



**Global Assessment Report
on Disaster Risk Reduction**

2022

**CONTRIBUTING
PAPER**

**Avoiding “Failure of Imagination”:
Informing Scenario Planning with Creative
Practices**

Nick Pozek



Disclaimer:

This is not an officially edited publication of the United Nations. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country or territory or of its authorities or concerning the delimitations of its frontiers or boundaries. The designations of country groups in the text and the tables are intended solely for statistical or analytical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of the names of firms and commercial products does not imply the endorsement of the United Nations.

Note: The designations employed and the presentation of maps in this report do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities or concerning the delimitation of its frontiers or boundaries.

Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial 3.0 IGO licence (CC BY-NC IGO); <https://creativecommons.org/licenses/by-nc/3.0/igo/legalcode>

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that UNDRR endorses any specific organization, products or services.

The use of the UNDRR logo is not permitted. If a translation of this work is created, it must include the following disclaimer along with the required citation below: "This translation was not created by the United Nations Office for Disaster Risk Reduction (UNDRR). UNDRR is not responsible for the content or accuracy of this translation. The original English edition shall be the authoritative edition."

Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user. Sales, rights and licensing.

UNDRR information products are available for non-commercial use. Requests for commercial use, rights and licensing should be submitted via: <https://www.undrr.org/contact-us>

This publication may be freely quoted but acknowledgement of the source is requested.

Citation: UNDRR (2022), *Avoiding "Failure of Imagination": Informing Scenario Planning with Creative Practices*, United Nations Office for Disaster Risk Reduction (UNDRR).

© 2022 UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION

For additional information, please contact:

United Nations Office for Disaster Risk Reduction (UNDRR)

7bis Avenue de la Paix, CH1201 Geneva 2, Switzerland, Tel: +41 22 917 89 08

Avoiding “failure of imagination”: Informing scenario planning with creative practices

Keywords: Scenario Planning, Creativity, Design Thinking, Speculative Design, Cinema

Contents

Introduction	3
Risk and the Cinematic Imagination	7
Conclusion	14
Bibliography	15

Introduction

This article systemically explores creative practices across a variety of disciplines that imagine future states and can aid in disaster prevention and risk reduction. It first examines the consequences of *failures of the imagination* in the context of disaster planning. It outlines the process of scenario planning and considers how each practice may be applied to scenario planning exercises. It examines the way the each of these practices model potential catastrophic events and, in some situations, offers potential solutions.

This article considers numerous practices across the fields of visual art, design, cinema, and theatre, but is not comprehensive. The author seeks to provide a broad cross-section of artists, works, and practices and demonstrate the variety that exists therein. Furthermore, those identified herein were selected for their immediate and easily visible relevance to scenario planning vis-à-vis disaster and risk management. The scope of risks considered is intentionally broad, encompassing disasters as diverse as economic crisis, severe weather, and terrorism. While the extreme events presented herein offer the most dramatic examples of “failure of imagination” scenario planning informed by creative practices can and should be applied to lower-stakes risks as well.

The existing literature exploring the use of creative practices to inform scenario planning is disaster risk reduction surprisingly limited. Panagiotis E. Petrakis and Dimitra P. Konstantakopoulou explore the role of creativity in strategic planning in *Uncertainty in Entrepreneurial Decision Making: The Competitive Advantages of: Strategic Creativity* specifically noting that “Since scenario development is a mental process, creativity is an integral part of scenario planning.” They present a framework that connects scenario planning, creativity, and risk, offering that “The implementation of creativity in scenarios requires team members to intensively exercise their mental capacities.” And while they address the factors that may create an environment conducive to innovation, the specific stimuli for creativity is beyond the scope of their text. (Konstantakopoulou and Petrakis, 2015)

In *Improvisation, Creativity, and the Art of Emergency Management*, James Kendra and Tricia Wachtendorf argue that “creativity and improvisation are good candidates for comprising an orienting theme or set of concepts for emergency management in the response phase.” Kendra and Wachtendorf consider the value that these skills offer in responding to a disaster, but do not explore how these same skills may be applied to preventing a disaster. (Wachtendorf and Kendra, 2007)

In 2007–2008 the United States housing market collapsed and with it, the values of securities tied to U.S. real estate plummeted. In the years preceding the collapse U.S. financial institutions had become increasingly leveraged and were unprepared to manage these losses. The shock of this crisis was felt across the intertwined and interconnected global financial sector. The U.S. financial crisis became the *global* financial crisis, and few financial institutions were left unscathed. The crisis continued into what would become the most severe global recession since the Great Depression. (Williams, 2010)

When postulating on the origins of the global financial crisis, former U.S. Treasury Secretary Timothy Geithner concluded “Our crisis, after all, was largely a failure of imagination. Every crisis is” (Geithner, 2014, p.857). In a span of a few weeks between August and September 2017, hurricanes Harvey, Irma and Maria tore through the Caribbean. In an after-action report released in 2018, the Federal Emergency Management Agency identified a failure to develop

an adequate recovery plan that would accommodate the degree to which Puerto Rico's infrastructure would be compromised by two successive hurricanes (Federal Emergency Management Agency, 2018). The Washington Post characterized this shortcoming:

This failure of imagination became clear when, two weeks after Irma's near miss of Puerto Rico, Maria caught the island flush, obliterated the electrical grid, shut down the cellphone network, closed ports and airports and killed a still-unknown number of people. (Hernández and Achenbach, 2018)

The enormity of the catastrophe hindered the accurate determination of the number of fatalities resulting from the hurricanes, but one estimate places the number 2,975 (The George Washington University Milken Institute School of Public Health).

On the morning of September 11, 2001, four airliners that had departed from airports in the northeastern United States bound for California were hijacked by 19 al-Qaeda terrorists. Two of the planes, American Airlines Flight 11 and United Airlines Flight 175, crashed into the North and South towers, respectively, of the World Trade Center complex in Lower Manhattan. (Congress, 2006)

In the wake of this tragedy, a comprehensive report by of the National Commission on Terrorist Attacks Upon the United States stated, "We believe the 9/11 attacks revealed four kinds of failures: in imagination, policy, capabilities, and management." A section of this report, titled *Imagination*, concludes that it "crucial to find a way of routinizing, even bureaucratizing the exercise of imagination." (National Commission on Terrorist Attacks upon the United States et al., 2004, chap.11)

It is hard to square a lack of imagination with the United States' reputation as an incubator for creativity. The U.S. media and entertainment industry is the largest in the world at \$660 billion - one-third of the \$2 trillion global markets. ('Media & Entertainment', 2021). In 2019, The U.S. earned \$16.3 billion in audiovisual exports to over 130 countries (Motion Picture Association, 2020).

Hollywood, California, the location of the U.S. film studios, has become globally recognized for professional film production and the hub of the U.S. film industry. Other hubs have adopted (or have been assigned) soubriquets inspired by the ubiquity of the Hollywood image including Bollywood in India and Nollywood in Nigeria. But the U.S. presence in the cultural economy extends beyond media. It also has a thriving market for fine art (such as painting and sculpture) and accounts for 44% of global art sales. (McAndrew, 2020). There are approximately 35,000 active museums in the U.S. (Institute of Museum and Library Services, 2014)

How can a country have both a thriving creative sector and yet still lack the imagination to envision the global financial crisis and the economic catastrophe that followed? It is likely because the creative practices of cultural production aren't immediately applied to risk analysis. Even the *9/11 Commission Report* notes that "Imagination is not a gift usually associated with bureaucracies." (National Commission on Terrorist Attacks upon the United States et al., 2004) This sentiment is echoed by Konstantakopoulou and Petrakis who note that "Innovativeness is favored by lack of bureaucracy while flat hierarchies with decentralized structures enhance creativity, and both tend to occur in societies with low power distance." (Konstantakopoulou and Petrakis, 2015)

The defining and interconnect forces of the 21st century: globalization, the fourth industrial revolution, climate crisis, nuclear proliferation, the COVID-19 pandemic, and economic

inequality seemed unfathomable a century earlier. The confluence of these forces creates an unstable world, primed for catastrophe. The prediction-based models that dominated 20th-century planning are not equipped to manage the exponential complexity, uncertainty, and velocity of these forces. The variables introduced to planning by globalized transportation networks, integrated technology infrastructures, massive production and consumption of energy, unprecedentedly destructive weapons, and unstable climate, make such predictions incalculable. Instead, projection-based models that accommodate a spectrum of scenarios are necessary for mitigating risk. Developing such models requires not only extrapolating trends but also leveraging the elusive imagination.

In a 2017 presentation at TEDxPennsylvaniaAvenue, Melissa Chiu, Director of the Hirshhorn Museum and Sculpture Garden, a Smithsonian Institution, and the national museum of modern and contemporary art, examined the prescient qualities of artists. In a talk titled “How Artists Predict the Future,” Chiu considered how new media artist Nam Jun Paik envisioned a “paperless society” and an “information superhighway” as early as the 1960s (Chiu, 2017). The title of the talk is suggestive, implying that artists have a unique prescience and can anticipate forthcoming events. This isn’t, of course, the argument that Chiu makes, instead she draws connections between the experiments that artists conduct the concepts with which they work, and how the extent to which these ideas are situated at the beginning of a much larger curve of adoption.

Artists also thrive in potential and possibility, considering alternatives and harmonizing both rigorous technical mastery with the unexpected. Composer John Cage superimposed star charts onto a conventional musical staff to create *Atlas Eclipticalis*, a musical piece that celebrated serendipity. By leaving the arrangement of musical notes to chance, Cage challenged conventional ideas about control and the role of the composer (Akiyama, 2014).

Recognizing the various forces that could and do shape our world is a vital part of mitigating the risks those forces pose. But it is also important to recognize how those forces can behave in ways that are unexpected and act outside of our control. This article considers how various modes of creativity in cultural production are can be used to inform scenario planning activities and strengthen risk mitigation.

Scenario planning is a strategic planning method in which participants consider alternate futures and model solutions to address the challenges and leverage the opportunities that these futures present. These futures are possibilities spun from the human imagination and weaving fears and ambitions. Although grounded in fact patterns, they are fiction, stories, and creative works.

Paul J.H. Schoemaker, the chairman of Decision Strategies International, Inc., and a professor at the University of Pennsylvania explained Scenario planning in a 1995 article in the MIT Sloan Management Review:

...scenario planning attempts to capture the richness and range of possibilities, stimulating decision-makers to consider changes they would otherwise ignore. At the same time, it organizes those possibilities into narratives that are easier to grasp and use than great volumes of data. (Schoemaker, 1995)

Scenario planning differs from other forms of modeling by considering situations in which different combinations of variables produce an array of outcomes or “scenarios.” But, to be effective, the construction of these scenarios requires both a sophisticated understanding of the industry to which it is being applied but also a vivid imagination that could conceive of the

forces that disrupt that industry. One of the strengths of scenario planning is that provides a platform to explore disruptive forces that are, by nature, hard to predict and difficult to quantify: government legislation, extreme weather, and economic crises. Further, it provides an opportunity to consider not only the discrete impact of each variable on a stable system but also the impact of variables in combination.

When facilitating scenario planning workshops with Nongovernmental Organizations (NGOs), the author uses PESTLE factors (political, economic, societal, technological, legal, and environmental) as a framework for participants to identify potential sources of disruption that could impact their sector. Participants brainstorm ways in which these factors could vary. For example, using the legal factor, an NGO might see increased regulation of their service area or decreased regulation of their service area. An environmental variant might be unprecedented precipitation or an unforeseen drought. Participants develop scenarios in which two or more of these variables converge. For example, in a situation of increased regulation and drought, may lead to supply chain disruptions for an NGO focused on providing access to water but it may also make a stronger case for private sector support.

Each of these scenarios is memorable given a name and discussed. Depending on the resources, timelines of the organization, and scope of the strategic planning work, detailed strategies that address the risks and opportunities presented in each scenario may be developed. This process for strategic planning is not unusual, and variants of it are used across the U.S. and around the world. And while a capable facilitator contributes to the success of these types of exercises, contributions by the participants are essential. The most effective and dynamic scenario planning exercises are those in which participants are willing to engage their creativity. And, ultimately the test of the scenario planning is when the exercise anticipates a future state and informs a response to that state.

While participants try to devise novel scenarios, many find it easier to reference, incorporate, and mix the culture that they consume into the description of the scenarios. Popular media becomes a convenient shorthand and a scenario might be likened to *Groundhog's Day*, *Black Mirror*, or *Mad Max*, evoking not only the plots to those movies or series, but also the emotional atmosphere that they produce: a seemingly inescapable pattern of recurrence, a dehumanized dystopia, or a merciless scramble for resources. By using a vocabulary cobbled from the fictional worlds presented on the screen, participants can effectively create vivid scenarios.

This might suggest that media consumption when paired with rigorous analysis could be a vital resource for scenario planning participants. Popular culture, by its nature, is the most ubiquitous. Its broad appeal is due, in part, to its overall accessibility – both its availability in theaters or at home and the limited amount of "insider knowledge" that one needs to understand and enjoy it.

Risk and the Cinematic Imagination

Horror films are a perennial favorite and in this genre are some of the most iconic cinematic works, including *Nosferatu* (Murnau, 1922), *Invasion of the Body Snatchers* (Siegel, 1956), *The Shining* (Kubrick, 1980), and *A Nightmare on Elm Street* (Craven, 1984). Horror films situate their protagonists against circumstances that are highly improbable, catastrophic, but predictable in retrospect. They map closely to the criteria for what Nassim Nicholas Taleb describes as a Black Swan event:

First, it is an outlier, as it lies outside the realm of regular expectations because nothing in the past can convincingly point to its possibility. Second, it carries an extreme impact. Third, despite its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable. typical black swan events. (Taleb, 2007)

Taleb argues that Black Swan events have an outsized impact on human history, and therefore present enormous risk (Taleb, 2008). When applying the tools of scenario planning to explore and potentially mitigate Black Swan events, horror films become useful. Horror films offer a convenient set of fully developed scenarios to examine: the origins of the Black Swan event, the consequences of the event, and potential responses (of often varying degrees of effectiveness) to the event.

Horror films imagine, for example, a conflict in which nature assumes both agency and antagonism towards humans and how that conflict could realize: Alfred Hitchcock's *The Birds*, presents a world in which a decentralized avian network becomes violent and undertakes deadly attacks on humanity, *Jaws* (Spielberg, 1975) considers a shark, undeterred by typical means, wreaking havoc on a summer resort town. In a CNN Opinion article, historian Julian Zelizer suggests that *Jaws* could serve as an allegory for the U.S. government's response to COVID-19 pandemic: "Ultimately, *Jaws* delivers a basic, and hard to dispute, message: that to make people feel safe to go into the water you need to defeat the shark." (Zelizer, 2020)

Iconic horror films present scenarios that test their protagonists' physical and psychological readiness. In 2011 the Center for Disease Control launched a tongue-in-cheek campaign to promote "Zombie Preparedness." (Good, 2011). The campaign drew on the major tropes of zombie films set forth in classic films such as *Night of the Living Dead* (Romero, 1968) and *The Last Man on Earth* (Ragona and Salkow, 1964), as well as more recent films such as *28 Days Later...* (Boyle, 2002) and *Dawn of the Dead* (Snyder, 2004). The capstone of the campaign was a graphic novel, *Preparedness 101: Zombie Pandemic*, that followed a suburban couple Todd and Julie with their dog Max, as they follow CDC guidelines to successfully remain safe during the spread of a virus. The graphic novel concludes with a checklist for an "All-Hazards Emergency Kit" and an explanation:

We hope you enjoyed reading this fictional story. It's meant to be both educational and entertaining. Now that you've seen the importance of being prepared, take the time to put together an emergency kit with the items included in the checklist on the inside of the back cover. You'll be ready for any kind of disaster, even zombies. (Silver, 2011)

In a sense, some of our only cognitive tools for processing the catastrophic are anchored in the cinematic, such as with the aforementioned September 11 coordinated attacks on the United States.

New Yorker critic Anthony Lane examines the cinematic vocabulary of catastrophe that preceded the attacks in films like *The Siege* (Zwick, 1998), released three years earlier, in which New York City becomes the target of escalating terrorist attacks after the US military abducts an Islamic religious leader:

The parallels between "The Siege" and the atrocities of September 11th are not an isolated coincidence; one could find similar quotations in a dozen other pictures. What the echo brings home is the degree to which people saw—literally saw, and are continuing to see, as it airs in unforgiving repeats—that day as a movie. (Lane, 2001)

He connects this to contemporaneous television coverage of the September 11 attacks themselves which employed "a phrase book culled from cinema: 'It was like a movie.' 'It was like Independence Day. 'It was like Die Hard.' 'No, Die Hard 2.' 'Armageddon.'" (Dery, 2012)

This connection was not lost on audiences. Although the movie's release had been scuttled by protestors decrying the film's Islamophobic tones, it became, by some accounts the "the most rented movie in America after 9/11" (Martin, 2007). The film not only became a way to process the tragedy of the violent attacks that occurred on September 11 but also possible futures after the attacks and security measures might be put into place.

While cinema may shape our thinking about risk, theater can offer opportunities to experiment and prototype scenarios in real-time.

Brazilian theatre practitioner and political activist Augusto Boal developed what he termed *Theatre of the Oppressed*, a theatrical form that integrated theatre and politics as both a form of activism and but also a toolset for conflict resolution. He imagined the audience of these performances not as spectators, but as "spect-actors," shaping the action onstage and thereby recognizing their agency to shape reality outside of the theatre.

In one of the techniques that Boal used for highly- interactive performances, performers solicit potential scenes to act out from the community in advance of the performances. They then act out these scenes to consider possible resolutions with ongoing input from the audience:

Having begun the scene, the actors develop it to the point at which the main problem reaches a crisis and needs a solution. Then the actors stop the performance and ask the audience to offer solutions. They improvise immediately all the suggested solutions, and the audience has the right to intervene, to correct the actions or words of the actors, who are obligated to comply strictly with these instructions from the audience. Thus, while the audience 'writes' the work the actors perform it simultaneously. (Boal, 2013, p.109)

The activity that Boal sets forth in this exercise bears striking similarities to scenario planning: It is highly participatory – the audience is actively engaged in brainstorming and proposing ideas for the actors to reproduce. It generates multiple possible outcomes, and each scene offers a different direction the action can take. And it explores collectively-generated solutions to resolve the crisis presented.

Beyond traditional scenario planning, however, Boal's methodology proposes an opportunity to model the human interpersonal dynamics that are often lost in high-level strategic planning exercises.

The rise of Silicon Valley companies like Google, Facebook, and Apple offers disruptive ideas about how the business of the 21st century can operate. Design is foregrounded as a part of this innovation – not only in the product lines but also in the experience of working at the company and embodying a corporate brand. The minimalist and perpetually futurist aesthetic that Apple embodies is drawn from Steve Jobs's own experience. While attending Stanford as an undergraduate student, Steve Jobs audited a calligraphy course, which he later credited to be the inspiration for Apple's beautiful typography. He would later develop a fascination with shin-hanga, modern Japanese woodblock prints (Kentaro, 2020).

To consider how one might apply a rigorous and disciplined approach to integrating creativity into otherwise bureaucratic processes, design thinking offers a prototype for an integrated and replicable approach.

In efforts to replicate some of the innovation that comes out of Silicon Valley, *design thinking*, has received wider attention in other business functions and sectors, including finance, legal, and human resources. Design thinking is a broad toolset and loose philosophy focusing on iterative, inquiry-based, and customer-centric approaches to research and development of graphic, industrial, digital and experiential design.

Historians trace design thinking back to L Bruce Archer, who sought to standardize the practice of design in *Systematic Method for Designers* (Archer and Council of Industrial Design (Great Britain), 1965). But the idea was popularized by Tim Brown's 2008 Harvard Business Review article, *Design Thinking*. Brown, then CEO and president of IDEO, an innovation and design firm whose headquarters is in Palo Alto, California, suggested that the strategies that designers used to create beautiful products could be applied to other areas of business. He asserted that "Thinking like a designer can transform the way you develop products, services, processes—and even strategy." (Brown, 2008).

Much like the scenario planning process, the design thinking process involves a robust ideations stage in which participants engage in brainstorming. The mindset of integrative thinking is vital to the success of design thinking. In *The Opposable Mind: How Successful Leaders Win Through Integrative Thinking*, Roger Martin describes integrative thinking as the "ability to face constructively the tension of opposing ideas and, instead of choosing one at the expense of the other, generate a creative resolution of the tension in the form of a new idea that contains elements of the opposing ideas but is superior to each." He uses, as a case study, Martha Graham, a dancer and choreographer, used an approach similar to integrative thinking to revolutionize dance. Beyond the movement of the dances, Graham took an interest in the props, costumes, and set – everything that appeared onstage. She collaborated with artist Isamu Noguchi to create sets with which the dancers could interact an uncommon and unprecedented approach that expanded her ability to create novel and immersive performances. By looking holistically at the options available to her and shedding conventional notions of what was fixed in dance, Graham applied intellectual flexibility and pliability that mirror the physical agility that her dancers presented onstage. (Martin, 2009)

What can be gleaned from integrative thinking, and the example of Martha Graham, is an approach to looking comprehensively at a problem and assuming a mindset that eschews assumptions about which tools (whether physical or mental) might be used to solve a problem.

Designing thinking emphasizes the necessity of research, including fieldwork such as observation and interviews, to fully understand the business challenge from a variety of different angles. It also stresses the importance of considering marginal and extreme cases, rather than just the most frequent occurrences, to test the universality of a solution.

Ideation is also significant to design thinking, and the development of prototypes is a key part of the process. Depending on what is being developed, prototypes may be sketches, storyboards, mock-ups, or functional models. Starting with crude models, the prototypes are then tested and refined until the best solution is determined and executed. (Brown, 2008)

Speculative design takes an approach of designing for future worlds rather than making subtle improvements on products that exist in the current world. Drawing on the practices of design thinking: conducting ethnographic research, building inventories of solutions, rapid prototyping, multivariate testing, speculative design offers a set of practices that accommodate a variety of possible futures. Anthony Dunne & Fiona Raby of London-based design studio Dunne & Raby explain speculative design:

This form of design thrives on imagination and aims to open up new perspectives on what are sometimes called *wicked problems*, to create spaces for discussion and debate about alternative ways of being, and to inspire and encourage people's imaginations to flow freely. (Dunne and Raby, 2013, p.2)

The practice of speculative design is separate from the market for products developed with commercial interests and intent. This distinction allows for the design of products and systems that are conceptually significant and offer social benefits, may have limited commercial viability or for which a business model has not been established. Further, the end-user (that is, the person who will ultimately be using what is designed) is a beneficiary of the design process and product rather than the consumer or customer.

An example of speculative design is industrial designer Meydan Levy's *Neo_Fruits*. This project presents nutritious and vitamin-rich artificial fruits that are 4d printed using cellulose. These artificial fruits offer an alternative to the ubiquitous processed foods that have long shelf-lives but a diminished nutritional value (Hahn, 2019). *Neo_Fruits* challenges our mindset about what is fixed about fruit and what can be modified. It raises a question about genetically modified fruits and other foods: What are the cultural reasons for retaining the form-factor of familiar fruits when other forms might be available? Why do we modify fruit to maximize flavor, color, edible mass, and other desirable qualities, but retain the familiar qualities that obscure this same modification?

This work also highlights the persistent challenge of "food deserts" which occur in low-income neighborhoods around the world. It suggests that, rather than re-examining the business models of fresh grocery stores or the fruit and vegetable supply chains that might stock these stores, that intervening in the design of the product itself might be the only sustainable approach. To that end, the necessity of such a design becomes a critique of capitalism and demonstrates a tension between the profit-driven market-aligned approach to providing access to fresh food and the benefits access to such food offers. It exposes our fundamental vulnerability to a crisis resulting from such tensions.

Bjørn Karmann and Tore Knudsen drew inspiration from the parasitic behaviors of the cordyceps fungus that abound in the rainforest to create *Alias*, a single-board computer and always-listening speaker encased in a 3D shell. It serves as a safeguard that protects users'

private conversations from being recorded by smart home devices and like the Amazon Echo and Google Home speakers. Alias sits on top of these devices and produces constant white noise that that limits the amount of ambient sound that the device can collect. Only when a custom “wake word” is uttered, does Alias pause the interference to permit smart home devices to respond to users. (Wilson, 2019)

The design of *Alias* speaks to increasing discomfort with electronics and foreshadows strategies to evade their persistent surveillance. It also surfaces users’ distrust of the companies (such as Amazon and Google) that manufacture, sell and support these devices. It suggests that the interests of such companies may supersede the interests of the users and that users are wary of what information might be gathered by these devices and to what end. At the same time, Alias’ function, which might be described as augmentation, customization, or hacking, recognizes the convenience, or perhaps necessity, of keeping smart the devices in the home. Rather than replacing Amazon Echo and Google Home with an alternative device, it offers a means for the user to interface with them on their terms.

The physical design, mimicking both the appearance and behavior of organic matter, such as a fungus, offers a counterbalance to the stark minimalist aesthetic of Smart Home speakers. The metaphor of the parasitic fungus that overtakes the device shows an interest in users reclaiming control of the devices that they own.

Commissioned as part of her residency at Ars Electronica, Lucy McRae’s short film *The Institute of Isolation* examines how travelers bound for outer space might prepare for the journey before departing from the earth. The fictional film depicts a woman donning designed garments, using special machinery to engage in exercises that training her to deal with the extremities both physical and psychological of space travel – specifically the long spans of isolation. Her film suggests how the human body could be conditioned to exist, and possibly thrive, outside of the earth’s atmosphere.

As the Earth’s climate crisis persists, the idea of moving “off-planet” being considered more widely and with greater seriousness. And some scientists speculate that such a migration may be necessary to enable the continuity of the human species. Mars’s proximity to earth and earth-like surface conditions (such as sunlight and temperature) make it a promising candidate such a colony (Horneck, 2008). The colonization of Mars has been the priority of companies like SpaceX, Boeing, and Lockheed Martin which all seek to reduce transportation costs associated with this venture (Chang, 2016). In 2017, SpaceX CEO Elon Musk announced to an audience at the International Astronautical Congress (IAC) in Adelaide, Australia, that he aimed to start sending people to Mars in 2024 (Amos, 2017).

The purpose of these projects is not to offer market-ready solutions for which there is a demonstrable demand. Instead, the work introduces new concepts and concerns into the popular discourse. By framing solutions that can be strange, radical, or even comic, they draw attention to problems where there are gaps in the market. In some instances, the solutions themselves pose more questions than they resolve.

The practice of speculative design veers closely to and often overlaps with, the creation of artwork. The conceptual, exploratory, and experimental nature of both disciplines leaves ambiguity in the distinction between the two. Additionally, both see a tension between their intended ends of realized a “product” that might exist in the ‘marketplace.’ For conceptual art “the idea or ideas that a work represents are considered its essential component and the finished ‘product’”(Chilvers and Graves-Smith, 2009).

Art can be provocative, asking questions, raising issues, but not necessarily presenting solutions. Art can be used to inform risk identification and mitigation by presenting by asking critical questions and creating 'texture' – examining the experiential qualities, emotions, and impressions of a future state. Art often asks the question, "what is the experience of being human in the world today?" but it can also ask "what will be the experience of being a human tomorrow?"

The following artists probe that question, each with different results. Individually they each take a unique perspective of this moment, but collectively, they offer a glimpse of the future. Each artist presents either one or more alternative futures with a widely varying degree of probability. Some are optimistic while others are terrifying. And it is their radical divergence from each other that affords so much interpolating territory for us to consider as a ground for analysis.

John Maeda's artwork explores the intersection of technology, art, and design. His works are often digital, and many have been acquired by museums such as the Museum of Modern Art and San Francisco Museum of Modern Art as compact disks on which the art, a piece of software, is encoded. The software itself produces an abstract experience for the user and considers the relationship between the human user and digital forms through systems and constraints.

In a 2012 lecture at TED Conference, Maeda explains:

What can we learn from artists and designers for how to lead? Because in many senses, a regular leader loves to avoid mistakes. Someone who's creative actually loves to learn from mistakes. A traditional leader is always wanting to be right, whereas a creative leader hopes to be right. And this frame is important today, in this complex, ambiguous space, and artists and designers have a lot to teach us, I believe. (Maeda, 2012)

Under the pseudonym "China Tracy," Chinese artist Cao Fei created "RMB City," a fictional city in Second Life, an online virtual world developed by Linden Labs. RMB City was opened to the public from 2009 through 2011. The public could "visit" the city for free by creating avatars in the Second Life world and then traveling to the city within the game. While many visitors of RMB City were are of the project, there was also an opportunity for visitors to discover the city while exploring the Second Life world. Regardless of how they arrived, visitors could experience artist projects, contests, and mayoral inaugurations, and other events. Through the span of the project, the RMB City continued to evolve and Fei cataloged the city and its activities through an extensive blog and videos generated from screen recordings (Berry, 2015). *RMB City* interrogated the distinction between the physical and virtual worlds, in a way that almost foreshadows the rise of virtual experiences that would be proliferating during the 2020-21 COVID-19 pandemic.

Responding to the late 1980's rise in homelessness in New York and Philadelphia, artists Krzysztof Wodiczko and David V. Lurie created *Homeless Vehicle*. The vehicle was made in consultation with homeless persons – adapted and modified according to their suggestions. Made of aluminum, steel mesh, sheet metal, and Plexiglas, the vehicle could be folded to the form of a cart for collecting cans and bottles or expanded to provide shelter and a secure place to sleep. (Morzuch, 1992)

In 2018, Danish-Icelandic artist Olafur Eliasson extracted 30 blocks of glacial ice from the waters surrounding Greenland and placed them in public spaces across London, in a work titled *Ice Watch*. As the blocks melt, they serve as a visual reminder of the impact of climate change on the environment (Yalcinkaya, 2018). The block's presence and deterioration juxtapose with the urban environment of London's busy streets. The water produced by the melting blocks forms small pools and drains into the sewer beneath the streets. The work is fleeting, and that reality is not lost on the viewer. What's conveyed is not a scientific explanation of the implications of climate change, but a simulated experience of its irreversibility.

Alexis Rockman creates monumental paintings that adverse results of human intervention into fragile ecosystems and the tensions created by an unbalanced environment. One of his paintings, *Battle Royale*, acquired by the New Orleans Museum of Art in 2012 addresses an ongoing struggle occurring in Louisiana's ecosystem. The painting vividly depicts 44 animals of different species, an alligator, black bear, pelican, bald eagle, engaged in warfare set in a Louisiana swamp. Some of these animals are indigenous to Louisiana and others have been transplanted (New Orleans Museum of Art, 2012). Much like Alfred Hitchcock's *The Birds*, *Battle Royale* envisions a world in which nature is upset and in which humanity is helpless in the face of uncontrollable chaos and seeming rebellion.

Gretchen Bender's *Total Recall* (1987) is a large-scale installation consisting of 24 color monitors and three projection screens. It juxtaposes and splices imagery appropriated from television commercials, broadcast news, action movies, to produce a "disconcerting, almost sinister assault on the senses." The work is accompanied by a cacophonous soundtrack from cyberpunk composer Stuart Argabright (Pinnington, 2014). The immersive intensity of *Total Recall* and the saturation of processed mass media images and sounds prefigures the invasiveness of digital content accompanies the rise of smartphones and streaming media decades after the works' creation. The work imagines a dystopia in which the viewer is inescapably overwhelmed by media that he or she cannot cognitively process in its entirety.

This article has presented only a small sample of the breadth of the ways that creative practices can be used to inform strategies to identify and manage risk.

Methodologies, such as those presented in Augusto Boal's *Theatre of the Oppressed* can be incorporated directly into planning efforts. The exercises the Boal proposes don't need to be replicated slavishly with the instructions as dictates. Instead, they can inspire the design and development of exercises more suited to the skills, expertise, talents, goals, interests, and intents of those engaged in the activity.

Design thinking and speculative design can provide frameworks for considering risk and proactively developing potential solutions. By employing processes that accommodate curiosity, creativity, exploration, critique, and dissent, planners can stave off groupthink, and surface the strongest possible ideas. By generating large quantities of both risks and potential mitigation strategies, including those that are highly speculative, the planning process will be much more robust and offer an opportunity to address areas of risk that are extremely consequential, if not existential, that may not be considered urgent.

Proactively seeking out artwork can reinforce scanning activities. The artists' process is to gather ideas that often go unrecognized and dissect or elevate them. While many prominent museums feature significant works by recognized artists, independent galleries or

unconventional art spaces can offer a view into the current ideas and information that are in circulation.

Cinema can offer scenarios that model potential challenges and opportunities presented by the confluence of forces. The broad appeal of popular cinema can serve as a mirror of the public's fears and apprehensions. They offer pre-packaged scenarios that can assist with and expedite scenario planning. Because they are specifically intended to entertain a popular audience, movies generally assume a low-level of subject matter expertise from the viewer and provide ample explanation when complex or potentially confusing situations are presented. Therefore, they can be understood by individual members of a cross-disciplinary team in which the lack of overlapping subject matter expertise may hinder such activities.

Conclusion

Artists, designers, and filmmakers do not operate in a vacuum, but instead channel the ideas and influences in the world around them to produce responsive and relevant works. When leveraged to support risk management and mitigation, they offer a wellspring of information and are a valuable resource. A collected vocabulary culled from art, design, theater, and cinema can provide qualitative and subjective complements for quantitative and objective metrics. Art becomes a kind of lens through which we can observe risks and opportunities over the horizon.

Bibliography

- Akiyama M. 2014. Dataflect: Numerical Epistemology and the Art of Data Sonification. *Leonardo Music Journal*. 24: pp.29–32. Available at <http://www.jstor.org/stable/43832697>.
- Amos J. 2017. Elon Musk: Rockets will fly people from city to city in minutes. *BBC News*. Available at <https://www.bbc.com/news/science-environment-41441877>.
- Archer LB and Council of Industrial Design (Great Britain). 1965. *Systematic method for designers*. London: Council of Industrial Design.
- Berry C. 2015. Images of urban China in Cao Fei's 'magical metropolises'. *China Information*. 29(2): pp.202–225. Available at <https://doi.org/10.1177/0920203X15588722>.
- Boal A. 2013. *Theatre of the Oppressed*. Theatre Communications Group.
- Boyle D. 2002. *28 Days Later...*
- Brown T. 2008. Design Thinking. Harvard Business Review
- Chang K. 2016. Elon Musk's Plan: Get Humans to Mars, and Beyond. *The New York Times*. : 27 September, . Available at <https://www.nytimes.com/2016/09/28/science/elon-musk-space-x-mars-exploration.html>.
- Chilvers I and Graves-Smith J. 2009. *A dictionary of modern and contemporary art*. Oxford ; New York: Oxford University Press.
- Chiu M. 2017. *How Artists Predict the Future*. Available at <https://www.youtube.com/watch?v=IIEKJvY2rM4>.
- Congress US. 2006. Google-Books-ID: eCO7Q10SGBUC. *Congressional Record, V. 148, PT. 7, May 23, 2002 to June 12, 2002*. U.S. Government Printing Office.
- Craven W. 1984. *A Nightmare on Elm Street*.
- Dery M. 2012. The Savage Eye: Aesthetics After 9/11. Thought Catalog Available at <https://thoughtcatalog.com/mark-dery/2012/09/the-savage-eye-aesthetics-after-911/>.
- Dunne A and Raby F. 2013. *Speculative everything: design, fiction, and social dreaming*. Cambridge, Massachusetts ; London: The MIT Press.
- Federal Emergency Management Agency. 2018. *2017 Hurricane Season FEMA After-Action Report*.
- Geithner TF. 2014. *Stress test: reflections on financial crises*. New York: Crown Publishers.
- Good C. 2011. *Why Did the CDC Develop a Plan for a Zombie Apocalypse?*. Available at <https://www.theatlantic.com/politics/archive/2011/05/why-did-the-cdc-develop-a-plan-for-a-zombie-apocalypse/239246/>.
- Hahn J. 2019. *Meydan Levy creates 4D-printed artificial Neo Fruit filled with nutrients*. Available at <https://www.dezeen.com/2019/12/07/meydan-levy-neo-fruit-4d-print-design/>.
- Hernández AR and Achenbach J. 2018. Failure of imagination hindered federal Puerto Rico response amid rough hurricane season. *Washington Post*. : 13 July, . Available at https://www.washingtonpost.com/national/failure-of-imagination-hindered-federal-puerto-rico-response-amid-rough-hurricane-season/2018/07/13/8ab2b1ea-86b0-11e8-8553-a3ce89036c78_story.html.
- Horneck G. 2008. Astrobiological Aspects of Mars and Human Presence: Pros and Cons. *Hippokratia*. 12(Suppl 1): pp.49–52. Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2577400/>.
- Institute of Museum and Library Services. 2014. *Government Doubles Official Estimate: There Are 35,000 Active Museums in the U.S.* Available at <https://www.ims.gov/news/government-doubles-official-estimate-there-are-35000-active-museums-us>.
- Kentaro S. 2020. The secret passion of Steve Jobs. *NHK World*. : 10 May, . Available at <https://www3.nhk.or.jp/nhkworld/en/news/backstories/1074/>.
- Konstantakopoulou DP and Petrakis PE. 2015. *Uncertainty in Entrepreneurial Decision Making*. Palgrave Macmillan US.
- Kubrick S. 1980. *The Shining*.

- Lane A. 2001. *This Is Not a Movie*. Available at <https://www.newyorker.com/magazine/2001/09/24/this-is-not-a-movie>.
- Maeda J. 2012. *How art, technology and design inform creative leaders*. Available at https://www.ted.com/talks/john_maeda_how_art_technology_and_design_inform_creative_leaders.
- Martin D. 2007. *Reporting The Bin Laden Beat: Journalist Lawrence Wright Knows More About Al Qaeda's Leader Than Many CIA Operatives*. Available at <https://www.webcitation.org/5mWylKvfJ?url=http://www.cbsnews.com/stories/2007/09/09/sunday/main3244713.shtml>.
- Martin RL. 2009. *The opposable mind: how successful leaders win through integrative thinking*. Boston, Mass: Harvard Business School Press.
- McAndrew C. 2020. *The Art Market 2020*. Art Basel & UBS.
- Morzuch M. 1992. *Krzysztof Wodiczko: Muzeum Sztuki w Łodzi, marzec-kwiecień 1992*. W Łodzi: Muzeum Sztuki.
- Motion Picture Association. 2020. *MPA Comments Regarding the 2021 National Trade Estimate Report on Foreign Trade Barriers*.
- Murnau FW. 1922. *Nosferatu, eine Symphonie des Grauens*.
- National Commission on Terrorist Attacks upon the United States, États-Unis C nationale sur les attaques terroristes contre les, Office USGP, et al. 2004. Google-Books-ID: juJxMFmJCEMC. *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks Upon the United States*. U.S. Government Printing Office.
- New Orleans Museum of Art. 2012. Recent Acquisition: Alexis Rockman's Battle Royale. *Arts Quarterly*. : .
- Pinnington M. 2014. *Who was Gretchen Bender?*. Available at <https://www.tate.org.uk/art/artists/gretchen-bender-19998/who-was-gretchen-bender>.
- Ragona U and Salkow S. 1964. *The Last Man on Earth*.
- Romero GA. 1968. *Night of the Living Dead*.
- Schoemaker PJH. 1995. Scenario Planning: A Tool for Strategic Thinking. *MIT Sloan Management Review*. : pp.18.
- Siegel D. 1956. *Invasion of the Body Snatchers*.
- Silver M. 2011. *Preparedness 101: Zombie Pandemic*. U.S. Department of Health and Human Services Centers for Disease Control and Prevention. Available at https://www.cdc.gov/cpr/zombie/00_docs/zombie_pandemic.pdf.
- Snyder Z. 2004. *Dawn of the Dead*.
- Spielberg S. 1975. *Jaws*.
- Taleb N. 2008. *The black swan: the impact of the highly improbable*. New York: Random House.
- Taleb NN. 2007. 'The Black Swan: The Impact of the Highly Improbable'. *The New York Times*. : 22 April, . Available at <https://www.nytimes.com/2007/04/22/books/chapters/0422-1st-tale.html>.
- The George Washington University Milken Institute School of Public Health. *Ascertainment of the Estimated Excess Mortality from Hurricane María in Puerto Rico*.
- Wachtendorf T and Kendra J. 2007. Improvisation, Creativity, and the Art of Emergency Management. *In: Understanding and Responding to Terrorism*. NATO science for peace and security series. E. Human and societal dynamics. IOS Press. pp.324–335. Available at <https://udspace.udel.edu/handle/19716/3054>.
- Williams MT. 2010. *Uncontrolled risk: the lessons of Lehman Brothers and how systemic risk can still bring down the world financial system*. New York: McGraw Hill.
- Wilson M. 2019. *This is the first truly great Amazon Alexa and Google Home hack*. Available at <https://www.fastcompany.com/90290703/this-is-the-first-truly-great-amazon-alexa-and-google-home-hack>.

Yalcinkaya G. 2018. *Olafur Eliasson installs giant blocks of glacial ice across London*. Available at <https://www.dezeen.com/2018/12/12/ice-watch-olafur-eliasson-installation/>.

Zelizer J. 2020. *What 'Jaws' can teach us about our coronavirus response*. Available at <https://www.cnn.com/2020/05/22/opinions/jaws-lessons-on-covid-19-response-zelizer/index.html>.

Zwick E. 1998. *The Siege*.

2021. *Media & Entertainment*. Available at <http://www.trade.gov/media-entertainment>.