

Imagination as a Research Method: Spatial Futures for Pyongyang in 2050

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Abstract

Conventional methods are necessary for addressing certain types of problems, but they are inadequate for investigating subjects that cannot be known in an increasingly complex and emergent world. The method proposed in this paper acknowledges the role of imagination as a cognitive function involved in all human activities from perception and reasoning to experiment and speculation. It forms the theoretical basis for an inter-disciplinary research method that combines the scenario method from Future Studies, fictive narrative, and design thinking and visualization for examining the projects for alternative plausible spatial futures of Pyongyang in the context of a unified Korean peninsula.

Keywords: Imagination; scenarios; architecture; urbanism; design methods; future design; unification

Introduction

“The years to come will be defined by the struggle over the imagination.”
Max Haiven²

Imagining what Pyongyang will look like in 30–35 years in a reconciled or unified Korea as a research subject raises epistemological challenges. The future of Pyongyang is inextricably linked to the form that the unification, or reconciliation of the Korean peninsula will take. North Korea is one of the most inaccessible

countries in the world. The country is strict about its privacy and has imposed many bans and restrictions.³ Access to Pyongyang is controlled by “regimes of visibility” that determine what visitors can experience depending on the degree and nature of the connection they have with the country.⁴ Field research is not often or easily possible. Unification is impossible to predict because of “wild card” events. The issue of reconciliation to which the urban future of Pyongyang is so intricately tied, has incomplete, contradictory and changing requirements. There is no final solution for unification. It is an “irreducibly complex” situation in which all the elements—politics, geopolitics, economy, shared culture and history function as a system of interacting parts that would stop functioning in its current form if any one of the parts were removed or altered. Reconciliation is a “wicked,” problem which, like climate change, social and economic inequality, and mass-migrations are increasing, but which we are ill-equipped to handle.

The second challenge of investigating Pyongyang stems from the poor quality of the sources and the difficulty of getting accurate information.⁵ While the physical urban characteristics of Pyongyang can be known with some detail with Google Earth and to a lesser degree with Google Maps, there is still an extreme lack of reliable information about daily life in this “reclusive” country and its capital. The main information about the country is testimony, or propositions about the country put forward by someone else on the internet, television, radio, articles by journalists, and books.⁶ Much information about North Korea is from South Korean media which is distorted through the long-standing conflict between the two states. There are few full time-journalistic correspondents in North Korea, and an absence of on-site reporting.⁷ First-hand accounts by defectors, are a key source, but they are reluctant to trust anybody, and with a few exceptions tend towards the kind of sensational and superficial narratives attuned to the narratives of Western media.⁸ For this investigation the nature of the subject of the urban future of Pyongyang, and the nature of the sources raises methodological issues and epistemological challenges.

Traditional epistemology generates a specific kind of knowledge that is the knowledge of *propositions*, or “justified true belief.”⁹ This type of knowledge, which is different from say knowledge of how to do something or personal knowledge of a person place or thing, must meet several “necessary and sufficient conditions” for it to be considered knowledge, or “justified true belief”: there must be a subject that has knowledge of a proposition that is known, the belief of the proposition must be justifiable, justification is accomplished with evidence, and evidence must come from “reliable” sources. Sources of knowledge and justification are perception, introspection, reason, testimony and memory.¹⁰

Sources of knowledge and justification for the subject of the urban future of Pyongyang are compromised. Direct experience, or *perception* of the city through

the five senses is controlled or prohibited. With the absence of perception, *introspection*, or reflecting on how the world appears to us in our perceptual experiences, is not possible. With the absence of introspection we are unable to form a firm foundation for our beliefs; *memory* as justification is already considered to be “fallible” and already considered as a less reliable source or “mere imagination”¹¹ which renders *reason*, or the *a priori* justification before experience, useless. *Testimony* by defectors and the media, which is the source of much of the knowledge of North Korea, is not always reliable. Thus, the urban future of Pyongyang as a subject does not meet the “necessary and sufficient conditions”¹² for “justified true belief” not only because the proposition is not knowable, but because “reliable” sources are not accessible and thus belief of propositions cannot be justified.

This raises the question of whether a subject for which a proposition cannot be known, and a belief cannot be justified can be considered as a subject for serious scholarship at all. This question is of particular urgency today in a world that is rapidly changing and radically contingent and where we are being asked to investigate propositions which, because of their nature cannot be known.¹³ I argue that it is not only possible to investigate propositions for complex and emergent subjects, but a matter of urgency today. This requires however, critically re-evaluating the role that traditional epistemology and methodologies can play, if any, for investigating subjects that meet the “necessary and sufficient conditions” of knowledge. I am not arguing that the methods and criteria of traditional epistemology are not at all useful for knowledge in general. Rather, they are inadequate for investigating complex, contingent, unknowable, and rapidly changing subjects like the urban future of Pyongyang. As some scholars are beginning to recognize, “the future we wish to create does not include ‘research’ as we are accustomed to imagining it.”¹⁴

Method

The epistemological challenge raised by the complex and emergent problems we are facing today demands new methods and premises. Investigating this particular complex and emergent problem, of the context of unification and the impact that it will have on the urban future of Pyongyang, a subject for which knowledge of propositions are not known and sources are inaccessible or unreliable, required: re-calibrating the status of traditional epistemology, acknowledging imagination as a crucial cognitive function that is engaged in all thinking and action, recognizing design as a “reflective practice,”¹⁵ is a valid form of knowledge, and combining research methodologies from other disciplines as

necessary for a particular subject and the available sources. For this investigation methodologies were adopted from design, future studies, and narrative fiction. Each method engaged different modes of thought and produced different kinds of knowledge.

The process for imagining alternative future contexts of unification, and the future urban “objects” that inhabit those contexts—be they spaces, buildings, urban environments, or began with using conventional epistemological methods of collecting and analyzing data, followed by developing alternative possible future contexts using the five-step process of the scenario method from Future Studies (discussed below), validating the coherence of the scenarios through narrative fiction, to speculating and giving form to the types of “things” that could inhabit this future scenario through design process and visualization. This method engages different types of thinking: analysis (data), analytical discourse (scenario method), fiction (narrative), experimentation, speculation, free play, and projective thinking (narrative and design). Each step generated a different aspect of the vision: the scenario method generated future contexts, fictive narratives prepared the ground for future social actions, and design materialized the urban futures that inhabit those spatial futures (Figure 1). The process was roughly linear, but highly reiterative where discoveries made in one part of the process required constantly reexamining the propositions made in another.

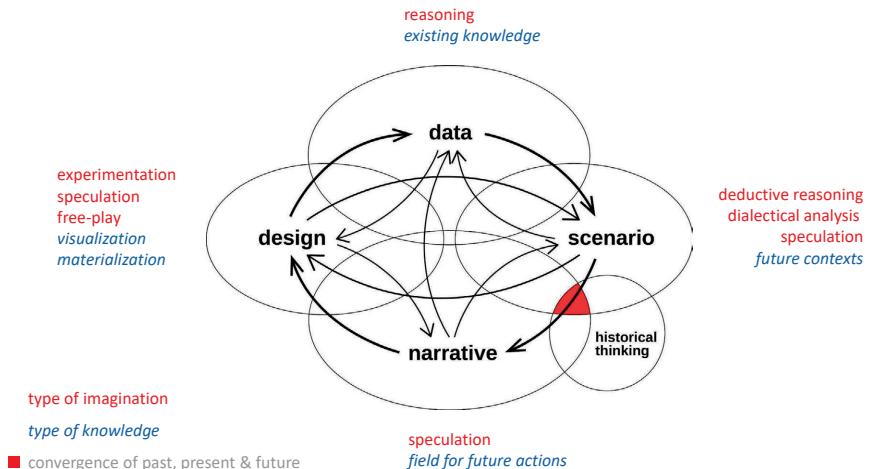


Figure 1 Methods, modes of thought and types of knowledge for imagining urban futures of Pyongyang in 2050.

This inter-disciplinary method is based on the fundamental premise that imagination, which is the cognitive function humans have for image-making in their heads, is crucial for investigating subjects that are unfamiliar, novel, and do not yet exist and which cannot meet the sufficient and necessary conditions of conventional epistemology. Imagination is a special form of knowing that is crucial for certain subjects including those that cannot meet the conditions necessary for knowledge as defined by conventional epistemology.

Accepting novel methods and imagination as a valid form of knowing requires recognizing the role imagination plays in the biology of perception and to varying degrees in every cognitive function we engage in from reason to speculation, experimentation and free play. Each kind of imagination allows us to have a different kind of knowledge about subjects that cannot be known using conventional means of justification to bring truth to belief. For the discipline of design it requires that designers accept that while the twentieth century was one of making “things”—products, industries, economic structures, societal norms, cultural responses, identities—the twenty-first century is one of imagination and shaping future contexts how we can be as individuals and in a community.¹⁶

Imagination

Imagination is not dreaming Utopias, or flights of fancy, or a sophisticated critique of the status quo. Imagination is not creativity, although imagination is necessary for creativity. It is not simply the irrational, undisciplined cognitive function belonging to artists, and is the counter-faculty to reasoning and science. In creation, *poietic* imagination is engaged to project novel, hitherto not see things.¹⁷ Imagination is not only about producing novelty that fuels creativity.¹⁸ It is not a marginalized or specialized activity of the mind.

Imagination is the image-making cognitive process of our mind. It is the power or capacity of humans to form internal visual or auditory images of objects and situations.¹⁹ It lies at the center of human cognitive processes.²⁰ It is the filter through which we interpret our own experience,²¹ our attempt to cognitively order disparate elements of a disorderly world when we see something for the first time, and the way we make sense of the world.²² Imagination is “our capacity to think about those things we do not or cannot directly experience. It is the filter through which we interpret our own experience. It informs our actions and is, in turn, shaped by our actions. Imagination creates reality, and in turn reality creates imagination.²³ Imagination is a special form of knowing,²⁴ and a crucial way faculty for investigating what we do not know. Imagination is a “special form of agency.”²⁵

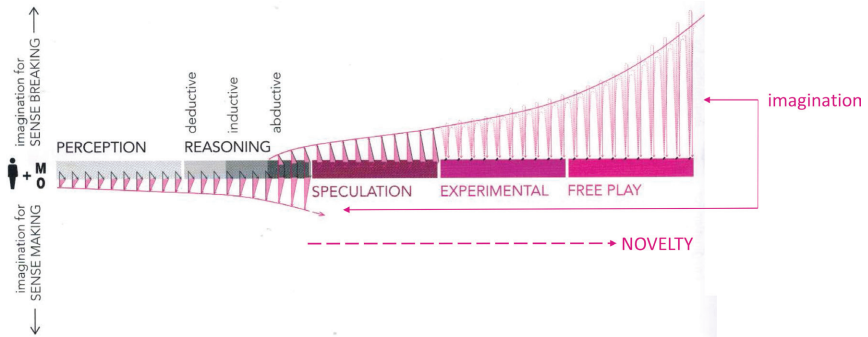


Figure 2 Spectrum of cognitive functions in which imagination functions. (Source: Modified from Pendleton-Jullian & Seely Brown, 2018)

We need imagination for its coherent synthetic “image-making” and “sense-making capacity” of known phenomena, but also for the disruptive side of “sense-breaking” required for projecting new things.²⁶ It is also a valid form of knowing what cannot be known, the unfamiliar, the novel, and what does not yet exist. Imagination is associated with a wide spectrum of cognitive functions from sense-making capacity of perception and reasoning, to the sense-breaking capacity of speculation, experiment, and free play (Figure 2).²⁷ Imagination does not function to tell you how things are, but functions provisionally. In the method described here, different forms of imagination are involved in the processes of data analysis, formulating scenarios, narrative fiction, and design (Figure 1). Imagination is particularly suited for investigating the future. It bridges fact and fiction, and the past, present, and future. “To imagine is to imagine a future in which thought and action are meaningful, which is to say that it is by drawing on the past that the imagination is able to work out a future within which to think or act in the present.”²⁸

Perception

Imagination is integral to the sense-making cognitive function of perception²⁹ and its role in making the world stable and coherent. It does not only come into play when an object is absent to the senses, as is commonly understood, but also when an object is present to the senses.³⁰ This counter-intuitive conclusion about human perception is explained physiologically. Our visual organ of perception, our eyes, are in constant motion, not only by the voluntary movement of the eyes and head when we track something, but the involuntary saccadic movements of the eye that are 20 to 200 milliseconds in duration³¹ and micro-saccadic movements of even

shorter duration that occur while are looking at static objects. Experiments have shown that when there is a perfect correspondence or alignment of the intervals between the saccadic eye movements and the projected image of a static object, the visual field goes grey and the object disappears.³² It is the changes and differences in luminance resulting from the saccadic movement of the retina and the free play of light across the cells of the retina that gives humans the capacity to project images of static objects. Human perception of static objects is the result of the discontinuity of sensory input. Human cognition is a process of constant image formation for the whole world to arise so that thought and action can occur. How is it then that we experience the world as stable and continuous?

Cognitive continuity, or a stable mental image of the world is made possible by means of a ‘resolving activity’ comprising three parts: biological (direct pathway), cultural mediation (indirect pathway), and individual imagination (fills the gap).³³ The direct pathway that connects the subject (oneself) to an object (event or object in the world) occurs biologically through the senses. Biologically, a stable image of the world is possible due to “cell assemblies” or “cortical firmware” that facilitates the maintenance and internal organization that is part of human phylogenetics. Simultaneously, there is an indirect pathway that connects the individual to an object/event that is mediated—through “images” we hold in our minds and feelings and memories associated with an individual’s history and culture, which also mediates or interprets the connection between the subject and object through ontology, behavior protocols, and epistemology³⁴ (Figure 3). Culturally mediated thought is future-oriented, because actions in the present are motivated by the

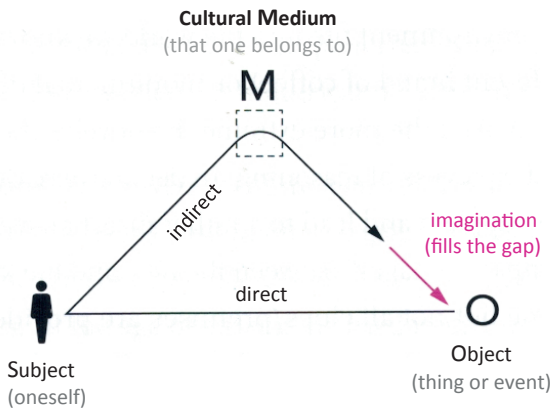


Figure 3 The components of human perception. (Source: Pelaprat & Cole, 2011; diagram modified from Pendleton-Julian & Seely Brown, *Design Unbound*, 2018)

need to reduce uncertainty about the future. There are differences between the input of the direct and indirect pathways such that the mental images do not correspond exactly or come together. This results in a gap. The gap between what we experience, and how we perceive the experience through our cultural and ontological frames, requires cognitive resolution. The world has a stable image because of the active ability of individuals to cognitively resolve, reconcile, and fill-in the gap between the discordant moment-to-moment sensory input by imagination.³⁵ This process of resolving the gap between experience and cultural and ontological frameworks is always working.

The more unfamiliar the phenomena or setting, the larger the gap and the more the imagination has to work to understand what they are seeing to produce an image of the world so that they can act and think in the present. "Every engagement we have with the world has a degree of novelty associated with it,"³⁶ a degree of the unknown. From a psychological perspective imagination is how humans order disparate elements of a disorderly world, and assigns it meaning.³⁷ When the gap is too large to resolve with normal reasoning, the imagination must come up with alternative, different, often novel possibilities to work on the space of the gap³⁸ such as speculation, experimental, and free-play.

Reasoning

Contrary to epistemological assumptions about objectivity and reason, imagination is a human faculty associated with the sense-making cognitive processes of reasoning.³⁹ Reasoning processes of deduction, induction, and abduction all depend on imagination in different forms and with different functions. Deductive reasoning, in which a conclusion is drawn directly from a premise. Inductive reasoning, in which a conclusion is supported by evidence but does not directly follow from conclusions,⁴⁰ relies on observation and logical inference and some imagination to fill the gaps. Abductive reasoning, which can be understood as "best guess" hypothetical reasoning, is a process of logical inference from observation to a hypothesis that might explain the observation followed by testing for validity and meaning and circulating back to formulating a new hypothesis recursively. This kind of reasoning is as dependent on imagination as it is on reasoning. Abductive imagination leads, and reasoning cleans up. It is the kind of imaginative understanding that is activated when faced with knowledge and problematic data to "frame a possible explanatory hypothesis."⁴¹ Designers engage in abductive reasoning and it is used in complex situations as an agent of both reasoning and imagination. Defined by pragmatic philosopher, mathematician and logician Charles S. Peirce, abductive reasoning is "an imaginative effort of

understanding beginning with an ‘aesthetic-hypothetic’ response to the world.”⁴² At the extreme end of abductive reasoning imagination functions to do more than make sense of the world through perception and reasoning, but is an agent of our ability to think about things that we do not or cannot experience directly.⁴³

Speculation, Experiment and Free Play

The unknowable can be knowable through the sense-breaking capacity of imagination in the cognitive functions of speculation, experiment and free-play for making new things. In the act of making something that did not exist before there is a widening gap to escape from the known and familiar to generate novelty, or going after strangeness when going after “radical novelty.”⁴⁴ Imagination functioning differently and at differing degrees in each of these cognitive processes. In these capacities, there is less reliance on facts and an increasing depending on imagination.⁴⁵

Speculative imagination, is not fantasizing, but is a cognitive function grounded in research of present reality and creatively explores the play of possibility in the present through imaginative speculation about the future.⁴⁶ It is based on the actual, projects possibility, and is generative of ideas, images and possible actions to achieve those images and ideas. Speculation functions synthetically and generatively as a form of inquiry which drives action, which in turn drives knowledge building, which in turn leads back to alter the way we act today. Speculative imagination is a sense-breaking cognitive faculty. It serves us in learning about the world. As a speculative faculty it is a necessary anchor for scaffolding understanding of an action. Speculation is a vehicle for problem solving.⁴⁷

Experimental imagination in the generative portion of the cognitive spectrum. It demands a wider field of play than the imaginations of perception, reasoning and speculation. Experimental imagination tries out new and foreign things turning off the critical faculties and relying on the key function of improvisational making and action with images—be they visual, auditory or movement.⁴⁸ It is an imagination that forms images in a back and forth between imagination and action.

Free-play is the function that is most generative in nature in the cognitive spectrum. It generates novelty rather than synthesize sensations, and produces images that are unplanned and unforeseen. It energizes and surprises. It is more associated with the unconscious mind, emotions, serendipity and intuition. It may be catalyzed by a question, but does not need to be. It is guided by “the act of playing itself” and “gets lost in the play.”⁴⁹ It is a divergent activity rather than a convergent one of reasoning and speculation. It is not ordered thought

but free-association. Free-play is after crossing and breaking boundaries rather than pushing boundaries, disrupting rather than experimenting, breaking with creative history and what it knows it can do.⁵⁰

Imagination thrives in contexts without boundaries or normative logic and where the gap between the familiar and unfamiliar is large and it can be allowed to be lost in a space of play. Play is a form of understanding what surrounds us, who we are, and a way of engaging with other. Through the understanding we gain from play, it functions to challenge the status quo, leading to knowledge, making new connections and breaking old ones.⁵¹ The realm of play, “if participated in openly, offers obvious opportunities to explore alternative modes of awareness, to develop insights into and knowledge of new modes of being, and to explore the radically different possibilities perhaps not readily available elsewhere.”⁵² Play has transformative potential.⁵³

Imagination has extreme generative power. It is a necessary cognitive faculty for creating and making something novel and meaningful. Imagination plays a fundamental role in how we perceive the world and create the world and then re-imagine the world again. It fuels creativity which is how we interact with the world through the domains of society and culture. Validating imaginative practices of abductive reasoning, speculation, experimentation, and free play as legitimate forms of knowing is necessary in an increasingly complex and emergent phenomena.⁵⁴ In such a world, we need to imagine what could be, and create the opportunity to test it, and move it forward.⁵⁵ The validity of imagination lies in its capacity to envision worlds that do not yet exist and its function in preparing the ground for actions yet to come. It guides our strategies and actions. This capacity of humans to make mental images allows them to create surprising and novel worlds that do not yet exist, by making them “as if” they already do exist.⁵⁶

Scenarios

There are several problems with futures as a subject for scholarly research. They are commonly conflated with science fiction. Science fiction is a kind of prediction of an imagined and speculative world that is typically set in the future or outer space and characterized by technological and social innovations through a blend of scientific rationalism and literary artifice.⁵⁷ As predictions, futures prescribe a single route from the present to the future. Their history of failure predictions are met with skepticism.⁵⁸ Depending on the method used to generate futures they fail to predict contingency and “wild card” events. However, predictions are only one way of understanding the future. Scenarios of futures which has been a method used by corporations and the military since the 1960s to develop

alternative plausible futures, and fictive world building more recently, are two practices that more adequately address the problem of predictions and futures as they are commonly understood.

The scenario method is a way of investigating the future that does not rely on single-route predictions because the complexities of the social, political and economic forces impacting the subject and the high probability of “wild card” event can produce wildly different outcomes.⁵⁹ Scenarios do not produce the most likely image of the future, but possible and even plausible equally valid alternative futures. Unlike predictions, scenarios incorporate the possibility of innovation, contingency, and unexpected outcomes.⁶⁰ Simply defined, they are “consistent and coherent descriptions of alternative hypothetical futures that reflect different perspectives on past, present, and future developments, which can serve as a basis for action.”⁶¹ They are “less a prediction *of*, than a systematic reflection *on* the future.”⁶² Scenarios do not aim at “calibrated probabilistic accuracy,” but greater openness to what may seem at first to be unlikely, but nonetheless possible outcomes. They describe the conditions of life of people living in, in a specific future and offer a method for analyzing certain developments and the necessary measures for resilience to deal with the most likely risks. The goal of the scenarios is to evoke a “much wider and deeper set of plausible futures” so that politicians, economists, or citizens—in the case of the futures of Pyongyang—are given a plausible basis for the strategic decisions that will take them into the future. Scenarios fall on a spectrum from models to narrative fiction depending on their goals (from pre-policy research to exploration), processes (from analytical to intuitive) and methods (from quantitative to qualitative).⁶³ Scenarios exhibit a spectrum from the possible to the plausible, or probable. They all begin with the speculative question: “What If?”

Scenarios are a way to prepare the ground for future action that begins with the question, “What if?” and once this is visualized, proceeds to ask the question, “How will we go towards the future that we want to inhabit.” Exploration was the goal of these scenarios. This demanded relying more on imagination than reason, synthesis than analysis, speculation over pre-policy research.

The scenario method was a five-step reiterative process that aims at envisioning a scenario based on trends of key factors of the present through imagination. The first step was to identify the key factors and sub-factors that would impact the urban form of Pyongyang in the future to most followed by a dialectic discourse to determine which two key factors would impact this future the most. The second step was to collect and analyze data of the past trends and project different future trajectories for those trends. The third step was to develop alternative scenarios based on the two-key factors and bring in the

many sub-factors that are entangled with the key factors. In most cases this step was aided by writing an origin story of the scenario or a history of the future of unification of the Korean Peninsula. The fourth step was to check the coherence and consistency of the scenarios through analytic discourse. The fifth step was to write or draw fictive narratives with fictive characters and plot set in a future scenario. Fictive narratives provide a way to check the coherence of a scenario, and gives texture and tactile visualizations of the impact that abstract numeric quantitative data can have on everyday life.

These scenarios provided possible future contexts—political, economic, ecological, social etc.—that would impact the future urban form of Pyongyang. The urban form that Pyongyang could take were visualized and given form through design which has its own set of practices and process.

Fictive Narratives

Fictive narratives function as a tool for testing the plausibility of a future reality, and providing a synthetic image of a future society from the collected data and future trends. Narratives of life in a future scenarios are a tool for “radical empathy” for the kinds of experiences, emotions, social rituals and the setting where the daily life of the people inhabiting the future scenario are played out. Literary fiction is probably “the most active experimental laboratory of the world-constructing enterprise.”⁶⁴ Literary fictions of possible future worlds create a free space to speculate and a space where imagination can connect with reality. Fictive narratives can also be counterfactual histories of the future also begin by asking the question, “What if?” Counterfactual histories of the future changes the “focalization” or view point of the historian who is neither in the present looking to the past, or in the present looking to the future, but writing a fictional history from the vantage point of a plausible or possible future beginning with the question “What if?” and based on evidence from the past and present. Counterfactual histories operate from the premise that history itself is a textual construct and thus the supremacy of fact over fiction must be suppressed. Drawings, zines, graphic narratives and other forms of visual fictions are another form of spatial story about the future (Figure 4). Like other forms of fictive narrative, these also “found” and “create the field” for actions that are yet to come. Fictive counterfactual histories allow us to go beyond visions of incremental change.

Fictive narratives pre-figure futures. They function as “spatial stories” in the sense defined by Michel de Certeau in that they “found” and “create the field” that precedes the historical realization of social actions that are yet to come.⁶⁵ They



Figure 4 Jeemin Sohn, Zine excerpt, “Pyongyang Project 2050: A Day in the Life,” The Pyongyang Projects, 2050.

function as a “fixation,” which means that they do what they say they will do which gives spatial stories, or narrative fiction “distributive power” and “performative force.”⁶⁶

Narrative fictions are powerful tools beyond the pragmatic role they play in checking the reliability of a scenario by creating as a free space for the imagination to speculate. They provide a space for play—a space where play is understood as being a form of understanding.⁶⁷ Narrative fictions also provide a “narrative buffer” that is permeable, allowing us to cross between our present world and a simulated future. Fictional narrative function as a “diegetic buffer”⁶⁸ for investigating dystopian futures or psychologically difficult scenarios, and as pre-figuring future actions. Narratives can be textual or visual in the form of zines, drawings, or storyboards. Design is at once a medium of inquiry, a free space for the imagination to speculate and engage in free-play, and allows us to insulate ourselves from the psychological difficulties and emotional consequences of contemplating dystopian scenarios by creating space to play with, and explore alternative visions of the future.

Design

Like narrative fiction, design fiction as play is the kind of playful thinking that connects imagination and reality.⁶⁹ Design fiction” is a design practice that articulates fictive objects and events in the context of a fictive future.⁷⁰ Design fiction is a kind of play that allows for free speculation. When the usual constraints of designing for the market are removed, design fiction is at once a way of making things, a form of understanding, and method for exploring the consequences of different commitments and values. If imagination is a material process, then design is the process that makes it material.⁷¹ Visualizations produced by Design Fiction are the most material phase of this method. Materializing spatial futures through visualizing them, and giving them form is what distinguishes literary fiction from design fiction. Design fiction extends beyond pre-figuring space to configuring a future space “as if” it already exists.⁷² Design fiction has transformative potential.⁷³ It takes the pre-figuration developed by narrative fiction one step closer to its possible realization by giving it form.

Designers are well-suited to this form of research because “design makes futures. What designers make becomes the futures we inhabit.”⁷⁴ Designers have the capacity to navigate easily between real and imagined worlds.⁷⁵ The provisional way that designers work, their method of abductive reasoning and projective capacities to imagine futures makes their form of practice particularly effective for addressing the kinds of emergent problems we are facing in a rapidly changing and radically contingent world.

Design fiction engages various forms of imagination: “fictive imagination” as a free space to speculate, play and one that insulates us from psychologically difficult dystopian futures; “informed imagination”⁷⁶ integrates fact and fiction; “speculative imagination”⁷⁷ treats speculative ideas as already actualized within a future context; and “radical imagination”⁷⁸ is the ability to imagine the world, life, and social institutions not as they are, but as they might otherwise be. In its less superficial form radical imagination is the courage and the intelligence to recognize that the world can and should be changed. Radical imagination is not just about dreaming of different futures but about bringing those possibilities back from the future to work on the present, to inspire action and new forms of solidarity today.⁷⁹ “Pragmatic imagination”—imagination put to purpose—is the form of imagination that sets imagination in motion.⁸⁰ All of them are a way of understanding the reality of our surroundings and change with imagination.⁸¹

This was a recursive process where insights gathered at each step required re-examining and conducting additional research of the impact factors which in turn required changing provisionally held design hypotheses. It was a space of

generating knowledge by means of a dialogue between imagination, in various degrees from abductive reasoning to free-play, and reasoning.

Projects

The projects that emerged from this method were developed by the Spatial Strategies Lab at Seoul National University, which is a design studio that focuses on methodological experimentation in an academic setting. The method and premises described here were not designed with pedagogical intentions, but developed and tested as an approach that could be used to address this type of problem in any context. The time period of projecting 30–35 years into the future is the time period used in the practice of the scenario method. This medium-term projection into the future is not like projecting 100 years that could more easily lead to fantasy futures. It is also not a short-term future that prevents us from projecting the cumulative effect of current trends. More importantly, scenarios were designed as a way to make decisions today to create more desired futures. Thus, a medium-term projection into the future in a span of time that is within a person's lifetime makes agency and taking certain decisions more real.

The only pre-condition for these future of Pyongyang projects was that reconciliation of the Korean peninsula could not take the form of a winner-loser scenario. This would result in obvious and easily imaginable scenarios in which the political and economic systems of the winner are imposed on the loser to create conditions we already have. Thus, reunification for these projects could only take the form of some kind of *rapprochement* which could only occur if each side gives something up. The term unification as it is used here is conceived in terms of reconciliation in order to distinguish it from “reunification.” Reunification has embedded in it the assumption that the peninsula will become a single country as it was “before” with a shared political and economic system. Reunification is a problematic concept since it is never clear what “before” refers to: Korea before the Korean War (1950–1953) and the Joint Trusteeship over Korea in which two separate governments were formed in the DPRK and South Korea (1948–1950) could be the Korean peninsula under the United States Army Military Government in Korea (1945–1948), under forced Japanese Occupation (1910–1945), the Korean Empire (1897–1910), or the Chosŏn Era (1392–1897).

The following projects that resulted from this method range from the ironic and dystopic to the subtle and exhilarating. The projects are published in full in *Pyongyang 2050: Spatial Futures*.⁸²

Monuments and Moments City

Monuments and Moments City proposes not destroying the existing monuments to the Kim dynasty, the people of Korea and Juche ideology in a unified Korea. Instead, an urban policy for the capital city is developed that adds new layers of “monuments” that respect existing view corridors between the large-scale monuments to the leaders, people and Juche ideology. The new layer of monuments function represents the on-going political and economic shifts that occur over a long process of unification (Figures 5–6). The current identity of Pyongyang as a symbolic stage-set for the Kim regime is maintained and a finer grained grid of “moments” are added to add life to the currently lifeless and overly spacious streets.⁸³

Juche City

The scenario for this project begins between 2015–2020 when unification is resolved by forming the Federation of Korea (FK), comprising two highly autonomous republics—Republic of South Korea (RSK) and the Republic of North Korea (RNK).⁸⁴ The Federation of Korea is governed by a new political party, Korea Party (KP) comprising an equal number of representatives from former North and South Korea. The powers of the Federation of Korea are set forth in the “Constitution of the Federal Republic of Korea” (2020). The New Korea Party begins the gradual process of unification. The Republic of South Korea (RSK) continues to function as a free-market economy with special economic zones, and the Republic of North Korea (RNK) as a socialist economy that adopts South Korea’s model of special economic zones to attract foreign investors. With the influx of new foreign investment infrastructural problems, such as the lack of electricity are solved and import/export rations improve. Permission to live in Pyongyang is no longer necessary leading to a large internal migration to Pyongyang. New illegal settlements of poor quality housing are formed along the main roads of the southern portion of Pyongyang. The influx of citizens to Pyongyang results in high unemployment for several years. From 2025–2030 special business zones, or “new town” of super-modern high rises are constructed on the north side of Pyongyang. The New Town catalyzes tourism and provides jobs for the residents of the illegal settlements on the south side. Two new political parties are formed: In 2025 a splinter group of the New Korea Party forms the Conservative Party of Korea whose objective was to preserve North Korean culture and identity by limiting foreign investment as a vehicle for building a stronger national economy. In 2045, a third party, the Progressive Party of Korea (PPK) is formed consisting mostly of young former North Korean citizens who support the full unification of Korea, a

free economy that align with global economic, cultural and lifestyle trends which is partially financed by international countries, corporations and organizations interested in the Korean economy. By 2050, more *sindosi* [신도시], or international business districts are established as the city continues to polarize into different political zones. As part of the unification negotiations, both sides agree that an independent state, called the Juche City to be built in Pyongyang. Modelled on the Vatican City the Juche City/주체 시티 is a politically and economically self-sufficient monarchical state based on the fundamental tenets of autonomy and the *Juche* ideology of “self-reliance.” Kim Jong-un, the leader of former North Korea at the time of unification and about 1000 of his staunchest supporters inhabit the Juche City which was completed in 2036. The Juche City is located on the east side of the Taedong River on axis with both the Juche Tower (1982) and Kim Il Sung Square (1954). The concept of Juche City is to symbolize, through its architectural hyper-monumentality, the power of the ruling Kim dynasty in former North Korea in the newly establish Republic of North Korea (RNK). Succession for leadership is hereditary.

The proposal of Juche City takes the form of a large scale enclave inserted into the existing fabric of Pyongyang occupying an area of 850,000 square meters. Juche City steps up from the most public area by the river and the Juche Tower to the most private residential estate of the leader. There are three levels of accessibility on successively higher levels: the public area around the Juche Tower that is accessible to tourists and residents of Pyongyang by foot along the river, and the Juche Pyramid that functions as an entrance to the Juche Mega Mall; a semi-private area that is the site of the Juche Army Base and large parade grounds opened to the public every year on April 15 when Juche City celebrates Kim Il Sung’s birthday, and the Juche State Building accessible only to the Juche Leader and state officials; and the top level, the most private area, is the Great Juche Building that houses is the residential complex of the Juche Leader. Each level is connected by ramps on each side wide enough to allow for the movement of tanks between levels and separated a 5-meter high gate guarded by the Juche City Security Forces (Figures 7–8).

Beneath this monumental and intimidating urban landscape is the Juche Mega Mall. It is accessible through the glass Juche Pyramid located in the public area above the level of the Juche Tower. Its large scale is intentionally larger than I. M. Pei’s glass pyramid at the Louvre in Paris, with access also controlled by Juche City Security Forces. The mall is twice the size (635,000 square meters) of the Mall of America in Minnesota which is currently the largest mall in the world, but more importantly the largest mall in the United States. The walls of the Juche City that face the city are lined with shops and other commercial venues also controlled

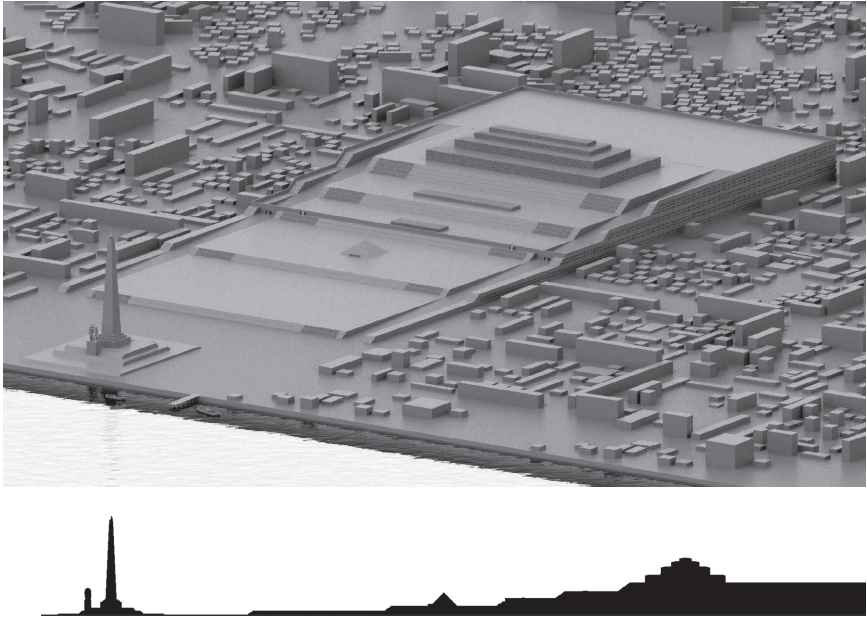


Figure 7 Klara Romigioli, Juche City, Pyongyang, 2050.

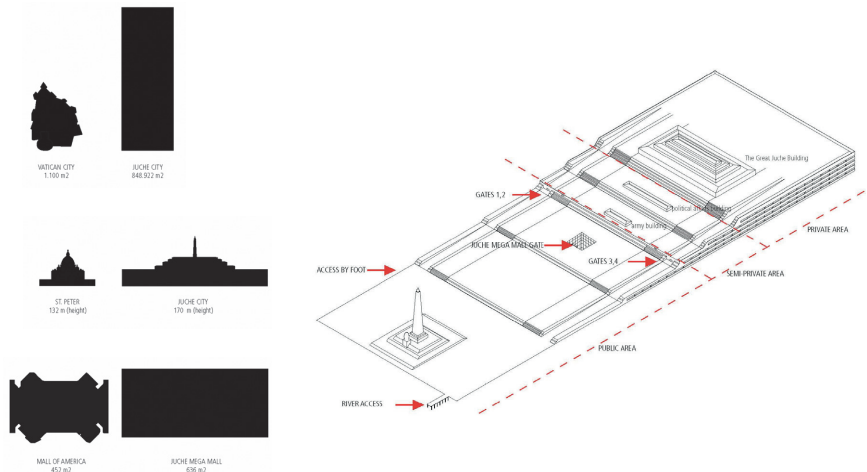


Figure 8 Klara Romigioli, Juche City, Pyongyang, 2050.

by the Juche City Security Forces. The Juche Mega Mall supports the sovereign state financially through profits from retail outlets, manufacturing facilities, the sale of designs and, as was the case in former North Korea, the construction expertise of monuments and monumental architecture, large panoramic paintings of historical events, cinemas, and the Museum of Juche Ideology and Museum of North Korea.

The Pyongyang Projects

This scenario begins with the fall of Kim Jong-Un in 2019. With the US involvement increasing gradually and UN Security Council sanctions against North Korea limiting travel and trade, the reunification of North and South Korea was inevitable.⁸⁵ The peaceful transition of power and the establishment of a new country called Unified Korea was met with great enthusiasm on the global front. Families were reunited, safer energy alternatives were developed, the job market expanded, and the industrialization of the northern region occurred at an incredible pace. Though it was a sudden transition for the residents of the northern region, many seemed to adapt to it well through the introduction of government programs focused on introducing former North Korea to the more economically advanced life of the south.

Pyongyang, welcomed a new political and economic changes and a new environmental approach to urban development that focused on energy infrastructure. In keeping with South Korea's pre-unification goal of becoming an exporter of energy, a new nuclear power plant was constructed outside the city limits that included privately and government-funded research facilities that focused on clean energy strategies housed in the existing government buildings of the former regime. Buildings, monuments, and squares that once represented the fear and pride of the Democratic People's Republic of Korea (DPRK) were transformed to become the social hub of this semi-urban city.

Migration from the north to the southern regions of the peninsula after unification in 2025 was forecasted as being inevitable given the isolated and underdeveloped state of the northern provinces that left poor housing and few industrial opportunities for the struggling lower class. The dramatic flow of people to the south would lead to severe gentrification and extreme housing costs forcing the homeless and jobless to return to Pyongyang and engage in the growing energy and agricultural industry. This would allow Pyongyang, along with the northern provinces to match the industrial scale of the south within ten years by 2035. The Korean Clean Energy Initiative (KCEI) was almost able to fuel the entire country reducing the amount imported oil. Echoing the spectacular growth of South Korea

after the Korean War, Unified Korea grew at such a fast pace that the overall GDP surpassed that of the Germany and Japan by 2045.

This progress was marred by the unfortunate nuclear power plant explosion in 2045 that destroyed Pyongyang along with wild fires that ravished the northern region. Nuclear radiation spread to a large portion of the northern region. The impact of the third major nuclear disaster after Chernobyl (1986) and Fukushima (2011) had an impact globally not only with spreading radiation, but also on the nuclear energy industry in its entirety. The risk of nuclear energy as a clean energy alternative proved to outweigh the immediate need for an energy alternative.

The economic impact of the failed energy industry, cost of reconstruction, and relocation delayed urban growth. Despite the delay, the plan for the complete reconstruction was put in place for the development of The Pyongyang Projects, a new sustainable city scheduled to be completed in 2030. Through a series of internal investments from the southern regions, a model for remediating nuclear sites, The Projects were completed within two years of the explosion and the nuclear power plant restored and running to its full capacity. Most of the radiation in the air and water was dispersed within the year, yet the remaining isotopic particles settled onto the ground surface of what was now a ghost city. The government cleared a 500-meter radius at the heart of the city by removing the debris and 12 cm of top soil. While radiation levels remained slightly higher than Seoul, the amount of radiation within the 500-meter clearing was not harmful to people over extended periods of time. However, there was a general wariness of moving back into a city that had slightly higher radiation levels than those of other countries. Despite these concerns, a small portion of the citizens of Unified Korea volunteered to move into the Pyongyang Projects by 2050.

The Pyongyang Projects, became the icon of the new city, as the home-base for global researchers and environmentalists to develop sustainable farming methods, environmental preservation policies, and alternative energy sources to best sustain the health of this city in the anthropogenic era. Its unique research opportunities attract young researchers and single-member households. The city is characterized by a heavy dependence on technology and virtual communication to extend its research reach to more global collaboration. A Public Works Program (PWP) established in 2048 marked the beginning transition for the city's effort to revitalize the northern region. The Public Works Program offered above average wages and housing for the residents of The Projects. This stimulated an increase in the number of younger middle-class families living in The Projects who were taking advantage of the favourable conditions of the government assistance program. With the job market in the south at a low, due to the sudden shift in job

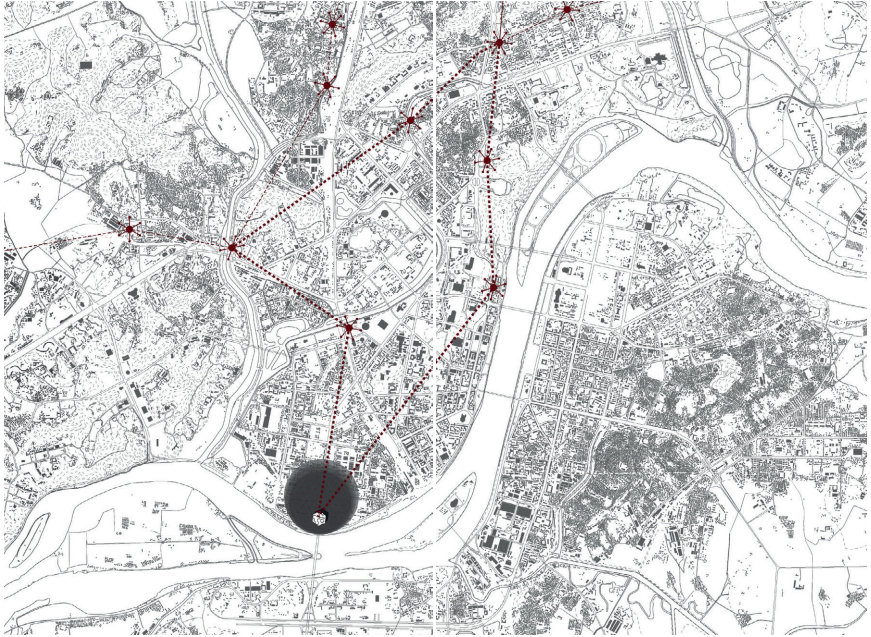
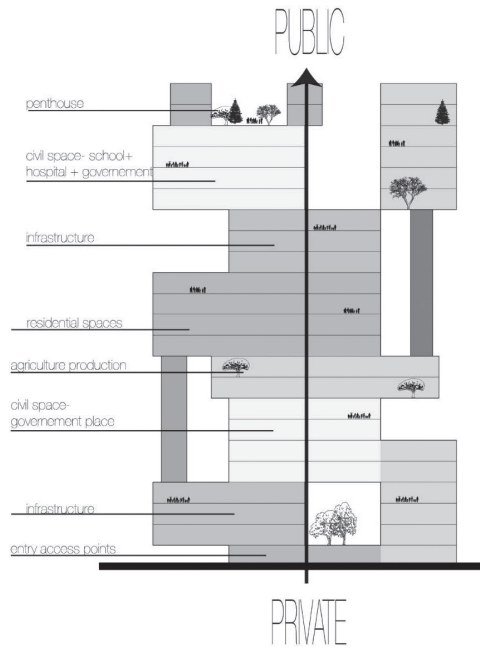


Figure 9a & 9b Jeemin Sohn, site plan and conceptual section of mega-structure and underground connections, The Pyongyang Projects, 2050.



opportunities after the reunification, many educated students were out of work after graduation. Therefore, The Projects, along with the Public Works Program provided them the opportunity to transition into a new life.

The Pyongyang Projects takes the form of a multi-level mega-structure housing about 960,000 citizens, within an urban farm facility that has the capacity to feed over a million people. It also includes a four-story mall, and numerous research facilities. The multi-purpose mega-structure is secured inside an artificial façade that protects the city from additional radiation and acts as not only a scientific research centre, but also a centre for social research that monitors daily life in close proximity. The government of United Korea plans to expand the habitation of the city by remediating more land and building more projects in future phases. The site for each phase is divided into five major zones: agriculture and research, agriculture and production, infrastructure, residential, and commercial. Each zone has a main entry point ensuring a degree of environmental security.

The vertical mega-structure is divided and contains each of the five zones as well to ensure that any issues can be isolated within each block rather than endanger the entirety of The Projects. Because the footprint of The Projects is only 100 x 100 meters the remaining cleared area is left as an experimental field for research about how to revitalize the soil after a nuclear disaster. This field hosts a large variety of planting patterns that range from those used for researching new soil conditions to those used solely for agricultural production for The Project.

The Pyongyang Projects faces the problem of becoming an isolated city with temporary residents. Though popular with the younger generation, the city lacks a strong family-oriented demographic, and wide range of ages. The technocratic government system constantly employs new members of The Pyongyang Projects community, making any significant changes to government extremely difficult to complete. The city itself is almost treated as a campus, or facility rather than as a city despite having its own legal, infrastructural, and residential system. Despite the internal difficulties, Pyongyang is the heart of leading-edge research in post-nuclear urban agriculture and a leader in global clean agriculture development (Figure 9a & 9b).

Linear City

The *Linear City* projects the future development of Pyongyang and Seoul as reciprocal. Over time Pyongyang grows south and Seoul grows north along an existing and new railway line between the two cities making it easy to commute from these “new towns” and between the capital cities and at the same time alleviating future population problems faced by both cities as specified in the scenario

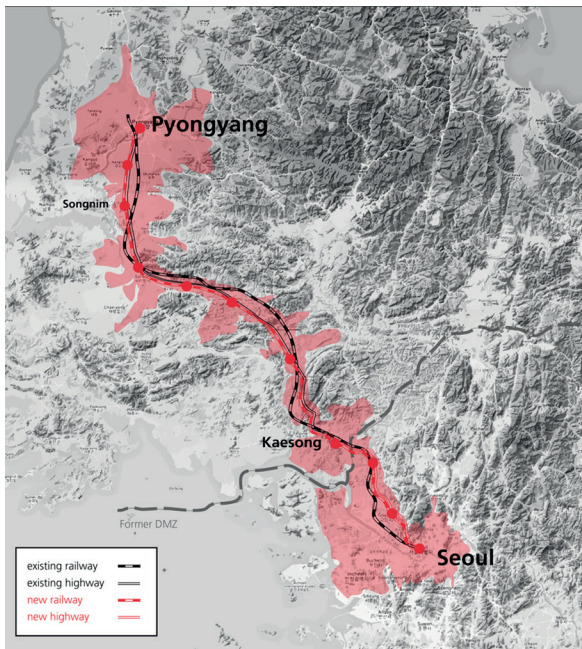
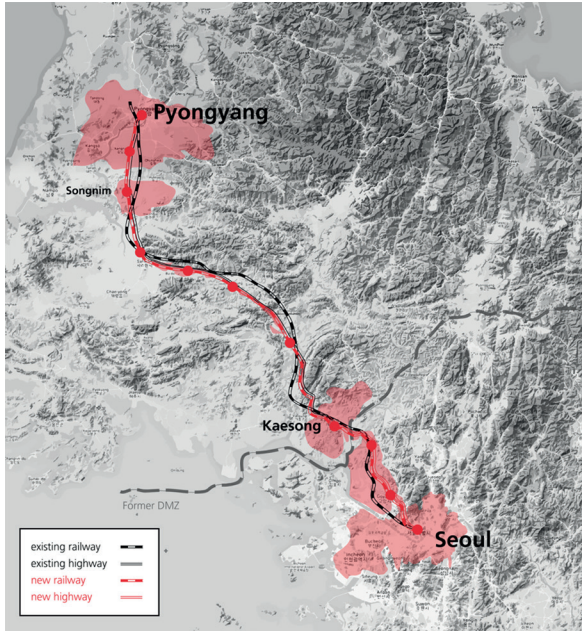


Figure 10 Chingwei Liu, Linear City connecting Seoul and Pyongyang, 2030 & 2050.

(Figure 10). The context of the Linear City is a political system with multiple parties and a mixed economy that is a combination of an open but controlled market modelled on China's economic system.⁸⁶ In this scenario improvements in the communication and transportation infrastructure attract international investment. They proposed re-opening the existing railway line for transport of goods, and building a new parallel line for a high-speed train for passengers; and extending the highway to connect Seoul to Pyongyang. Migration to North Korea is fueled by an aging society in South Korea and Seoul residents seeking lower density and housing costs in Pyongyang, but with easy access to Seoul with the new train and highway infrastructure. International migration is stimulated by incentivizing tax-free zones and an otherwise free market economy.

The Linear City grows south from Pyongyang which grows to towards the south to accommodate influx from the rural areas of North Korea, and grows north from Seoul to alleviate the high real estate costs and density. The structure of the linear city replicates the administrative structure of the *gu*/구 used in Seoul. The *gu* take on the socialist ideal of North Korea of equally sharing resources—government, cultural, medical, public transport, schools, and a Personal Rapid Transit provides every resident of the *gu* access to rapid train transit to both Seoul and Pyongyang.

Roller Coaster City

The scenario for the Urban Roller Coaster for Pyongyang is one in which the Kim regime collapses and the dictatorship of its current leader, Kim Jung Un, is replaced by a multi-party democracy and a socially-inspired humanistic market-driven free-market economy.⁸⁷ The intention behind the Pyongyang Urban Roller Coaster is for public spaces of Pyongyang to provide the citizens of the DPRK with a mechanism to change their memories of their difficult past. In 2050, the Pyongyang Urban Roller Coasters is the longest (15km) and at its highest point (150m) the tallest in the world. It physically connects what before were only visual corridors between the monuments commemorating the leaders, symbols of the North Korean people, and *Juche* philosophy of the DPRK. The intention of the roller coasters however, was to both change the perspective and memories of North Korea citizens. The urban roller coaster for Pyongyang is a proposal for changing the individual and collective memories of the DPRK in a unified Korea without removing or destroying the monuments and the past they represent that give Pyongyang its iconic and identity. Public space is put at the service of transforming difficult memories of people who have lived through the difficult years of the authoritarian Kim family regime.

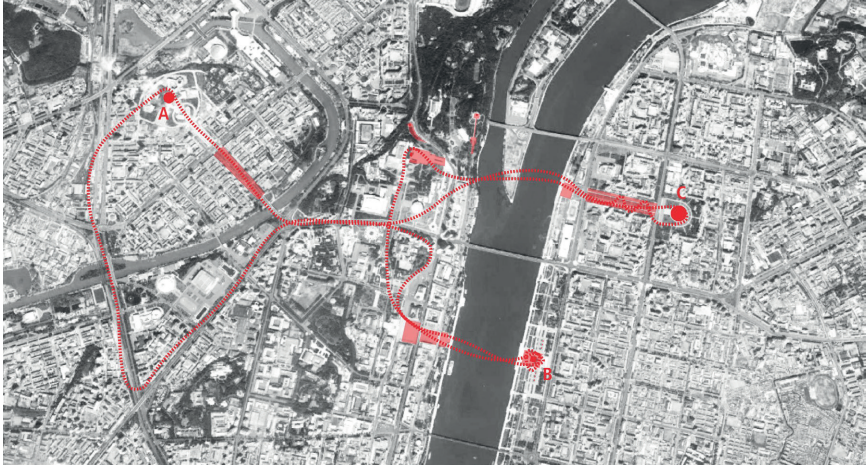


Figure 11 Jae Ho Lee, Routes A, B & C, Urban Roller Coaster routes, Pyongyang, 2050.

The Pyongyang Urban Roller Coaster comprises three roller coaster routes of varying types, heights, speeds and locations around the city (Figure 11). In addition, the currently empty Ryugyong Tower hosts a roof top roller coaster, and two tunnel slides. The rooftop roller coaster winds around the central mast of the tower providing riders with a so-far unimaginable 360-degree unobstructed birds-eye-view of the city. Two slides, one from the hotel level and one from the residential level, slithers in and out of the Ryugyong Tower to the 100 level all the while being taken through a visual history of Pyongyang projected on the glass panels of the slide that is superimposed on the real scenery of the city beyond (Figures 12–17). At the 100m level is the station for roller coaster routes A and B that run along a wide and long street at a high speed towards the Potong Gate heading up to a small hill along Mansudae Street that leads to the junction of Kim Il Sung Square and the Mansu Hill Grand Monument (Figures 18–19).

Routes B & C begin at this point and diverge after passing the Potong Gate. Route B takes passengers through the symbolic space of the old city. The roller coaster loops its way across Kim Il Sung Square, crossing the Taedong River. Riders are taken up and swirled around the symbolic 170m high column of *Juche* ideology (Figures 20–22). Route C takes riders towards the symbolic space of the revolution Mansu Hill Grand Monument and the Monument to the Foundation of the Korean Workers' Party. The riders come back through the symbols of the hammer, sickle and brush of the Monument to the Workers' Party and are whirled towards the two colossal statues of the Kims standing high on Mansu hill against

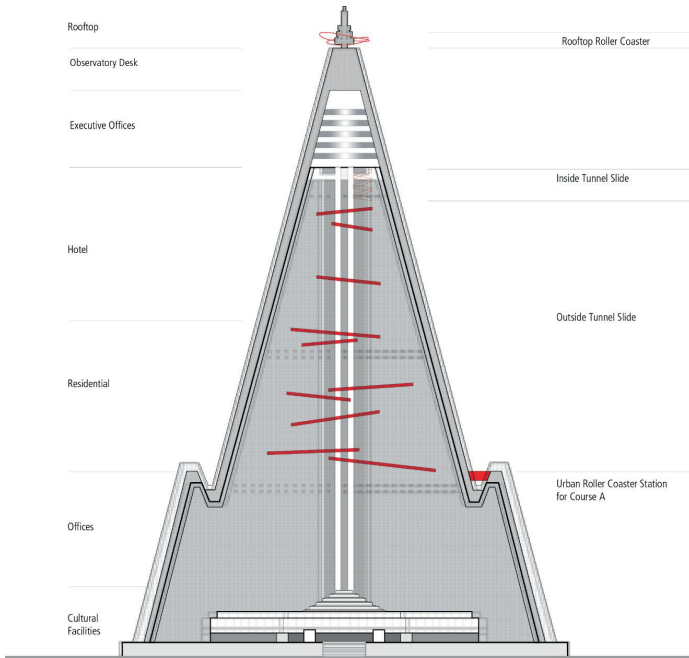


Figure 12 Jae Ho Lee, Ryugyong Tower, section, tunnel and slides, Pyongyang, 2050.

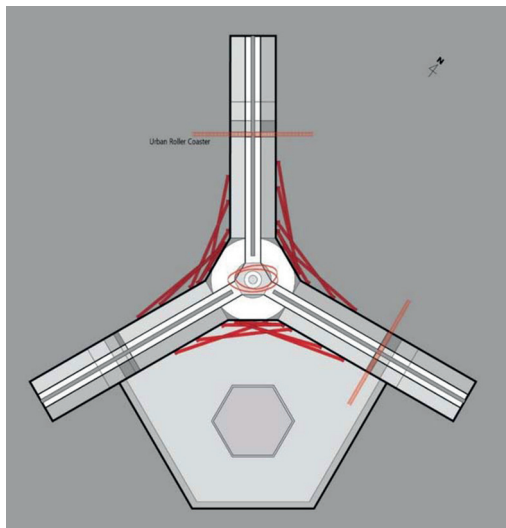


Figure 13 Jae Ho Lee, Ryugyong Tower, plan, tunnel and slides, Pyongyang, 2050.



Figure 14 Jae Ho Lee, Ryugyong Tower, slide at residential level, Pyongyang, 2050.



Figure 15 Jae Ho Lee, Ryugyong Tower, slide at hotel level, Pyongyang, 2050.



Figure 16 Jae Ho Lee, Ryugyong Tower, slide at hotel level, Pyongyang, 2050.



Figure 17 Jae Ho Lee, Rooftop Roller Coaster, Ryugyong Tower, Pyongyang, 2050.

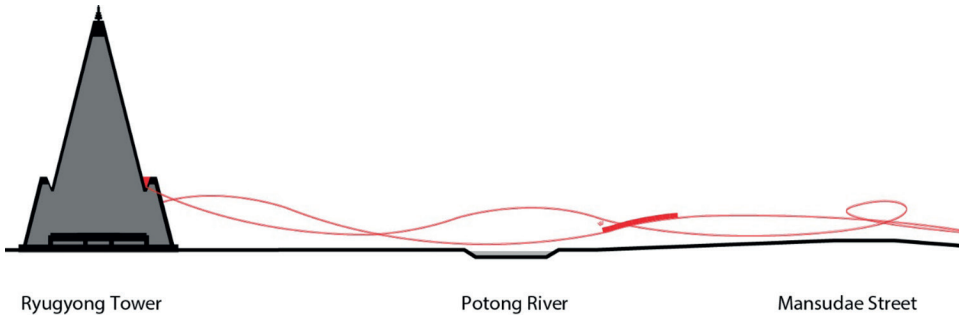


Figure 18 Jae Ho Lee, Section, Routes A & B, Urban Roller Coaster, Pyongyang, 2050.



Figure 19 Jae Ho Lee, Route A, Urban Roller Coaster view looking at Ryugyong Tower, Pyongyang, 2050.

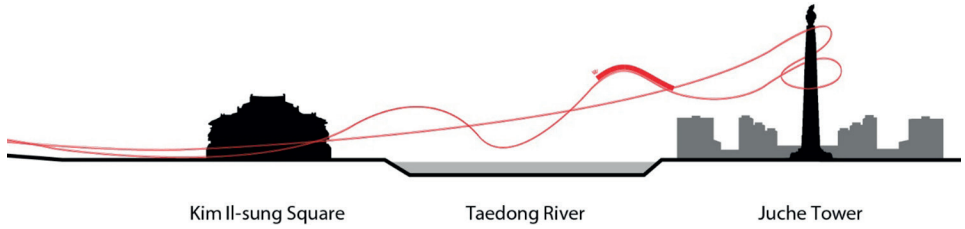
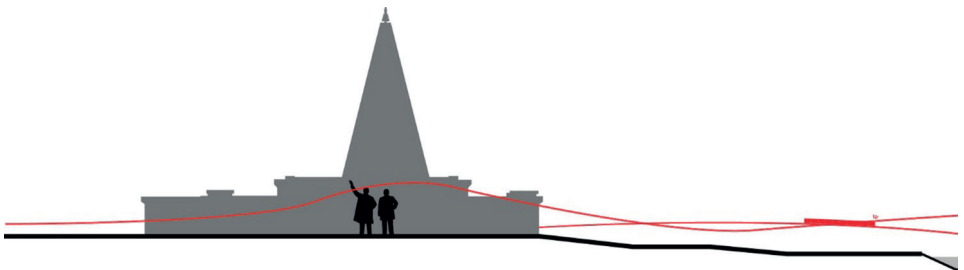


Figure 20 Jae Ho Lee, Route B, Urban Roller Coaster looking towards the Juche Tower from Kim Il Sung Square, Roller Coaster City, Pyongyang, 2050.



Figure 21 Jae Ho Lee, Route B, Urban Roller Coaster looking towards The People's Grand Study House, Kim IL-Sung Square, Pyongyang, 2050.

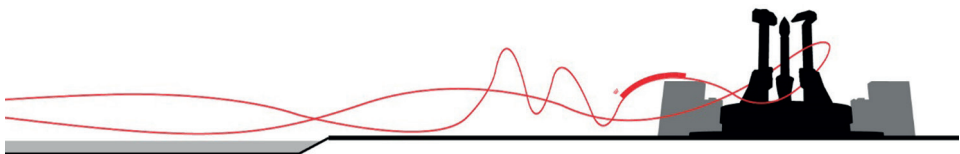


Korean Revolution Museum &
Kim Il-sung & Kim Jung-il Statue

Figure 23 Jae Ho Lee, Section, Route C, Urban Roller Coaster, Pyongyang, 2050.



Figure 22 Jae Ho Lee, Route B, Urban Roller Coaster winding around the Juche Tower, Pyongyang, 2050.



Taedong River

The Monument to the Foundation
of the Workers' Party



Figure 24 Jae Ho Lee, Route C, Urban Roller Coaster looking towards Mansu Hill Grand Monuments and the Ryugyong Tower, Pyongyang, 2050.



Figure 25 Jae Ho Lee, Route C, Urban Roller Coaster looking towards Monument to Party Founding, Pyongyang, 2050.

the backdrop of the Ryugyong Tower (Figures 23–25). Courses B and C take riders up steep inclines and spin them around and around monuments allowing them to escape their familiar meanings of a socialist collective-centered ideology to life as thought-centered individuals, and from a solemn life to one of leisure and amusement. In the end, the thrills of these rides leave riders with only the excitement and new real experience to be engraved in their memories letting past memory of the place fall into oblivion where the roller coaster now exists.

The roller coaster provides the North Korean people with the unfamiliar experience of an exhilarating loss of control that counters the experience of absolute control many have experienced their entire lives. No longer are they made to feel small at the foot of over-scaled monuments of Kim Il-Sung and Kim Jong-Il, or looking up to the ever-visible Juche Tower. Instead the roller coasters take them up and circle around these monuments, physically and psychically changing the perspective of the people riding. They can now able to look at their leaders in the eye.

The over-sized roller coasters provide people with an extreme experience that allows them to forget, even if temporarily at first, the difficult memories they have of their political and economic past. With repetition and over time refreshing and new experiences will transform those memories into new and more fun memories. The roller coasters allow citizens to engage in an ongoing process of forming and re-forming a new sense of a familiar place and in the process generating new individual memories and eventually new collective memories of North Koreans and the world at large.

Imagination as Knowledge

The inadequacy of epistemology or traditional knowledge lies in its inability to address subjects and problems that do not comply with its “necessary and sufficient conditions” for knowledge. Traditional knowledge cannot address propositions that cannot be known, or justify beliefs that are not based on “reliable” sources. While conventional epistemology has served us well for addressing propositions that are known, and beliefs that can be justified, it is ill-equipped to address certain kinds subjects—those that are emergent, irreducibly complex and that present us with novel and irreducible unknowns. The validity of the method used here does not lie in its particularities of combining data analysis, the scenario technique, fictive narrative, speculative design to visualize future contexts and future objects and spaces that inhabit them. The validity of this method and its acknowledgement of imagination as a special form of knowing allows us to know of subjects that cannot be accessed using conventional epistemology. Its value lies

in accepting the full spectrum of imagination as a crucial cognitive function for understanding unknowable and unfamiliar realities and devising new methods for new problems. The value of this method also lies in being comfortable with provisional thinking rather than irrevocable conclusions, and aiming for alternatives rather than predictions. In short, the values of this method lies in replacing epistemology with imagination when required by the subject and nature of the sources. The validity of this research method lies in its ability to materialize our imaginings of the future impact of our current commitments and values, which has transformative power and influences the actions today that already are already forming the future. Whether this method is considered to be valid or not may be beside the point, if we do not have a method at all for investigating unknowable propositions and subjects that cannot be justified through reliable sources that are increasingly threatening our very existence on the planet.

Notes

1. Department of Design, College of Fine Arts, Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul, South Korea, 08826, anniepedret@gmail.com.
2. Max Haiven. *Crises of Imagination, Crises of Power: Capitalism, Creativity and the Commons* (London: Zed Books, 2014), 1.
3. "What Do Journalists Think About Reporting on North Korea?" *NKNews*, October 9, 2014. <https://www.nknews.org/2014/10/what-do-journalists-think-about-reporting-on-north-korea/>; Nathan Vanderklippe. "Scores of Journalist Throng to North Korea, But They Face Strict Rules," *The Globe and Mail*, September 7, 2018, <https://www.theglobeandmail.com/world/article-scores-of-journalists-throng-north-korea-but-they-face-strict-rules/>.
4. Benjamin Joinau. "The Arrow and the Sun: A Topo-Mythanalysis of Pyongyang," *Sungkyun Journal of East Asian Studies* 14, no. 1 (2014): 68; Benjamin Joinau. "Regimes of Visibility in Pyongyang: Notes for an Ethnographic Fieldwork on Public Spaces and Monumentality in DPRK," Lecture Delivered April 19, 2018, Centre de l'École Française d'Extrême-Orient à Séoul and Royal Asiatic Society Korea, Colloquium on Korean Studies, City, Urban Planning and Architecture in North Korea, Asiatic Research Institute, Korea University.
5. NK News, "Reporting on North Korea"; Stephan Blancke. "Difficulties in Gathering and Understanding Intelligence About North Korea," *North Korean Review* 12, no. 2 (Fall 2016): 124.
6. Charles K. Armstrong. "Trends in the Study of North Korea," *The Journal of Asian Studies* 70, no. 2 (May 2011): 357–71.
7. NK News, "Reporting on North Korea."
8. Armstrong. "Study of North Korea," 362; US Fed News Service, "Doctoral Student Focuses Research on North Korean Defectors," Washington, D.C., May 7, 2017.
9. Matthias Steup. "Epistemology," in Edward N. Zalta, ed., *The Stanford Encyclopedia of Philosophy* (Winter 2018 Edition), <https://plato.stanford.edu/archives/win2018/entries/epistemology/>.
10. Ibid.
11. Ibid.
12. Ibid.

13. Ann Pendleton-Jullian, "Design, Agency and the Pragmatic Imagination," YouTube video, 1:20, Watson Institute for International and Public Affairs, November 30 2015, <https://www.youtube.com/watch?v=ZgZf5j6dOHH>.
14. Alex Khasnabish and Max Haiven. *The Radical Imagination: Social Movements in the Age of Austerity* (London: Zed Books, 2014), 249.
15. Donald Schön, *The Reflective Practitioner: How Professionals Think in Action* (New York: Basic Books, 1983).
16. Ann Pendleton-Jullian and John Seely Brown. "World Building," in *Design Unbound* vol. 2 (Cambridge, Mass.: MIT Press, 2018), 51.
17. Ibid.
18. Ibid.
19. Pendleton-Jullian, "Design, Agency."
20. Etienne Pelaprat and Michael Cole. "Minding the Gap': Imagination, Creativity and Human Cognition," *Integrative Physiological and Behavioral Science* 45 no. 4 (June 2011): 397.
21. Khasnabish and Haiven. *Radical Imagination*, 4.
22. Sierk Ybema and Thijs Willems. "Making Sense of Sense-Breaking," *Academy of Management Annual Meeting Proceedings*, 2015, no. 1 (November 30, 2017), <https://journals.aom.org/doi/10.5465/ambpp.2015.14563abstract>.
23. Khasnabish and Haiven. *Radical Imagination*, 226, 262, 264.
24. Pendleton-Jullian. "Design, Agency."
25. Pendleton-Jullian and Seely Brown. "World Building:" 50.
26. Ibid.
27. Pendleton-Jullian and Seely Brown. "Pragmatic Imagination," *Design Unbound*, vol. 2 (Cambridge, Mass.: MIT Press, 2018), 392.
28. Pelaprat and Cole. "Minding the Gap:" 8.
29. Khasnabish and Haiven. *Radical Imagination*, 4.
30. Pelaprat and Cole. "Minding the Gap:" 2.
31. Ibid., 3.
32. R. M. Pritchard. "Stabilized Images on the Retina," *Scientific American* 204 (1971): 72–8; A. W. Inhoff and R. Topolski. "Use of Phonological Codes During Eye Fixations and in On-Line and Delayed Naming Tasks," *Journal of Memory and Language* 33 no. 5 (1994): 689–713, quoted in Pelaprat and Cole, "Minding the Gap:" 3.
33. Pelaprat and Cole. "Minding the Gap:" 5.
34. Pelaprat and Cole. quoted in Pendleton-Jullian and Seely Brown. "Pragmatic Imagination:" 6, 412.
35. Ibid., 392.
36. Pendleton-Jullian and Seely Brown. "Pragmatic Imagination:" 411.
37. Ybema and Willems. "Making Sense of Sense-Breaking."
38. Pendleton-Jullian and Seely Brown. "Pragmatic Imagination:" 414–15.
39. Ibid., 410.
40. Ibid., 392, 396–7.
41. Ibid., 394–5.
42. Charles Pierce, quoted in Pendleton-Jullian and Seely Brown. "Pragmatic Imagination:" 392.
43. Khasnabish and Haiven, *Radical Imagination*, 4.
44. Pendleton-Jullian and Seely Brown. "Pragmatic Imagination:" 392, 412.
45. Ibid., 392.
46. Thomas Alexander, quoted in Pendleton-Jullian and Seely Brown. "Pragmatic Imagination:" 397.
47. Pendleton-Jullian and Seely Brown. "Pragmatic Imagination:" 398–9, 401.
48. Ibid., 401–405.
49. Ibid., 405–7.

50. *Ibid.*, 408–9.
51. Miguel Sicart. *Play Matters* (Cambridge, Mass.: MIT Press, 2014), 10, 21.
52. Klaus V. Meier. “An Affair of Flutes: An Appreciation of Play,” in *Philosophic Inquiry in Sport*, William J. Morgan and Klaus V. Meier, eds (Champaign, Ill.: Human Kinetics, 1988), 194, quoted in Sicart, *Play Matters*, 77.
53. Michael DeAnda. review of *Play Matters*, by Miguel Sicart, *American Journal of Play* (Winter 2015): 254.
54. Pendleton-Jullian and Seely Brown. “Pragmatic Imagination,” Prequel to *Design Unbound*, <http://www.pragmaticimagination.com>.
55. Pendleton-Jullian. “Design, Agency.”
56. Pendleton-Jullian and Seely Brown. “World Building:” 55.
57. Peter Stockwell. “Science Fiction,” in David Herman, Manfred Jahn, and Marie-Laure Ryan eds. *Encyclopedia of Narrative Theory* (London and New York: Routledge, 2005), 518.
58. David J. Staley. “A History of the Future,” *History and Theory*, 41, no. 4 (December 2002): 72.
59. *Ibid.*, 79.
60. Brian Fay. “Unconventional History,” *History and Theory*, 41 no. 4 (December 2002): 3.
61. Philip van Notten. “Writing on the Wall: Scenario Development in times of Discontinuity,” (Ph.D. diss., University of Maastricht, 2004), cited in Philip van Notten, “Scenario Development: A Typology of Approaches,” in *Think Scenarios, Rethink Education, Schooling for Tomorrow*. Paris: OECD Publishing, 2006, 69–92.
62. Peter Schwartz. *The Art of the Long View: Planning for the Future in an Uncertain World* (Chichester, 2005), quoted in, Johannes Tschapka and Taeyon Kim, “2043: Scenario Technique as an Educational Means of Learning Sustainability,” *Zeitschrift für Didaktik der Gesellschaftswissenschaften* 1 (2015): 135.
63. Philip Van Notten. “A Typology of Approaches,” 72.
64. Lubomír Doležel, “Preface,” *Heterocosmica: Fiction and Possible Worlds* (Baltimore; London: Johns Hopkins University Press, 1998), quoted in *Heterocosmica*, Johns Hopkins University Press, <https://jhupbooks.press.jhu.edu/title/heterocosmica>.
65. Michel de Certeau. *The Practice of Everyday Life* (Berkeley: University of California Press, 1984), 123–124.
66. Khasnabish and Haiven. *Radical Imagination*, 123.
67. Joshua Tanenbaum, Marcel Pufal, and Karen Tanenbaum. “The Limits of Our Imagination: Design Fiction as a Strategy for Engaging with Dystopian Futures,” *Limits '16*, Proceedings of the Second Workshop on Computing within Limits, Irvine, California, June 8, 2016 (New York: ACM, 2016).
68. *Ibid.*, 4.
69. DeAnda. review of *Play Matters*, 254.
70. David A. Kirby. “The Future is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-World Technological Development,” *Social Studies of Science* 40 no. 1 (February 2010); Miguel Sicart. *Play Matters* (Cambridge, Mass.: MIT Press, 2014); Tanenbaum et al. “Design Fiction.”
71. James Basey. “Imagination as Research.” KooZA/rch, 15 February 2017, <https://koozarch.com/2017/02/15/imagination-as-research/>.
72. Pendleton-Jullian and Seely Brown. “World Building:” 55.
73. DeAnda. review of *Play Matters*, 254; Kirby. “The Future is Now,” 44, 66.
74. Cameron Tonkinwise. “Just Design: Being Dogmatic about Defining Speculative Critical Design Future Fiction.” *Medium* (blog). August 15, 2015. <https://medium.com/@camerontw/just-design-b1f97cb3996f>.
75. Basey. “Imagination as Research.”
76. Tanenbaum et al. “Design Fiction.”
77. Anthony Dunne and Fiona Raby. *Speculative Everything* (Cambridge, Mass.: MIT Press, 2013).

78. Dunne and Raby. *Speculative Everything*; Max Haiven. *Crises of Imagination*.
79. Khasnabish and Haiven. *Radical Imagination*, 3.
80. Pendleton-Jullian and Seely Brown. "Pragmatic Imagination," 364–461.
81. Sicart. *Play Matters*, 10.
82. Annie Pedret. *Pyongyang 2050: Spatial Futures* (Seoul: Damdi, 2018).
83. Jelena Mandić. "City, Monuments and Moments," in *Pyongyang 2050*, 86–89, 103–129.
84. Klara Lucilla Romigioli. "Juche City," in *Pyongyang 2050*, 86–101.
85. Sohn Jeemin (Jasmine). "The Pyongyang Projects," in *Pyongyang 2050*, 197–215.
86. Liu Ching-Wei and Piao Xianmei. "Linear City," in *Pyongyang 2050*, 131–145.
87. Lee Jae Ho. "Urban Roller Coaster," in *Pyongyang 2050*, 173–195.

Bibliography

- Alexander, Thomas M. "Pragmatic Imagination." *Transactions of the Charles Pierce Society* 26.3 (1 July 1990): 325–348.
- Basey, James. "Imagination as Research," KooZA/rch, 15 February 2017, <https://koozarch.com/2017/02/15/imagination-as-research/>.
- DeAnda, Michael. Review of *Play Matters*, by Miguel Sicart. *American Journal of Play* 7.2 (Winter 2015), 254.
- De Certeau, Michel. *The Practice of Everyday Life*. Berkeley: University of California Press, 1984.
- Doležel, Lubomír. *Heterocosmica: Fiction and Possible Worlds*. Baltimore; London: John Hopkins University Press, 1998.
- Dunne, Anthony and Fiona Raby. *Speculative Everything*. Cambridge, Mass.: MIT Press, 2013.
- Fay, Brian. "Unconventional History." *History and Theory* 41.4 (2002): 1–6.
- Gray, Paul S., John B. Williamson, David A. Karp, and John R. Dalphin. *The Research Imagination: An Introduction to Qualitative and Quantitative Methods*. New York: Cambridge University Press, 2007.
- Haiven, Max. *Crises of Imagination, Crises of Power: Capitalism, Creativity and the Commons*. London: Zed Books, 2014.
- Joinau, Benjamin. "The Arrow and the Sun: A Topo-Mythanalysis of Pyongyang." *Sungkyun Journal of East Asian Studies* 14.1 (2014): 65–92.
- Kirby, David A. "The Future is Now: Diegetic Prototypes and the Role of Popular Films in Generating Real-World Technological Development." *Social Studies of Science* 40. 1 (2010).
- Khasnabish, Alex and Max Haiven. *The Radical Imagination: Social Movements in the Age of Austerity*. London: Zed Books, 2014.
- Pedret, Annie. *Pyongyang 2050: Spatial Futures*. Seoul: Damdi, 2018.
- Pelaprat, Etienne and Michael Cole, "Minding the Gap": Imagination, Creativity and Human Cognition," *Integrative Physiological and Behavioral Science* 45.4 (2011): 397.
- Pendleton-Jullian, Ann. "Design, Agency and the Pragmatic Imagination." YouTube video, 1:20. Watson Institute for International and Public Affairs. November 30 2015. <https://www.youtube.com/watch?v=ZgZf5j6dOHM>.
- Pendleton-Jullian, Ann and John Seely Brown. "Pragmatic Imagination" and "World Building." In *Design Unbound*, Vol. 2. Cambridge, Mass.: MIT Press, 2018.
- Pendleton-Jullian, Ann and John Seely Brown. "Pragmatic Imagination." Prequel to *Design Unbound*. Accessed 4 April 2019. <http://www.pragmaticimagination.com>.
- Rao, Mallika. "A North Korean Architect Imagined the Future and It's Crazy/Beautiful." *Huffpost*, 12 August 2014. https://www.huffingtonpost.com/2014/08/12/north-korea-architecture_n_5652019.html.
- Sicart, Miguel. *Play Matters*. Cambridge, Mass.: MIT Press, 2014.

- Staley, David J. "A History of the Future." *History and Theory* 41. 4 (2002): 72–89.
- Stockwell, Peter. "Science Fiction." In, eds. David Herman, Manfred Jahn, and Marie-Laure Ryan. *Encyclopedia of Narrative Theory*. London and New York: Routledge, 2005.
- Tanenbaum, Joshua, Marcel Pufal and Karen Tanenbaum. "The Limits of Our Imagination: Design Fiction as a Strategy for Engaging with Dystopian Futures." In *Limits '16*, Proceedings of the Second Workshop on Computing within Limits, Irvine, California, 8 June 2016. New York: ACM, 2016.
- Tschapka, Johannes and Taeyon Kim. "2043: Scenario Technique as an Educational Means of Learning Sustainability." *Zeitschrift für Didaktik der Gesellschaftswissenschaften* 1 (2015).
- Tonkinwise, Cameron. "Just Design: Being Dogmatic about Defining Speculative Critical Design Future Fiction." *Medium* (blog). August 15, 2015. <https://medium.com/@camerontw/just-design-b1f97cb3996f>.
- Van Notten, Philip. "Scenario Development: A Typology of Approaches." In *Think Scenarios, Rethink Education*. Paris: OECD Publishing, 2006: 69–92.
- Wright, Frank Lloyd. *The Disappearing City*. New York: W. F. Payson, 1932.
- Ybema, Sierk and Thijs Willems. "Making Sense of Sense-Breaking." *Academy of Management Annual Meeting Proceedings*. 2015: 1 (November 30, 2017). https://www.researchgate.net/publication/291369747_Making_Sense_of_Sense-Breaking