

Simple Methods for Optimal Decision Making in Anticipation of *Black Swan* Events

¹V. Christianto* and ²Florentin Smarandache

Author's Affiliation:

¹Malang Institute of Agriculture, East Java, Indonesia. E-mail: victorchristianto@gmail.com

²Dept. Mathematics & Sciences, University of New Mexico, Gallup, NM, USA.

E-mail: smarand@unm.edu

*Corresponding Author:

Victor Christianto, CRA

Malang Institute of Agriculture, East Java, Indonesia.

E-mail: victorchristianto@gmail.com

Received on 21.01.2024

Revised on 22.02.2024

Accepted on 03.04.2024

ABSTRACT

In recent years, Taleb and others consider black swan events can be catastrophic not only in organizational scale, but also at national scale. Therefore, methods to anticipate them, however it is deemed impossible, should be sought after. There is not a consensus among researchers on the level of predictability of a Black Swan event. Prof. Taleb (2007) believes that black swan events are unpredictable and highly improbable events which are inevitable in our world. And the only way for managing these types of incidents is to become anti-fragile and robust in order to become immune to prediction errors and protected from adverse events. Green (2011) partly supports this idea by stating that although these types of events are not predictable, organizations should prepare to be mounting an effective response while simultaneously dealing with the psychological impact of being shocked by an inconceivable event of staggering proportions.

KEYWORDS: Unknown Unknowns, Black Swan Events, Taleb, Optimal Decision Making, Forward Thinking

How to cite this article: Christianto V. and Smarandache F. (2024). Simple Methods for Optimal Decision Making in Anticipation of *Black Swan* Events. *Bio-Science Research Bulletin*, 40(1), 6-12.

INTRODUCTION: WHAT IS BLACK SWAN EVENT?

Imagine a world where graceful white swans dominate pristine lakes, their elegance a familiar sight. Then, out of nowhere, a black swan glides onto the scene, shattering the expected and sparking curiosity or even panic. This captivating metaphor is how Nassim Nicholas Taleb, renowned author and thinker, describes "*black swan events*" – unpredictable, high-impact occurrences that upend our understanding of the world.

Taleb introduces these events not as fantastical creatures, but as real-world phenomena defying our reliance on past data and probability models. They are rare, yes, but their consequences can be

immense – the 2008 financial crisis, Fukushima tsunami in 2011, etc.

What makes them so impactful? Our tendency to underestimate the unknown. We build our knowledge based on what we've observed, creating mental maps of "normal" and "possible." Black swans, by definition, fall outside these maps, leaving us blindsided and vulnerable. But here's the twist: Taleb doesn't advocate dwelling in fear of the unknown. Instead, he urges us to embrace antifragility – the ability to not just survive, but thrive, in the face of uncertainty.

In recent years, Taleb and others consider black swan events can be catastrophic not only in organizational scale, but also at national scale. There is not a consensus among

researchers on the level of predictability of a Black Swan event. Taleb (2007) believes that Black Swan events are unpredictable and highly improbable events which are inevitable in our world. And the only way for managing these types of incidents is to become anti-fragile and robust in order to become immune to prediction errors and protected from adverse events. Therefore, methods to anticipate them, however it is deemed impossible, should be sought after.

IS IT POSSIBLE TO ANTICIPATE A BLACK SWAN EVENT?

Black swans may disrupt our sense of order, but they also hold the potential for transformation. By understanding their nature and preparing for the unpreparable, we can turn these disruptive events into catalysts for positive change and resilient progress. Remember, the unexpected isn't something to fear, but a force to be respected and, with the right approach, even harnessed.

What makes them so impactful? Our tendency to underestimate the unknown. We build our knowledge based on what we've observed, creating mental maps of "normal" and "possible." Black swans, by definition, fall outside these maps, leaving us blindsided and vulnerable. But here's the twist: Taleb doesn't advocate dwelling in fear of the unknown. Instead, he urges us to embrace antifragility – the ability to not just survive, but thrive, in the face of uncertainty.

SEVERAL SIMPLE METHODS

While it may not be possible to identify and mitigate in advance of all possible black swans, nonetheless there are few things that organizational and national leaders can do to anticipate black swan events, as we discuss in the following paragraphs, including but not limited to: identifying outliers, loss event database, early warning system, develop business continuity plan, and start to avoid as far as possible negative groupthink effects.

A. Identifying outliers

Imagine sailing through uncharted waters, relying solely on the familiar stars to guide you.

Suddenly, a rogue wave crashes against your ship, a storm you never saw coming. This is the essence of a black swan event – unpredictable, high-impact occurrences that blindside us with their magnitude. But what if, like an experienced navigator, we could anticipate these hidden currents and adjust our course? This is where outliers come in.

Outliers are data points that deviate significantly from the established norm. They're often dismissed as anomalies, quirks of randomness. But under the lens of black swan mitigation, they become vital early warning signs. By identifying and analyzing these outliers, we can gain valuable insights:

- **Exposing vulnerabilities:** In this era of VUCA, it becomes more evident that outliers can expose weaknesses and vulnerabilities in our existing models and assumptions. A sudden spike in financial transactions, for example, might signal potential fraud or systemic risk.

- **Emerging Trends:** Often, outliers can represent the nascent stages of future trends. A seemingly insignificant shift in consumer behavior could hint at a brewing revolution in the industry.

- **Unforeseen Connections:** Analyzing outlying events can reveal previously hidden connections and dependencies between seemingly unrelated systems. This can help us understand potential cascading effects and prepare for broader disruptions.

Of course, not every outlier is a harbinger of a black swan. Recognizing true signals amidst the noise requires a layered approach:

- **Contextualize:** Understand the historical context and potential explanations for the outlier. Is it a seasonal fluctuation, a measurement error, or a genuine anomaly?

- **Statistical Tests:** Employ statistical tools to assess the probability of the outlier occurring purely by chance. This helps differentiate between random blips and potentially significant deviations.

- **Cross-referencing:** Look for corroborating evidence in other data sets or expert opinions.

Does the outlier align with other emerging trends or known vulnerabilities?

By taking these steps, we can transform outliers from inconvenient glitches into powerful warning lights. This doesn't guarantee complete foresight, but it allows us to:

- **Strengthen Defenses:** Proactively address weak points identified by outliers, making our systems more resilient to potential shocks.

- **Develop Contingency Plans:** Prepare for diverse scenarios based on potential black swan trajectories informed by outlier analysis.

- **Foster a Culture of Vigilance:** Encourage a mindset of curiosity and skepticism towards established norms, making us more receptive to unexpected events.

Ultimately, mitigating black swans isn't about eliminating surprise – it's about embracing uncertainty and building adaptability. By identifying and understanding outliers, we can navigate the ever-shifting currents of reality, not as passive passengers, but as proactive navigators ready to weather any storm, even the ones born from black swans (cf. Gladwell, *Outliers*).

B. Loss event database

The 2008 financial crisis, etc. Those devastating events are stark reminders of the lurking shadow of "black swans" – unpredictable yet impactful occurrences that shake the foundations of our world. While fully predicting these unknowns may be a fool's errand, a powerful tool sits within our grasp: the humble loss-event database.

Think of this database as a historical tapestry woven from the threads of past disruptions. Within it lies a wealth of information – the causes, consequences, and ripple effects of losses both large and small. By meticulously documenting these events, we can unlock a vital first step in mitigating future black swans: knowledge creation.

Here's how it works:

- **Learning from Scars:** Each recorded loss tells a story. It reveals vulnerabilities in systems, blind

spots in our understanding, and the domino effect of cascading failures. By analyzing these stories, we learn valuable lessons, building mental muscles to identify and address similar weaknesses in the present.

- **Pattern Recognition:** Black swans might be unpredictable individually, but their footprints often leave subtle traces. The database allows us to track patterns and connections between seemingly disparate events. This enables us to identify potential warning signs and trigger points for future disruptions, giving us precious time to prepare.

- **Scenario Building:** Armed with the knowledge of past losses, we can engage in a powerful exercise – creating plausible black swan scenarios based on real-world precedents. This not only tests our systems' resilience but also fosters a culture of preparedness within organizations and across societies.

However, simply collecting data is not enough. To truly leverage on the use of the loss-event database against black swans, we need to:

- **Standardize and Categorize:** Develop a clear taxonomy for classifying losses based on their nature, impact, and cascading effects. This creates a searchable repository of knowledge, readily accessible to those who need it most.

- **Encourage Openness:** Break down silos and foster collaboration. Sharing loss data across industries and sectors allows for broader analysis and the identification of interconnected vulnerabilities that might otherwise go unnoticed.

- **Continuously Update:** The world is dynamic, and so should our database. Regularly incorporating new loss events and lessons learned ensures our understanding of potential black swans remains ever-evolving.

By building and leveraging this historical record of losses, we embark on a proactive journey towards a more resilient future. We no longer stand blindfolded, waiting for the next black swan to strike. Instead, we arm ourselves with the knowledge of the past, empowering ourselves to anticipate, adapt, and even mitigate

the impact of these uncharted storms. Remember, while black swans may be inevitable, their devastating effects don't have to be. Let's weave a tapestry of preparedness, building a firewall of foresight to navigate the turbulent waters of uncertainty.

C. Early warning system

Imagine steering a ship through a dense fog, relying solely on the compass and the feel of the wind. This is akin to navigating the treacherous waters of the unknown, where "black swan" events – unpredictable, high-impact occurrences – lurk just beyond visibility. But what if we could pierce the fog and glimpse the storm clouds ahead? This is where the power of early warning dashboards comes in.

Think of an early warning dashboard as a vigilant sentinel, constantly scanning the horizon for potential threats. It's a centralized platform that gathers data from diverse sources, analyzes it in real-time, and presents key insights in a clear, actionable format. By bringing together information on:

- **Outliers:** Identifying data points that deviate significantly from established norms, potentially signaling hidden risks.

- **Emerging Trends:** Tracking subtle shifts in behavior, economic indicators, or social media sentiment that could foreshadow larger disruptions.

- **Vulnerability Assessments:** Pinpointing weaknesses in systems and infrastructure that could be exploited by black swan events.

The dashboard becomes a powerful tool for:

- **Triggering Proactive Responses:** Early warning of an impending crisis allows for timely interventions, mitigating potential damage and safeguarding critical operations.

- **Prioritizing Resource Allocation:** By highlighting the most pressing threats, the dashboard guides decision-makers in directing resources and efforts towards areas of greatest vulnerability.

- **Fostering a Culture of Preparedness:** Continuous monitoring and visualization of

potential risks keep everyone informed and engaged, creating a proactive mindset within organizations and communities.

But building an effective early warning dashboard requires careful consideration:

- **Data Integration:** The dashboard's strength lies in its ability to synthesize information from various sources. This necessitates seamless data integration, overcoming siloed systems and ensuring data quality and consistency.

- **Actionable Insights:** Presenting raw data is not enough. The dashboard must translate complex information into clear, actionable insights that guide decision-making and response efforts.

- **Continuous Improvement:** Just like the ever-evolving nature of black swans, the early warning system needs to be constantly refined. Regularly testing its effectiveness, incorporating new data sources, and adapting to changing landscapes are crucial for maintaining its accuracy and relevance.

By implementing these principles, we can transform early warning dashboards from passive information displays into proactive shields against the unknown. They become instruments of foresight, empowering us to navigate the murky waters of uncertainty with greater confidence and preparedness. Remember, black swans may be inevitable, but their impact doesn't have to be. With the right tools and mindset, we can turn the tide on these disruptive events, charting a course towards a more resilient and adaptive future.

D. Business continuity plan and management system

Imagine a tranquil lake, your business peacefully gliding across its surface. Suddenly, a dark cloud emerges, unleashing a torrential downpour – a metaphorical "black swan" event, an unpredictable and high-impact disruption that threatens to capsize your operations. But just like a seasoned sailor, you're prepared and equipped with a comprehensive business continuity plan (BCP) used within a *user-friendly, real-time dashboard*.

Black swan events are by their nature unpredictable. But while we can't foresee them perfectly, we can be prepared for the unexpected. A robust BCP, visualized and easily accessible through a dashboard, is your first line of defense.

Here's how it works:

- **Centralized Command Center:** Imagine your dashboard as a virtual bridge, consolidating critical information in one place. From risk assessments and incident reports to response protocols and recovery plans, everything your team needs is readily available.

- **Real-Time Visibility:** The dashboard provides a clear picture of the evolving situation. Monitor key metrics like system uptime, resource availability, and communication channels to make informed decisions in real-time.

- **Agile Adaptation:** Black swans are notorious for throwing curveballs. With a dynamic dashboard, you can easily update your BCP on the fly, adjusting response plans and resource allocation as the situation unfolds.

- **Enhanced Communication:** Clear and concise messaging is crucial during chaos. The dashboard can serve as a central communication hub, keeping stakeholders informed and aligned throughout the crisis.

Building your BCP dashboard requires careful planning:

- **Identify Core Functions:** Pinpoint the critical processes that keep your business afloat. Prioritize ensuring their continuity during disruptions.

- **Map Potential Threats:** Conduct thorough risk assessments to identify potential black swan events that could impact your operations.

- **Develop Response Protocols:** For each identified threat, create detailed plans outlining response actions, resource allocation, and communication strategies.

- **Visualize for Clarity:** Present information on the dashboard in a clear and intuitive way, utilizing charts, graphs, and real-time updates for easy comprehension.

By investing in a well-designed BCP dashboard, you're not just mitigating risk; you're building resilience. It empowers your team to weather any storm, black swan or not, with greater agility, confidence, and ultimately, success.

Remember, the calm seas of normalcy can be deceptive. By embracing the BCP dashboard as your navigational tool, you chart a course towards a future where even the darkest clouds hold the promise of a clear horizon. So, raise the sails of preparedness, steer towards resilience, and let your BCP dashboard guide you through the ever-changing waters of the business world.

A few suggestions: Regularly test and refine your BCP dashboard through simulations and exercises. This helps identify weaknesses and ensures your team is ready to act when the real storm hits.

E. Avoid as far as possible groupthink effects: Why Dissent is the Antidote to Black Swans

Imagine a group sailing toward a seemingly endless horizon, lulled into complacency by the sun and wind. They huddle together, reinforcing each other's conviction that their course is perfect, dismissing any whispers of potential storms. This is the insidious danger of groupthink, a phenomenon that can blind organizations and societies to the lurking shadows of "black swan" events – unpredictable, high-impact disruptions that shatter the illusion of smooth sailing.

Groupthink, while seemingly appealing in its unity, can be a hidden reef on the path to progress. It thrives on conformity, suppressing dissenting voices and critical thinking. This, in the face of potential black swans, is a recipe for disaster. By stifling diversity of perspectives, we miss crucial warning signs, ignore alternative solutions, and ultimately make decisions based on a distorted reality.

So, how do we avoid this perilous trap and steer clear of the black swan's wrath? The answer lies in embracing the very thing groupthink seeks to stifle: dissent. Here's why dissent is the key to mitigating black swan risks:

- **Challenges Assumptions:** Dissent is a wrench in the gears of complacency. It forces us to re-examine our shared assumptions, question the established course, and consider alternative possibilities. This critical analysis is crucial for identifying potential blind spots and vulnerabilities that could be exploited by black swans.

- **Brings in Diverse Perspectives:** Black swans, by their very nature, defy expectations. Embracing dissent ensures inclusion of diverse viewpoints and experiences, increasing the chances of spotting the "outliers" and "anomalies" that might signal an impending disruption.

- **Encourages Risk Assessment:** A dissenting voice often questions the potential downsides and risks of a chosen course. This healthy skepticism pushes for more thorough risk assessments, identifying potential black swan scenarios and enabling proactive mitigation strategies.

However, cultivating a culture of dissent requires conscious effort:

- **Create Safe Spaces:** Dissent thrives in environments where diverse opinions are not punished but valued. Leaders must actively create safe spaces for questioning, debate, and even constructive conflict.

- **Reward Critical Thinking:** Encourage employees to challenge assumptions, ask tough questions, and present alternative solutions. Reward critical thinking and innovative ideas, not just blind adherence to the group's consensus.

- **Structure for Inclusion:** Design meetings and decision-making processes that actively solicit divergent perspectives. Encourage input from all participants, not just those loudest in the room.

By embracing dissent, we crack the shell of groupthink and emerge more resilient, better equipped to navigate the turbulent waters of uncertainty. We build organizations and societies that are not only agile and adaptable, but also receptive to the early warning signs of

black swans. Remember, true unity doesn't come from blind conformity, but from the strength of diverse voices harmonizing in the face of the unknown. So, let dissent be your compass, guiding you towards a future where even the darkest swans bring not fear, but a chance to course-correct and chart a brighter course.

CONCLUDING REMARK

Black swans may disrupt our sense of order, but they also hold the potential for transformation. By understanding their nature and preparing for the unpreparable, we can turn these disruptive events into catalysts for positive change and resilient progress. (Hajikazemi, S. et al., 2016; Perfors, A. & N.T. Van Dam, 2018) [1][2]

The unexpected isn't something to fear, but a force to be respected and, with the right approach, even harnessed.

While it may not be possible to identify and mitigate in advance of all possible black swan events, nonetheless there are few things that organizational and national leaders can do to anticipate black swan events, as we discussed above. The few simple methods we consider here are mostly coming from a field known as risk management, they include: identifying outliers, loss even database, and also Early warning system.

This mini review is an early effort to come up with several simple to follow processes to mitigate black swan events (Tyler, Simon, 2022; Christiano, V. & Smarandache, F., 2024) [3][4].

Acknowledgment

The authors are deeply grateful for discussions with Mr. Deddy Jacobus from *Risk Workshop International*, Indonesia; who is specialized in risk management consulting. The opinions presented here are ours; meanwhile the present review article has been written with assistance of a large language model / AI.

Version 1.0: 3 Jan. 2024, pk. 14:27
VC, FS

REFERENCES

1. Hajikazemi, S. et al. (2016) The Black Swan – Knowing the unknown. *Procedia - Social and Behavioral Sciences* 226 (2016), 184 – 192
2. Perfors, A. & N.T. Van Dam (2018) Human decision making in black swan situations. *In Proceedings of the 40th Annual Meeting of the Cognitive Science Society, CogSci 2018*. url: <https://scholars.mssm.edu/en/publications/human-decision-making-in-black-swan-situations>
3. Tyler, Simon. *The “Keep It Simple” Book*. Jakarta: Penerbit Bhuna Ilmu Populer, 2022 (edisi digital)
4. Christianto, V. & Smarandache, F. The Convergence of Ikigai and Design Thinking. *SMIJ* Vol. 7 (2024). DOI: <https://doi.org/10.61356/SMIJ.2024.77101>, url: <https://sciencesforce.com/index.php/smij/article/view/230>
