprise and discovering opportunities. They are often paired with scenarios to determine which of several possible trajectories is unfolding. Other techniques such as What If? Analysis, High Impact/ Low Probability Analysis, and Analysis of Competing Hypotheses use indicators to provide early warning of an unanticipated event or validate what is being observed.

An indicators list can serve as a baseline for generating collection requirements or establishing research priorities. Indicators can also be used to track whether a new business strategy is working or whether a low probability scenario is emerging that offers new commercial opportunities.

When analysts or decision makers are sharply divided over the interpretation of events (e.g., how a war is progressing) or the culpability of a “person of interest” or counterintelligence target, indicators can help depersonalize the debate by shifting attention away from personal viewpoints to more objective criteria. Emotions are often diffused, and substantive disagreements clarified if both sides agree at the outset on a set of objective criteria showing that developments are – or are not – moving in a particular direction or a person’s behavior suggests guilt or innocence.

### Value Added

Indicators provide an objective baseline for tracking events, instilling rigor into the analytic process, and enhancing the credibility of the final product. They can be used to:

- Identify which scenario or alternative future is emerging.
- Alert one to unanticipated developments that might otherwise go undetected.
- Validate existing hypotheses or viewpoints.
- Spot emerging trends and warn of unanticipated change.
- Make the warning process more rigorous.

When used in national security analysis, indicators are usually forward looking and described as estimative, predictive, or foresight indicators. They are used to monitor, detect, or evaluate change over time. In the law enforcement community, indicators are used to assess whether a target’s activities or behavior is consistent with an established pattern. These indicators look backward and are often described as evaluative, diagnostic, or descriptive indicators. Analysts should remember and

decision makers should demand that lists of indicators remain valid. As John Pyrik has warned:

*The value of indicators is greatly diminished if they are not updated and refined as new insights are acquired and conditions evolve.*

—John Pyrik, *Analyst's Guide to Indicators*

## The Method

Creating an Indicators list can range from a simple process of jotting down a list of things one would expect to see if a particular situation developed to a sophisticated team effort to identify truly unique indicators with accompanying rating scales and levels of confidence. The first process could take an hour; the second could take weeks of concerted effort.

When developing indicators, each indicator should be carefully defined. It is also important to establish what is “normal” for that indicator. Depending on the need at hand, indicators can be derived by applying a variety of structured techniques, including:

- **Cluster Brainstorming** or **Mind Maps** to generate signposts.
- **Circleboarding™** to identify all the dimensions of a problem.
- A **Key Assumptions Check** to unearth key variables or key uncertainties.
- **Gantt Charts** or **Critical Path Analysis** to identify markers.
- **Decision Trees** to reveal critical nodes.
- **Structured Analogies** to flag what caused similar situations to develop.

Consider the indicators as a set. Are any redundant? Have you generated enough? The set should be comprehensive, consistent, and complementary. Avoid the temptation of creating too many indicators; collectors, decision makers, and other analysts usually ignore long lists.

As a check on one's own objectivity, it is often useful to develop two sets of indicators: a list that would suggest that the hypothesis is correct, or an event is going to happen and a second list that would suggest that the hypothesis is incorrect or the event is not likely to happen.

**Characteristics of a Good Indicator** The best indicators satisfy all the following characteristics. The first three are critical for any good indicator, the fourth and fifth are more challenging to satisfy.

- **Observable/Collectible.** Can be observed and collected at suitable time periods.
- **Valid.** Must accurately measure the concept. Depending on the complexity, more than one indicator may be needed, but the object is to have as few as possible.
- **Unambiguous.** Data collection must be consistent using comparable methods. People who are collecting must observe the same thing. This requires a precise definition of every indicator.

- **Stable.** Must be useful over time to allow comparisons and to track trends.
- **Unique.** Should measure only one thing and, in combination with others, should only point to the phenomenon being studied.

In some cases, an indicator might not be unique or diagnostic, but is integral to the phenomenon being studied. In such cases, a good strategy is to construct a cluster of indicators that combines one or two non-diagnostic but necessary indicators with one or more diagnostic indicators.

When indicators are treated as a cluster, they can be amplicative and synergistic. In essence, the whole becomes more than the sum of the parts. This is often the case when a positive feedback loop is present and events could accelerate rapidly. Cross-Impact Analysis, regression analysis, and other techniques can be used to measure this dynamic.

Analysts must periodically review the validity and relevance of an indicators list. Narrowly conceived or outdated indicators can:

- Reinforce analytic biases.
- Reflect flawed assumptions.
- Encourage analysts to discard new evidence.
- Lull consumers inappropriately.
- Turn out to be poor “pointers” to what they were supposed to represent.
- Prove useless because targets have learned what indicators are being used and have changed their methods accordingly.

#### **When Indicators Fail**

- You cannot gather the data or tell if it is there.
- You cannot return to it in a year or two.
- Others using comparable methods cannot observe it.
- It does not relate to what you are trying to measure.
- It measures more than one thing.

#### **Presenting Indicators**

Techniques for increasing the sophistication and credibility of an indicators list include:

- Establishing a scale for rating each indicator.
- Providing specific definitions for each indicator.
- Rating the indicators on a scheduled basis (e.g., monthly, quarterly, or annually).
- Assigning a level of confidence to each rating.
- Providing a narrative description for each point on the rating scale, describing what one would expect to observe at that level.
- Listing the sources of information used in generating the rating.



## Indicators Evaluation

Indicators Evaluation is a simple technique for assessing the diagnostic power of indicators.

### When to Use It

Indicators Evaluation is an essential technique to use when developing indicators for competing hypotheses or alternative scenarios. Once an analyst has developed a set of alternative scenarios or future worlds, the next step is to generate indicators for each scenario (or world) that would appear if that particular world were beginning to emerge. A critical question not often asked is whether a given indicator would appear only in the scenario to which it is assigned. Indicators that could appear in several scenarios are not diagnostic and not particularly useful in determining whether a specific scenario is emerging. The ideal indicator is highly consistent for the world it is assigned and highly inconsistent for all other worlds.

### Value Added

Employing the Indicators Evaluation technique to evaluate and dismiss non-discriminating indicators can significantly increase the credibility of the analysis. By applying the method, analysts can rank their indicators from most to least diagnostic and decide how far up the list they want to draw the line in selecting key indicators. In some circumstances, analysts might discover that most or all the indicators for a given scenario have been eliminated, forcing them to brainstorm a new set of indicators. If analysts find it difficult to generate independent lists of diagnostic indicators for two scenarios, then the scenarios might not be sufficiently dissimilar, suggesting they should be combined.

### The Method

- Analysts populate a matrix listing:
  - Alternative scenarios or worlds (or competing hypotheses) on the top of the matrix (as is done for hypotheses in ACH).
  - Indicators generated for all the scenarios on the left side of the matrix (as is done with relevant information in ACH).
- In each cell of the matrix, assess whether the indicator for that particular scenario is:
  - Highly likely to appear (0 points)
  - Likely to appear (1 point)
  - Could appear (2 points)
  - Unlikely to appear (4 points)
  - Highly unlikely to appear (6 points)

- Once this process is complete, add up the points for each row to calculate the diagnosticity of each indicator and resort the indicators from highest to lowest score.
- Display the most discriminating indicators at the top of the list and the least discriminating indicators at the bottom.
  - The most discriminating indicator is “Highly Likely” to emerge in one scenario and “Highly Unlikely” to emerge in all other scenarios. The least discriminating indicator is “Highly Likely” to appear in all scenarios.
  - Most indicators will fall somewhere in between.
- Retain the indicators that have “Highly Unlikely” and “Unlikely” ratings and are the most discriminating.
- Discard indicators with few or no “Highly Unlikely” or “Unlikely” ratings unless they provide critical information when included in a cluster of indicators.
- Regroup the indicators, once non-discriminating indicators have been eliminated, under their assigned scenario. If most indicators for a scenario have been eliminated, develop new – and more diagnostic – indicators for that scenario.
- Check the diagnostic value of any new indicators by using the Indicators Evaluation process.

## Decision Support Techniques: Shape the Options

Decision Support Techniques help decision makers identify optimal policies and preferred strategies to mitigate problems and capitalize on new opportunities.

Analysts are usually not asked to make decisions or determine policy tradeoffs, but they can and should use Decision Support Techniques to provide timely support to managers, commanders, planners, and policymakers who must make these choices. To succeed in this task, analysts must understand the operating environment of the decision maker and anticipate how that person is likely to approach an issue. They must understand the dynamics of the decision-making process to recognize when and how they can be most useful.

The decision aids described in this section provide a framework for analyzing why and how a leader, group, organization, or country has made, or is likely to make, a decision. If analysts can describe adversaries’ or competitors’ goals and preferences, it will be easier to anticipate their actions. Often the best support an analyst can provide is to describe the forces that are most likely to shape a decision or an outcome. Knowledge of these key drivers then gives the decision maker a “head start” in trying to leverage the eventual outcome.

By providing structure to the decision-making process, the techniques used for Decision Support help analysts and decision makers avoid the common pitfalls of

Groupthink and coming to Premature Closure. The natural tendency toward Mirror Imaging is more likely to be kept in check when using these techniques because they provide multiple perspectives for viewing a problem and envisioning the interplay of complex factors. Decision Support Techniques also offer protection against the intuitive traps of Projecting Past Experiences, Overestimating Probabilities, and Overrating Behavioral Factors while underestimating the importance of external or situational factors.

This section describes six different techniques analysts, policymakers, decision makers, and planners can use to devise policies and options needed to mitigate problems, capitalize on new opportunities, or otherwise leverage the influence of their organization.

- **Opportunities Incubator™.** A systematic method for identifying actions that can facilitate the emergence of positive scenarios and thwart or mitigate less desirable outcomes.
- **SWOT Analysis** (Strengths, Weaknesses, Opportunities, and Threats). A  $2 \times 2$  matrix used to develop a plan or strategy to accomplish a specific goal and evaluate what is most likely to help or hinder that objective.
- **Impact Matrix.** A management tool for assessing the impact of a decision on the organization and devising the best strategies for implementing it successfully.
- **Decision Matrix.** A powerful device for making trade-offs between conflicting goals and preferences.
- **Force Field Analysis.** A tool that helps the decision maker identify the most effective ways to solve a problem or achieve a goal – and whether it is possible to do so.
  - **Pros-Cons-Faults-and-Fixes.** A strategy for critiquing new policy ideas by listing both the Pros and the Cons as well as how best to fault the Pros and fix the Cons (Figs. B.26 and B.27).

### Opportunities Incubator™

The Opportunities Incubator™ is a systematic method for identifying actions that can facilitate positive outcomes and thwart or mitigate less desirable outcomes.

#### When to Use It

The Opportunities Incubator™ is useful when decision makers are preparing for change or to shape how change may occur.

#### Value Added

The Opportunities Incubator™ helps senior officials and decision makers identify which actions would be most effective in preventing a negative scenario from

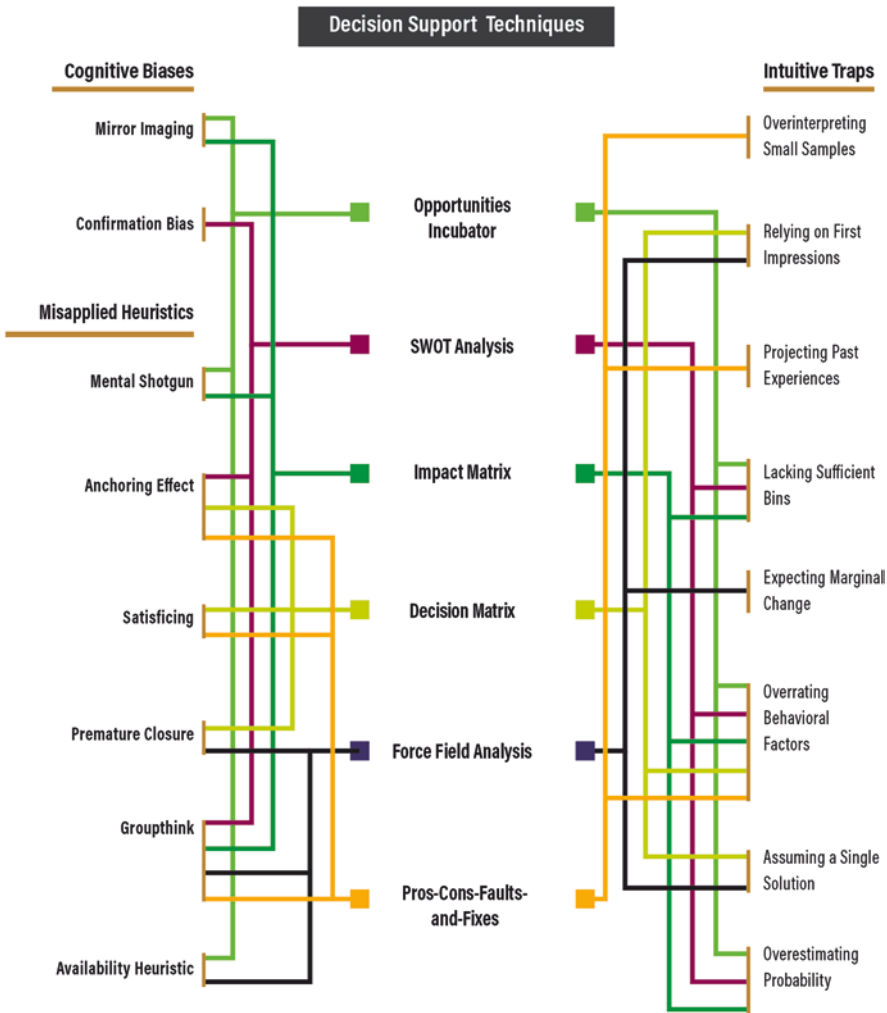


**Fig. B.26** Definitions of decision support biases, heuristics, and traps. (Source: Copyright 2024 Pherson. All Rights Reserved)

occurring or fostering the emergence of a good scenario. The tool focuses attention on who is most affected by a given scenario and who has the capability and intent to influence an outcome.

**The Method**

After developing a set of scenarios, assess each scenario separately using the steps below (see Fig. B.28):



**Fig. B.27** Matching decision support techniques to biases, heuristics, and traps. (Source: Copyright 2024 Pherson. All Rights Reserved)

- Describe the scenario, projected trajectory, or anticipated outcome in one sentence.
- Determine your client’s perception of the scenario, projected trajectory, or anticipated outcome. Use the following scale: Strongly Positive, Positive, Neutral, Negative, Strongly Negative.
- Identify the primary actors in the scenario who have a stake in the projected trajectory or anticipated outcome.
- Assess how much each actor might care about the scenario’s projected outcome because of its positive or negative (perceived or real) impact on the actor’s liveli-

Scenario: \_\_\_\_\_

Client Perception: \_\_\_\_\_

Actor Assessment					Client Strategy
Primary Actors	Levels of Interest	Capability	Intent	Priority Tier	
					Driver(s)

Preference Legend: DD = Very Desirable; D = Desirable; N = Neutral; U = Undesirable; UU = Very Undesirable

**Fig. B.28** Opportunities Incubator™: sample matrix. (Source: Copyright 2024 Pherson. All Rights Reserved)

- hood, status, future prospects, etc. This assessment considers how motivated the actor may be to act, not whether the actor is likely to act or not. Use the scale: Very Desirable (DD), Desirable (D), Neutral (N), Undesirable (U), Very Undesirable (UU).
- Assess each actor’s capability or resources to respond to the scenario using a High, Medium, or Low scale.
  - Assess each actor’s likely intent to respond to the scenario using a High, Medium, or Low scale.
  - Identify the actors that should receive the most attention based on the following tiers:
    - 1st: DD or UU Level of Interest rating plus High ratings in both Capability and Intent.
    - 2nd: High Ratings in Capability and Intent.
    - 3d: DD or UU Level of Interest rating plus a High rating in either Capability or Intent.
    - 4th: High rating in either Capability or Intent.
    - 5th: All other actors.
  - Reorder the rows in the matrix so that the actors are listed from first to fifth tiers.

- Record the two to three key drivers that would most likely influence or affect each actor or the actor's response.
- Consider your client's perception and determine how and when they might act to influence favorably, counteract, or deter an actor's response. From this discussion, develop a list of possible actions the client can take.

## SWOT Analysis

SWOT Analysis helps organizations evaluate the Strengths and Weaknesses internal to its structure and the Opportunities and Threats presented by the external environment.

SWOT (Strengths, Weaknesses, Opportunities, and Threats) Analysis is often used to assess a future course of action for an organization, to fashion an optimal plan for reorganizing or realigning people or functions, or to evaluate the potential for achieving stated goals. It can both support the process of organizational change or be used after a reorganization to refocus personnel on the overall mission of an organization.

### When to Use It

After setting a goal or objective, use the SWOT framework for collecting and organizing information to support strategic planning and decision making. Typically, a group assesses the organization's ability to achieve a goal by listing its Strengths and Weaknesses or what could be marshaled to support the objective and what might prevent or stand in the way of success. Then the participants assess the Opportunities and Threats in the external environment that would help and hinder goal attainment.

SWOT is particularly effective as a team-building project at the start of a project. One caution is that it focuses on a single goal without considering the costs and benefits of alternative strategies for achieving the same goal. Other equally good or better courses of action risk being ignored.

### Value Added

The SWOT framework is a useful way of listing information and often points to specific actions that can or should be taken to maximize goal achievement. It helps mitigate Groupthink or the natural tendency to put on "rose-colored glasses" during the decision-making process.

### The Method

- Define the objective.



**Fig. B.29** SWOT analysis. (Source: Copyright 2024 Pherson. All Rights Reserved)

- Create a “box” with four quadrants; label the top quadrants Strengths and Weaknesses and the bottom quadrants Opportunities and Threats in that order (see Fig. B.29).
- Use a brainstorming technique to generate a list of:
  - Organizational attributes that will help attain the goal or objective.
  - Attributes that are detrimental to achieving the goal or objective.
  - External conditions that will help attain the goal or objective.
  - External conditions that could hinder success.
- After brainstorming ideas for a quadrant, organize them in order of how great an impact the attribute has before moving on to the next quadrant. Doing so often yields a “match” for the listed attribute or item that can be assessed during subsequent strategy formulation.
- After completing each quadrant, identify possible strategies for moving forward by asking:
  - How can we use each Strength?
  - How can we improve each Weakness?
  - How can we exploit each Opportunity?
  - How can we mitigate each Threat?

Another approach is to use matching and converting techniques:

- Match Strengths with Opportunities to make the Strengths even stronger.
- Then consider how the Opportunities can be matched with Weaknesses to convert the Weaknesses into Strengths or at least mitigate the impact of the Weaknesses.



## Impact Matrix

The Impact Matrix is a framing technique that helps managers or analysts identify actors affected by an anticipated decision or scenario, their level of interest in the outcome, and the likely impact on the organization, personnel, or mission.

### When to Use It

The best time for a manager or policymaker to use the Impact Matrix is just before a major policy is to be announced or a mandated change is about to be implemented. The technique helps the manager identify where resistance to and support for a new policy or mandated change is most likely to arise. Analysts can also use it to anticipate how a public or a political system is likely to react to a new marketing strategy or policy pronouncement.

Analysts can also use the technique:

- At the conclusion of a Foresight Analysis project to help their clients frame strategies for implementing good scenarios or mitigating the impact of bad scenarios.
- As a follow-on to a Pros-Cons-Faults-and-Fixes or Force Field Analysis to alert clients to potential supporters or opponents of a decision or policy.

### Value Added

Managers can use the technique to develop a strategy for how to implement an anticipated – or particularly unpopular – policy so they can take proactive steps prior to the announcement. The technique can expose unanticipated pockets of resistance or support and identify with whom it would be most beneficial to consult before the policy becomes public knowledge. Key actors can then be engaged before the announcement to make its impact more digestible.

Using a structured approach that identifies the people affected by a decision, how closely the actor(s) might follow or track developments, and whether they would be affected by the scenario or outcome – either positively or negatively – leading to unwarranted optimism or pessimism, and uncover considerations not initially conceived of or addressed.

### The Method

- Individually, or as a team, identify all the groups or individuals affected either positively or negatively by a given organizational decision or scenario (see Fig. B.30).
- Assess how much each actor would care if the decision were adopted or the scenario unfolded.

Actor:	Level of Interest: <small>Low, Moderate, or High</small>	Capability to Influence <small>Low, Moderate, or High</small>	Impact: <small>P= Mostly Positive; 0= Neutral or Mixed; N= Mostly Negative</small>
Me			
My supervisor			
Other employees			
The client			
Colleagues or counterparts elsewhere in my organization			
Colleagues in counterpart organizations			
Other			

**Actors:** Which key individuals or groups are affected by the decision or issue?

**Level of Interest (or salience):** How much does each actor care about it? Rate how important this issue is to each actor or how much they are likely to care about it. Their level of interest should reflect how great an impact the decision would have on their time, their quality of work life, their prospects for success, etc.

**Capability to Influence:** How much influence can the actor exert on other key players to help implement the decision or scenario? Does the actor have the resources to make a difference?

**Impact of Decision:** How much will it change behavior? Categorize the impact of the decision on each actor as mostly Positive (P), Neutral or mixed (0), or mostly Negative (N). If a decision has the potential to be negative, mark it as negative. If in some cases the impact on a person is mixed or is both positive and negative for members of a group, then mark it as neutral.

**Fig. B.30** Impact matrix: identifying key actors, interests, and impact. (Source: Copyright 2024 Pherson. All Rights Reserved)

- Assign a Low, Moderate, or High rating after reflecting what the decision or scenario might mean for each actor’s mission, prospects for success, skill level(s), or need for adaptation.
- Categorize whether the named actors or entities would perceive the effect or impact as Positive, Neutral, or Negative.
- Consult with those most likely to be impacted negatively and enlist support from those who will react positively to help make the decision or new procedure work.

The results of the Impact Matrix exercise can inform a rollout or communication strategy, be the basis for an Opportunity Analysis section in a detailed assessment or help generate Indicators for monitoring.

## Decision Matrix

A Decision Matrix helps analysts identify the course of action that best achieves specified goals or preferences.

A Decision Matrix is a simple but powerful tool that demonstrates the trade-offs between conflicting goals or preferences (Fig. B.31). The process involves creating criteria for choosing between a set of options and assigning a value to each criterion. The highest score will reveal the best choice. One can manipulate the values in the matrix to see how the “best choice” changes if the values assigned to each criterion are changed or if one’s assessment changes about the ability or likelihood of an option to satisfy a criterion.

### When to Use It

A Decision Matrix is useful for weighing options for business clients, military officers, or policymakers so that they can “see” which option maximizes revenue, best achieves the strategic objective, or best attains a policy goal. Analysts can use the tool in a Red Hat analysis to demonstrate the possible choices a leader might make when faced with a given situation or to help decision makers or clients see the potential effect of a policy choice or business decision. It can also be used at the end of a Foresight exercise to identify optimal strategies for making good scenarios happen or mitigate the impact of bad scenarios.

### Value Added

By deconstructing a decision into its component parts, the technique makes it easier to identify areas of disagreement or hidden assumptions and determine their impact on the decision. One can also see how sensitive a decision is to changes that might be made to the values assigned to the selection criteria. The matrix helps analysts and decision makers avoid Premature Closure, as well as giving unwarranted weight to first impressions and overrating behavioral factors.

### The Method

Break the decision or problem into two components:

- Generate a) a list of options to be considered and b) the criteria needed to judge the desirability of the options.
- Create a matrix with one column for each option and two additional columns to the left.
  - In the first column, list the criteria in rough order of importance.

	% Weight	Option 1	Option 2	Option 3
Criterion 1	30%	$3.5 \times 30 = 105$	$3 \times 30 = 90$	$3.5 \times 30 = 105$
Criterion 2	10%	$3.5 \times 10 = 35$	$2 \times 10 = 20$	$4.5 \times 10 = 45$
Criterion 3	20%	$2.5 \times 20 = 50$	$4.5 \times 20 = 90$	$3 \times 20 = 60$
Criterion 4	20%	$4 \times 20 = 80$	$2.5 \times 20 = 50$	$3.5 \times 20 = 70$
Criterion 5	15%	$3 \times 15 = 45$	$4 \times 15 = 60$	$3 \times 15 = 45$
Criterion 6	5%	$3.5 \times 5 = 17.5$	$2.5 \times 5 = 12.5$	$4 \times 5 = 20$
Totals	100%	332.5	332.5	345

**Fig. B.31** Decision matrix: doing the math. (Source: Copyright 2024 Pherson. All Rights Reserved)

- In the second column, assign numerical weights to each criterion so that the total adds up to 100 percent.
- Work across the matrix one row at a time to evaluate the relative ability of each option to satisfy the selection criteria. Assign 10 points to each row and allocate these points to the options. In the example below, Option 1 receives 3.5 points toward satisfying Criterion 1, Option 2 “3”, and Option 3 “3.5”.
- Multiply the point score by the percentage or weight assigned to each criterion. In the example below, Criterion 1 has a 30 percent weight, so the score for Option 1 is  $3.5 \times 30 = 105$ .
- Total the scores of each option at the bottom of each column.

If you accept the preferences and judgments expressed in the matrix, the option with the highest total score would be the “best choice”.

**Force Field Analysis**

Force Field Analysis is a simple technique for listing and assessing all the forces for and against a change, problem, or goal.

**When to Use It**

Force Field Analysis is useful in the early stages of a project or research effort when the analyst is defining the issue, gathering data, or developing recommendations for action. It requires that the analyst clearly defines the problem in all its aspects. It aids in structuring the data and assessing the relative importance of each of the forces affecting the issue. The technique can also help overcome the natural human

Goal: Develop Federal/Local information sharing network to counter terrorism	
5 Major threat to national security	4 High cost
4 High public concerns for safety	4 Leadership resistance
4 First responder needs for federal info	3 Need to standardize policies
3 Need to overcome organization barriers	2 Different federal/local missions
2 Technology is available	2 Systems incompatibility

**Fig. B.32** Force field analysis example. (Source: Copyright 2024 Pherson. All Rights Reserved)

tendency to dwell on the aspects of the data that are most comfortable. The technique can be used by an individual analyst or by a small team.

**Value Added**

The benefit of Force Field Analysis is that it requires an analyst to consider all the forces and factors that influence a situation. It helps analysts think through the ways various forces affect the issue and fosters recognition that such forces can be divided into two categories: driving forces and restraining forces. By sorting the evidence into two categories, the analyst can delve deeply into the issue and consider less obvious factors. By weighing all the forces for and against an issue, analysts can better recommend strategies that would be most effective in reducing the impact of the restraining forces and strengthening the effect of the driving forces.

The technique helps analysts avoid Premature Closure and Groupthink. It also protects them against relying on first impressions and expecting only marginal change.

Force Field Analysis offers a powerful way to visualize the key elements of the problem by providing a simple tally sheet for displaying the differing levels of intensity of the forces individually and as a whole. With the data sorted into two lists, decision makers can more easily identify which forces deserve the most attention, developing strategies to overcome the negative elements while promoting the positive elements.

**The Method**

- Define the problem, goal, or change clearly and concisely.
- Brainstorm to identify the forces that will most influence the issue. Consider such topics as needs, resources, costs, benefits, organizations, relationships, attitudes, traditions, interests, social and cultural trends, rules and regulations, policies, values, and leadership to develop the full range of forces promoting and restraining the factors involved (see Fig. B.32).
- Make one list showing the forces or personalities “driving” change and a second list showing the forces or personalities “restraining” change.

- Assign a value (an intensity score) to each driving or restraining force to indicate its strength. Give the weakest intensity score a value of 1 (weak) and the strongest a value of 5 (strong). The same intensity score can be assigned to more than one force if the analyst considers the factors equal in strength. List the intensity scores in parentheses beside each item.
- Examine the two lists to determine if any of the driving forces balance out the restraining forces.
- Devise a manageable course of action to strengthen the forces that lead to the preferred outcome and weaken the forces that would hinder the desired outcome.

Analysts should keep in mind that the preferred outcome may be either promoting or restraining a change. If the problem is growing drug use or criminal activity, the analysis would focus on factors that would have the most impact restraining criminal activity or drug use. On the other hand, if the preferred outcome is improved border security, the analyst would highlight the drivers most likely to promote border security if strengthened.

### **Pros-Cons-Faults-and- Fixes**

Pros-Cons-Faults-and-Fixes is a tool designed to critique new policy ideas or strategies by checking the human tendency to jump to a conclusion before completing a full analysis of the problem.

#### **When to Use It**

Making lists of pros and cons for any action is a common approach to decision making. Finding “Faults” and “Fixes” distinguishes this tool from a simple “Pros” and “Cons” approach. The Pros-Cons-Faults-and-Fixes technique is applicable to virtually all types of decisions. It is one of the easiest structured techniques for decision makers to use. It requires only a certain procedure for making the lists and discussing them to solicit divergent input.

#### **Value Added**

A new idea rarely meets with instant approval. When a new idea is brought up for discussion, one or two people immediately explain why they do not like it or why it will not work, and the idea is then dropped. However, there are occasions when just the opposite happens. A new idea is immediately welcomed, and a commitment to support is made before the idea is critically evaluated.

This technique does not tell the analyst whether the decision or strategy in question is “good” or not, nor does it help decide whether the Pros or the Cons have the strongest argument. That answer is still based on the professional judgment of the analyst or decision maker. The purpose of the technique is to offset any tendency to rush to judgment by organizing the elements of the problem logically and considering both sides of a problem or issue systematically. Documenting the elements of a

problem and taking the time to reflect whether all parties would view each element the same way helps the analyst and the decision maker see things more clearly and become more objective and emotionally detached from the decision.

The technique mitigates against classic biases including Groupthink, Satisficing, and the Anchoring Effect. It also protects against Projecting Past Experiences, Overrating Behavioral Factors, and Overinterpreting Small Samples.

### The Method

Clearly define the proposed action or choice, then:

- List the Pros in favor of the decision or choice.
- List the Cons or arguments against the choice.
- Review each list and consolidate similar ideas.

If the choice is between two clearly defined options, go through the previous steps for the second option. If there are more than two options, a technique such as the Decision Matrix may be more appropriate than Pros-Cons-Faults-and-Fixes.

- Decide whether the goal is to demonstrate that an idea will not work or show how best to make it succeed.
- If the former, take the Pros and see if they can be “Faulted.” How might the policy fail to materialize or have undesirable consequences? Identify:
  - A reason why the Pro would not work or why the benefit would not be received.
  - An undesirable side effect that might accompany the benefit.
  - A need for further research to refute the assumption that the Pro will be beneficial.
- If the latter, take the Cons, and see if they can be “Fixed.” How can their influence be neutralized? Can you even convert them to Pros? Four possible strategies are:
  - Propose a modification of the Con that would significantly lower the risk of the Con being a problem.
  - Identify a preventive measure that would significantly reduce the chances of the Con being a problem.
  - Do contingency planning that includes a change of course if certain indicators are observed.
  - Identify a need for further research to confirm the assumption that the Con is a problem.
- A third option is to combine both approaches: to Fault the Pros and Fix the Cons.
- Compare the Pros, including any Faults, against the Cons, including the Fixes. Weigh one against the other, and make the choice based on your professional judgment, not on any numerical calculation of the number of Pros versus Cons.

## Selecting the Right Structured Analytic Technique

Analysts must be able, with minimal effort, to identify and learn how to use the techniques that best meet their needs and fit their styles. The selection guide provided in Fig. B.33 lists twelve tasks that analysts perform and matches the task to several Structured Analytic Techniques that would maximize their performance.

The tasks are organized to conform generally with the analytic production process as represented by the five families of techniques. To identify the structured techniques that would be most helpful in learning how to perform a task with more rigor and imagination, analysts pick the statement that best describes their objectives and then choose one or two of the techniques listed below the task.

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## Appendix C. Worldwide Threat Assessment, Cyber Threats

*Excerpt of testimony from Daniel R. Coats, Director of National Intelligence, US Congress, Senate, Select Committee on Intelligence, Worldwide Threat Assessment of the US Intelligence Community, January 29, 2019, 5–6, <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf>.*

Our adversaries and strategic competitors will increasingly use cyber capabilities – including cyber espionage, attack, and influence – to seek political, economic, and military advantage over the United States and its allies and partners. China, Russia, Iran, and North Korea increasingly use cyber operations to threaten both minds and machines in an expanding number of ways – to steal information, to influence our citizens, and to disrupt critical infrastructure.

At present, China and Russia pose the greatest espionage and cyber attack threats, but we anticipate that all our adversaries and strategic competitors will increasingly build and integrate cyber espionage, attack, and influence capabilities into their efforts to influence US policies and advance their own national security interests. In the last decade, our adversaries and strategic competitors have developed and experimented with a growing capability to shape and alter the information and systems on which we rely. For years, they have conducted cyber espionage to collect intelligence and targeted our critical infrastructure to hold it at risk. They are now becoming more adept at using social media to alter how we think, behave, and decide. As we connect and integrate billions of new digital devices into our lives and business processes, adversaries and strategic competitors almost certainly will gain greater insight into and access to our protected information.

**China** China presents a persistent cyber espionage threat and a growing attack threat to our core military and critical infrastructure systems. China remains the most active strategic competitor responsible for cyber espionage against the US Government, corporations, and allies. It is improving its cyber attack capabilities and altering information online, shaping Chinese views and potentially the views of





**Fig. B.33** Selecting the right structured analytic technique. (Source: Copyright 2024 Pherson. All Rights Reserved)

US citizens – an issue we discuss in greater detail in the Online Influence Operations and Election Interference section of this report.

Beijing will authorize cyber espionage against key US technology sectors when doing so addresses a significant national security or economic goal not achievable

through other means. We are also concerned about the potential for Chinese intelligence and security services to use Chinese information technology firms as routine and systemic espionage platforms against the United States and allies.

China has the ability to launch cyber attacks that cause localized, temporary disruptive effects on critical infrastructure – such as disruption of a natural gas pipeline for days to weeks – in the United States.

**Russia** We assess that Russia poses a cyber-espionage, influence, and attack threat to the United States and our allies. Moscow continues to be a highly capable and effective adversary, integrating cyber espionage, attack, and influence operations to achieve its political and military objectives. Moscow is now staging cyber attack assets to allow it to disrupt or damage US civilian and military infrastructure during a crisis and poses a significant cyber influence threat – an issue discussed in the Online Influence Operations and Election Interference section of this report.

Russian intelligence and security services will continue targeting US information systems, as well as the networks of our NATO and Five Eyes partners, for technical information, military plans, and insight into our governments' policies.

Russia has the ability to execute cyber attacks in the United States that generate localized, temporary disruptive effects on critical infrastructure – such as disrupting an electrical distribution network for at least a few hours – similar to those demonstrated in Ukraine in 2015 and 2016. Moscow is mapping our critical infrastructure with the long-term goal of being able to cause substantial damage.

**Iran** Iran continues to present a cyber espionage and attack threat. Iran uses increasingly sophisticated cyber techniques to conduct espionage; it is also attempting to deploy cyber attack capabilities that would enable attacks against critical infrastructure in the United States and allied countries. Tehran uses social media platforms to target US and allied audiences.

Iranian cyber actors are targeting US Government officials, government organizations, and companies to gain intelligence and position themselves for future cyber operations.

Iran has been preparing for cyber attacks against the United States and our allies. It is capable of causing localized, temporary disruptive effects – such as disrupting a large company's corporate networks for days to weeks – similar to its data deletion attacks against dozens of Saudi governmental and private sector networks in late 2016 and early 2017.

**North Korea** North Korea poses a significant cyber threat to financial institutions, remains a cyber-espionage threat, and retains the ability to conduct disruptive cyber attacks. North Korea continues to use cyber capabilities to steal from financial institutions to generate revenue. Pyongyang's cybercrime operations include attempts to steal more than \$1.1 billion from financial institutions across the world – including

a successful cyber heist of an estimated \$81 million from the New York Federal Reserve account of Bangladesh's central bank.

**Non-State and Unattributed Actors** Foreign cyber criminals will continue to conduct for-profit, cyber-enabled theft and extortion against US networks. We anticipate that financially motivated cyber criminals very likely will expand their targets in the United States in the next few years. Their actions could increasingly disrupt US critical infrastructure in the healthcare, financial, government, and emergency service sectors, based on the patterns of activities against these sectors in the last few years.

Terrorists could obtain and disclose compromising or personally identifiable information through cyber operations, and they may use such disclosures to coerce, extort, or to inspire and enable physical attacks against their victims. Terrorist groups could cause some disruptive effects—defacing websites or executing denial-of-service attacks against poorly protected networks—with little to no warning.

The growing availability and use of publicly and commercially available cyber tools is increasing the overall volume of unattributed cyber activity around the world. The use of these tools increases the risk of misattributions and misdirected responses by both governments and the private sector.

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## Glossary of Commonly Used Terms

**Actor Analysis** Questions asked in an investigation about motives, means, and patterns of behavior.

**AIMS** The audience, issue or intelligence question, message, and storyline for an analytic product.

**Analytic Spectrum** The graphical display of the range of analytic endeavor that arrays the required skills along one axis depicting time value (reactive to proactive) and one depicting complexity (data-driven to concept-driven).

**Assumptions** Beliefs or ideas that underpin an argument that are accepted as true or certain to happen but without proof; also gap fillers used to make connections between items, elements, or issues.

**Building Block Questions** The core underlying topics that must be probed to enable you to answer the essential questions. They tend to be open-ended.

**Cognitive Biases** Unconscious errors of reasoning caused by our simplistic information processing strategies.

**Critical Thinking** The application of the processes and values of scientific inquiry to the special circumstances of intelligence analysis.

**Descriptive Analysis** Analytic products that report or summarize what is known about people, places, or objects.

**Empirical Analysis** The usually computer-aided study of large stores of quantitative data or social media reporting or “Big Data.”

**Essential Questions** Essential Questions capture the core purposes for your analytic responsibilities.

**Estimative Analysis** Analytic products that look to the future, asking what might happen next and proactively anticipate what courses of action decision makers may take in response to potential stimuli.”

**Evaluative Analysis** Analytic products that examine the significance of a problem or a topic as it relates to the client’s interests, using logic to interpret or make judgments about values or meanings behind the data.

**Explanatory Analysis** Analytic products that probe the reason or cause of a situation, getting at why it has developed or is transpiring.

**Five Families of Structured Analytic Techniques** Exploration, Diagnostic, Reframing, Foresight, and Decision Support.

**Five W's and an H** The six questions often asked by journalists: Who, What, When, Where, Why, and How.

**Heuristic** A simple procedure that helps us find adequate, though often imperfect, answers to difficult questions.

**Hypothesis** A potential explanation or conclusion that is to be tested by collecting and presenting evidence to see if it can be falsified.

**Intuitive Traps** Concrete manifestations of recognized cognitive biases, heuristics, and mental mindsets that can negatively influence the analyst in his practical work.

**Key Drivers** Factors that will influence, shape, or affect the outcome of an activity, the development of an issue, or which alternative scenario is most likely to emerge.

**Operative Case Analysis** A systematic collection and analysis of all available data on a particular crime, regardless of the investigation that is currently going on.

**Profiling** Making hypotheses on the background of a crime in order to find new investigative approaches.

**Quasi-Quantitative** The use of expert-generated data when analysts lack the empirical data needed to analyze an intelligence problem and rely on a larger model that describes a specific phenomenon.

**The Question Method** A simple technique analysts use to organize a long-term research project or a short-fused memo.

**So What of the So What?** The secondary and tertiary impact of a development and what the reader might want to consider doing next.

**STEMPLES+** Social, Technological, Economic, Military, Political, Legal, Environmental, and Security plus other factors when applicable such as demographic, cultural, brand, and psychological.

**Structured Analytic Techniques** Step-by-step processes that externalize the analyst's thinking in a manner that makes it readily apparent to others, thereby enabling it to be reviewed, discussed, and critiqued piece by piece.

**System 1 Thinking** Works automatically and quickly, largely effortlessly and without volitional control.

**System 2 Thinking** Directs attention to the effortful mental activities that rely on it, including complex computations.

**Tangible Evidence** Documents, objects, charts, and images that can be directly examined by someone to see what is revealed.

**Target Audience** The group of readers for whom the paper is written.

**Testimonial Evidence** Reporting derived from human sources, informants, or assets.

**Text box** A section in a paper that is not integral to the main story but provides additional explanatory or contextual material. A text box is sometimes called a tone box if the background in the box is shaded.

**"What?" Section** What has recently changed or has been discovered that is of interest to the product's target audience.

**"Why now?" Section** Identification and explanation of the factors driving the event or discovery that is the focus of the "what?" section.

**WYSIATI Rule** What you see is all there is.

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## Recommended Readings

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To order any of these publications, go to: <https://shop.globalyptica.com/collections/publications>.

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