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Chasing Black Swans through Science Fiction: Surprising Future Events in the Stories of a Finnish Writing Competition

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Abstract

In the paper we analyse the notion of 'black swan' as popularised by Taleb (2007). We propose that in the context of the futures' imagination, a black swan can be defined as hybrid that integrates local knowledge with multiple temporal scales, combining past, present and future tenses. As empirical material, we analyse the short stories from a writing contest held by the Finnish Parliament's Committee for the Future. The material contains 132 short stories. The analysis gives intriguing insights into how Finnish people – from different locales, of different ages and with differing educational and professional backgrounds – imagine different futures.

Keywords: black swan, science fiction, surprising events, futures

Introduction

It can be argued that the common interest in futures studies, as a field of knowledge and a strategic endeavour, is the charting of alternative future trajectories on varied levels of likelihood and plausibility. Thus, the key task of the futures studies and foresight is to map

alternative futures that can vary from the most probable megatrend to the remotest possible wild card, which is often at the edge of the human imagination. From those alternatives, contextualised strategic insight is built based on this wide ranging scope of knowledge.

A useful approach to charting the fringes of futures imagination is to map emerging issues, wild cards or 'black swans'. In other words, intellectually stimulating yet low likelihood events that would have a potentially strong impact on society. Such emerging issues can be collected from different sources, such as open citizen platforms, expert-based surveys, horizon scans and so on. One way to collect emerging issues is to track them in science fiction stories. For example, Molitor (1977, p.9) has categorised science fiction as a "visionary" and "uninhibited" source of data that is comparable with "artistic poetic works". Black swan, a concept popularised by Nassim Taleb (2007), refers to a sort of ultimate wild card: by definition, a black swan is an utterly unexpected event that lay beyond the reach of human sensing systems, beyond our 'rational radar'.

The key intellectual and theoretical stimuli behind our paper lies in the contradictory notion of a black swan: if it refers to an utterly unanticipated event, how is it possible to argue that such a thing can be thought of by the human mind? When we chase black swans, what are we actually doing? Can we truly argue that we can identify the utterly expected – which is a conceptual contradiction *par excellence* – or are we actually engaged in something else?

In the paper we provide an empirical analysis of the notion of a black swan as they are produced in the ideas of a writing contest held by the Finnish Parliament's Committee for the Future. The competition was open to the general public in Finland and can be perceived as a representation of black swans in the popular imagination. In total, the material contains 132 short stories produced by people from different Finnish locales and backgrounds.

We propose that, in the context of futures imagination, black swans can be defined as conceptual hybrids of knowledge that are embedded in varied spatial and temporal contexts. We thus claim that when humans engage in identifying black swans they are always practising this from a specific subjective perspective, which is a combination of their personal history as well as generic temporal, social and spatial contexts. We challenge the idea that it is generally possible to identify black swans that are 'out of the box', i.e. from beyond subject's social space of knowing. Instead, we suggest that identification of a black swan always includes elements that resonate with the context of its creation; and it is this resonance that enables the subject to contemplate the ontological black swanness of the black swan. In the paper, we analyse the type of black swans this set of science fiction stories identified: what their contexts are, their backgrounds and knowledge sources. Through this analysis we show how the popular imagination produces new futures knowledge by hybridising space, time and speculation to create black swans.

The paper is structured as follows: In section 2 we provide the basic theoretical outline of the concept of a black swan and discuss its relationship to the related concepts of wild cards and weak signals. In section 3 we deepen our theoretical perspective by discussing the notions of partial perspective and bounded rationality. In section 4 we move towards the empirical analysis and contemplate how science fiction stories can be utilised as instruments for imagining black swans. The subsequent sections 5, 6 and 7 present our empirical setting and our interpretive

analysis. Section 8 provides the concluding remarks.

Black Swans, Wild Cards and Weak Signals

Nassim Taleb, the author who coined the term black swan, defined it by following three aspects:

> 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 (unlike the bird). Third, in spite of its outlier status, human nature makes us concoct explanations for its occurrence *after* the fact, making it explainable and predictable. (Taleb, 2007, p.xxii)

Aven (2013, p.47) argues that the notion of black swan is characterised by rarity and extremity, and the surprising nature of the event. Thus, black swans, as objects for future-oriented analysis, are something that should be outside the radar of subjective scoping.

Krupa and Jones (2013) suggest a 'black swan theory' that is based on following points. Firstly, black swans are perceived as "entirely unexpected outliers" that have "little or no precedents" (Krupa & Jones, 2013, p.287). The second point is that black swans are events that are, or at least appear to be, "retrospectively predictable and anticipatable" (Krupa & Jones, 2013, p.287). The third point is black swans result "due to a human illusion of understanding" (Krupa & Jones, 2013, p.287), and, fourthly, black swans should be extreme in their implications.

The interesting aspect in Krupa and Jones' description is the issue that they highlight the role of "human illusion of understanding" when contemplating black swans. It links with Piore's brief article on the Fukushima nuclear reactor catastrophe as a black swan. Piore (2011, p.53) makes the argument that Fukushima incident is a "failure of imagination", the incapability of the human mind to accept the fact that even though some events are highly unlikely, they might still happen tomorrow.

In futures studies, there are related concepts that merit attention when talking about black swans. The first of these is the notion of a 'wild card'. As Mendonća et al (2004, p.203) define them, wild cards "refer to incidents with perceived low probability of occurrence but with potentially high impacts and strategic consequences for an organisation or a society". They argue that wild cards have such wide-ranging and fast-paced effects that societal systems do not usually have the capability to prepare for their impact. This is because wild cards induce systemic and complex effects, with multiple "interlinked variables", that are not easy to identify before a drastic tipping point has been achieved.

Another concept that occupies much of the same turf as black swan and wild card is the notion of 'weak signal'. Mendonća et al (2004, p.205) define weak signal as "information on potential change of a system toward an unknown direction". Accordingly, a weak signals analysis refers to an analysis of very low probability events – with not much historical evidence – that cannot be linearly forecast. This analytical emphasis makes the weak signal analysis similar to the emerging issues analysis as developed by Molitor (see e.g. Molitor, 1977; 2000; 2003). Also, the classic management theorist Ansoff (1984) argued that weak signals could be a

function of either external or internal issues that are on such a vague stage as to escape a definite explanation or estimation of impact.

The linkage between the weak signal and the wild card is basically the issue that weak signals are "unstructured information" (Ilmola & Kuusi, 2006, p.911) that might be geared toward a specific wild card. As Mendonća et al. (2004, p.208) suggest, weak signals are "scattered data that point to the emergence of potential wild card events". They (Mendonća et al., 2004, p.208) also identify an element of cultural context in the identification of a weak signal: "The concept of 'wild card' is a culturally embedded one in the sense that we can always note that some things are real surprises to some groups and some individuals." It is thus possible that a weak signal remains a low-level and scattered phenomenon, and does not develop into a more evidential signal. Also, weak signals do not always signify a wild card, particularly if their impacts fade out and remain peripheral. These observations point to the idea that weak signals and wild cards are, although related, conceptually different. Then again, black swans should be, by definition, utterly surprising events that are not indicated by any embryonic signals.

The lens of interpreting the weak signals, wild cards and black swans is of critical importance. For example, Ilmola and Kuusi (2006) have adapted Ansoff's (1986) notion of filters for the identification process of weak signals. They conclude that an "open filter" produces a more varied set of signals but an "in-depth filter" produces deeper knowledge about fewer strategic topics.

Imagining Black Swans: Partial Perspectives and Bounded Rationality

When contemplating black swans, the key question is that whether the notion of black swan, as an utterly surprising future event, grants the possibility of imagining them *ex ante*, before they happen. We argue that when imagining black swans we always deal with partial perspectives, a limited view from somewhere. We test, through our analysis, what the role of the specific spatial and temporal context is when imagining a black swan. The identification of black swans is thus a question of adapting local knowledge and a particular mindset, adapting the anthropologist Clifford Geertz (1983).

We argue that in the search for black swans, the historical context and the spatial context matter. Those contexts, as well as other factors, contribute to a perspective some behavioural psychologists and economists have called 'bounded rationality'. Herbert Simon, who coined the term, defined it as follows (Simon, 2000, p.25):

> Bounded rationality is simply the idea that the choices people make are determined not only by some consistent overall goal and the properties of the external world, but also by the knowledge that decision makers do and don't have of the world, their ability or inability to evoke that knowledge when it is relevant, to work out the consequences of their actions, to conjure up possible courses of action, to cope with uncertainty (including uncertainty deriving from the possible responses of other actors), and to adjudicate among their many competing wants. […] Consequently, rational behavior in the real world is as much determined by the "inner environment" of people's minds, both their memory contents and their

> processes, as by the "outer environment" of the world on which they act, and which acts on them.

In another piece, Simon (1972, pp.163–164) concludes that bounded rationality is the consequence of, at least, three factors. The first is risk and uncertainty, which refers to the factors that affect the neo-classical assumption of perfect rationality. Basically, there are factors that profoundly shake this calculative perspective whenever the view is transferred from the world of neo-classical economic theory to the world of actually existing economy. The second factor is the actors' incomplete awareness of the future alternatives. The variety of options for future developments is always greater than our awareness of them, resulting in yawning gaps in futures knowledge. The third factor is the effect of complexity. The human mind is ill-equipped for figuring out complex causal relationships that include multiple feedback loops in several dimensions. However, these kinds of complex frameworks can be deciphered by using different tools, such as system dynamic modelling combined with foresight and evaluation approaches (e.g. Auvinen et al., 2015).

Nonetheless, it is not entirely impossible to prepare for black swans. For example, Krupa and Jones (2013, p.289) have formulated three strategies for policy-making that endorse resilience in preparing for black swans. The first strategy is to acknowledge the inherent weaknesses of long-term projections. Krupa and Jones (Krupa & Jones, 2013, p.289) argue that long-term projections are highly affected both by over and underestimation and simplification. One should realise that long-term prognoses have an inherent component of uncertainty that grows as a function of time. The second strategy is to avoid picking winners. From the long-term perspective, it is more rational for policy-makers to build a 'balanced portfolio' of action options than to put all the chips in one basket. Policy-making should aim at resilient and robust systems instead of potentially vulnerable one-track plans. The third strategy is to count all the direct and indirect costs of the actions, including life-cycle and external costs. Krupa and Jones (2013, p.289) argue that in the context of energy policies, the external costs are still rarely counted when formulating policies. This creates a paradoxical situation, even though the potential impacts of climate change are already widely accepted through scientific evidence, energy policies are still realised as if the environment is a neutral and unaffected platform of the activities.

In the next section we frame our empirical case by discussing the potential to identify black swans through science fiction.

Locating Black Swans in Science Fiction Stories

Science fiction literature can be viewed as a rich repository for searching for different possibilities and options in futures thinking. Recently, the field of science fiction has been studied in academic exercises, for example, in human geography (e.g. Kitchin & Kneale, 2001; 2005), in cultural studies (e.g. Kuhn, 1990) and in literary studies (e.g. Jameson, 2005).

Here, our aim is to use short stories, collected from a Finnish writing competition, as repositories for imagining black swans. Our aim is not just to view these stories as pieces of 'citizen science fiction' – interesting pieces of narratives that give insight into a nation-state – but as sources of information that provide

insight into re-thinking the notion of black swan. This is because our perspective is based on the hypothesis that the black swans identified in the stories are not black swans *per se* (because this would be a paradoxical supposition) but something else. We argue that they are speculative future-oriented arguments anchored in a particular spatio-temporal setting.

We further argue that every process of identifying emergent phenomena, be they weak signals, wild cards or black swans, is, due to its nature, a partial, contextual and bounded process. What we identify as an emerging phenomenon is, to a large extent, not only connected to – as Simon (1972; 2000) argued in the thesis of bounded rationality – to the "outer environment" that is supposedly graspable and understandable, but also to the "inner environments" of the subjects' mind that are always tied to certain spatio-temporal knowledge setting and capacities. Thus, our aim in this analysis is to discuss the contextual frames in the stories and to re-think some of the theoretical arguments behind emerging phenomena in futures studies, usually conceptualised as linear and straight-forward processes realised by a sort of 'universal knowing subject'.

In the next section we will turn towards our case study, the Finnish writing competition initiated by the Committee for the Future of the Finnish Parliament.

Analysing the Setting and the Ideas of the Finnish Writing Competition

The contexts of the Finnish writing competition

The writing competition was initiated by The Committee for the Future (henceforth Committee). It was established in 1993 as a temporary committee in the Finnish Parliament (Eduskunta). In 2000, the Committee was given permanent status. All members of the Committee are Members of the Finnish Parliament (MPs). The Committee for the Future was, when it was set up, unique in the world as an institution (Tiihonen, 2011).

The Committee's mission is to generate dialogue with the government on major future problems and opportunities. Once during its term of office, the Government issues a report on long-term future prospects and the Government's targets which is submitted from the Prime Minister's Office to Parliament. The main task of the Committee for the Future is then to prepare the Parliament's response (sc. Futures Submission) to the Government's Report on the Future. In this way, the Finnish Government and Parliament can recognise important political themes at an early stage, so that different alternatives and policy lines will be completely open and under development (Tiihonen, 2011) This dialogue on the future between the Government and Parliament is also a unique process.

The most important impact of the Committee then is not in the Parliament's legislative work but in the Committee's function as a parliamentary think tank (visionary power). Since the problems and opportunities of the future cannot be studied through traditional parliamentary procedures and work methods alone, the Committee has been given the specific task of following and using the results of futures research. In this task, the Committee cooperates with Finland Futures Research Centre (FFRC). FFRC, established in 1992, is a Department at the Turku School of Economics, University of Turku. The Ministry of Education and Culture

has entrusted FFRC with the national task of developing the Finnish foresight system.

At the beginning of a term of office the Committee selects its own themes and the best working methods for dealing with them. For example, in autumn 2011, the Committee held a number of hearings with experts representing various sectors of society (public sector, universities, business and non-governmental organisations). Based on these hearings, the Committee chose seven areas of study for itself during the parliamentary term 2011–2014: sustainable growth; an inspired society; acquiring new knowledge; can the welfare society endure?; black swans; crowdsourcing; and radical technologies (Hietanen & Tiihonen, 2014).

Traditionally the Committee has listened to experts from research organisations. But increasingly it has become just as important to listen to ordinary people's perspectives. That was the main inspiration behind the black swan writing competition, to encourage people to become involved in the Committee's work. Another target was to combine art and science (science fiction and futures studies) to locate the surprising, impossible breakthroughs of the future.

A total of 132 short stories were received in the writing competition *Black Swans – What Will Change the World?* The competition was open to the general public in Finland. The aims of the writing competition were to (1) develop the skills of the Committee on futures research methods; (2) to study surprises and discontinuities in addition to trends; (3) to include the views of others alongside those of scientific experts, officials and interest groups; and (4) to increase the creativity of foresight by bringing together arts (creative writing) and futures studies methods.

The panel of judges selected four entries to receive prizes. A further 16 entries were selected for publication in the book (BS, 2013). The winning entries selected by the judges deal with subjects such as energy shortages, the future of Africa, global justice, organised crime and Asia's role in world politics. Thus, the Black Swans project was an excellent addition to other foresight work carried out by the Committee. The project acquired material that was different from other foresight projects and challenged the ways in which the results of foresight projects are handled.

In the next section we enter into analysis of the key contents of the stories. Our aim is to identify the contexts and settings in which the black swans in the stories are embedded. We utilise an interpretative classification that is presented in a quantified form. This classification analysis is followed by an analysis of the rhetorical strategies used in the stories.

The contextual dimensions of the stories

The 132 future stories were read through several times and then classified and analysed using a special holistic framework. The framework consisted of several dimensions that aimed to capture and crystallise the core content of the stories.

The first classification dimension was the often used PESTE framework (political; economic; social; technological; environmental), which, in this case, was modified by adding one further dimension into the framework; namely values (Figure 1). The purpose was to identify the origins of change trajectories – the origins of the drivers of change, and whether the drivers of change or critical development paths originate from the Political, Economic, Social, Technological, Environmental or Values spheres. Here, we use the common acronym PESTEV for this framework.

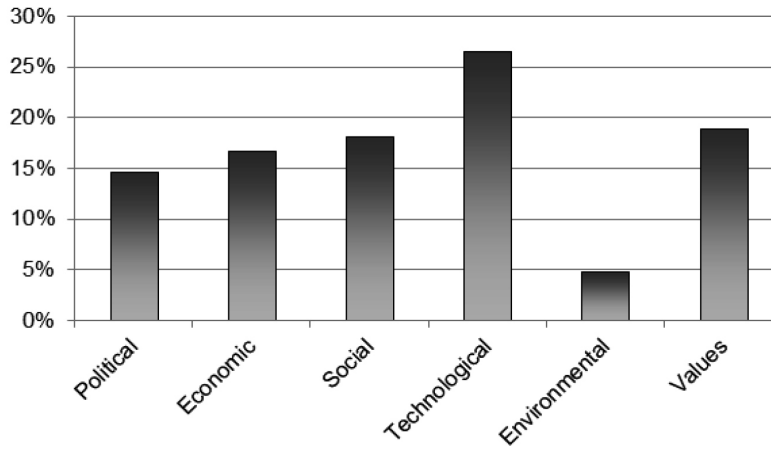

Figure 1. The origin of the change trajectories in the stories measured in PESTEV dimensions.

The second classification dimension was the 'tone of the writing', which refers to whether the writer was proposing the future development of an event in desirable, positive terms (utopia) or as something undesirable or even disastrous for mankind (dystopia) (Figure 2). Some stories were also written in a very neutral style.

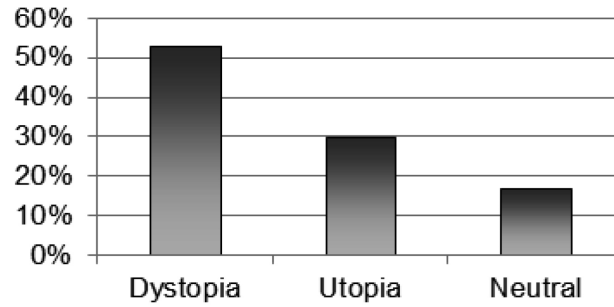

Figure 2. The tone of the writing.

The third dimension according to which the future stories were classified was the style of the text, whether the story was presented in a storylike format using personalised characters as 'actors' in a story (Figure 3). The majority of stories fell into this category, yet some writers had adopted a more analytical approach by aiming to analyse either the state of the future or the development paths into the future using either an explicit or implicit framework, creating scenarios, identifying key drivers of change, etc.

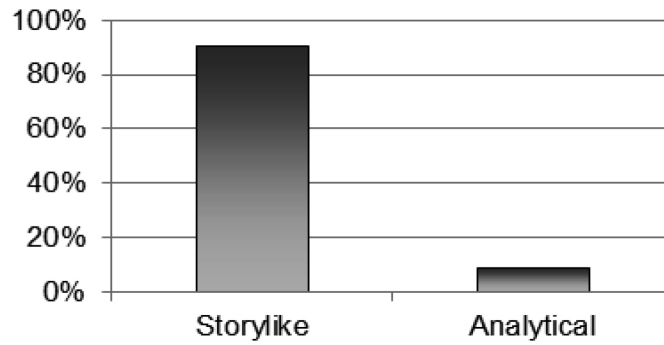

Figure 3. The style of the stories.

The fourth dimension identified in the stories was the nature of each script in relation to the continuity of the future development. The stories were divided into two groups: disruptive and incremental (Figure 4). The scripts were quite evenly distributed along this dimension.

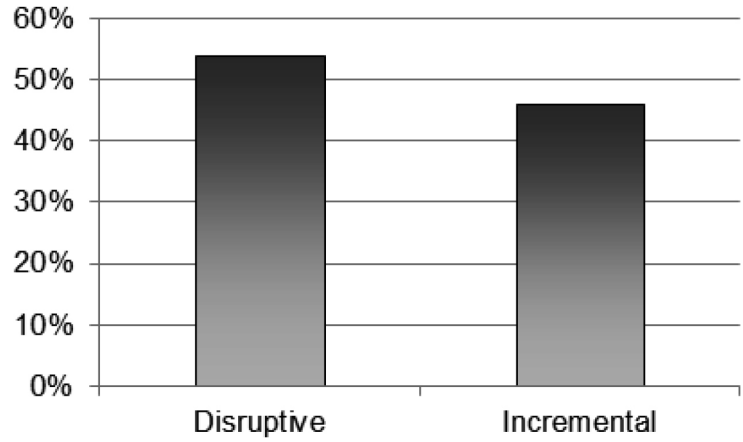

Figure 4. Continuity of the future development in the stories.

The fifth and final dimension, not as easily recognised as the others, was the geographical or contextual dimension of the story (figure 5). In this sense, the scripts were classified into two groups: generic scripts and localised ones that were indicated by the fact that the future script was either placed in a limited regional context or approached as global, generic change phenomena.

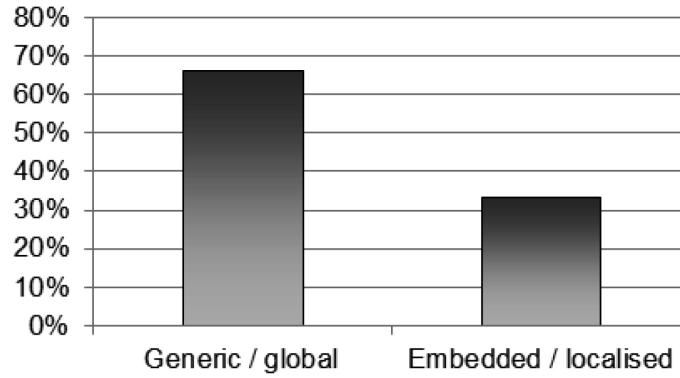

Figure 5. Contextual or geographical dimensions of the stories.

Rhetorical Strategies for Characterising Black Swans

In this section we identify four main rhetorical strategies for characterising black swans in the stories. We propose that all of these future-oriented rhetorical strategies emphasise the two inherent factors in imagining black swans, that is, the partial perspective and bounded rationality.

Temporal strategies: presentism and the haunting past

The first rhetorical strategy, presentism, is an almost inbuilt feature of the stories because many of the stories were connected to a lineage of events springing from recent history to the present in Finland. For example, in the story *When Will the Lights Come Back On?* the prime minister of Finland is named Pertti Katainen, a name that connects directly with the name of the then prime minister of Finland, Jyrki Katainen. In the story, the character is a grandson of Jyrki Katainen. The second example of presentist thinking, or presentism, is the use of the concept of "Jytky" in several stories. Jytky is a Finnish neologism coined by the current Finnish Minister of Foreign Affairs, Timo Soini, who is also the leader of the populist right-wing conservative party named The Finns. The word refers to the electoral success of the party in Finland in the 2011 parliament election.

There are also several other examples of the conditioning power of the present:

1. Volcano Katla's eruption (BS, 2013, p.83) and the crashing of airplanes due to this (BS, 2013, p.273). In 2010 there was a large volcanic eruption in Iceland, which affected European air traffic. The event was much debated in the Finnish media.
2. A decrease in the amount of science departments at universities (BS, 2013, pp.90-91). University changes were much debated in Finland in the early 2010s.
3. Privatisation of the public health system (BS, 2013, pp.91-92). This topic has been continuously on the agenda in Finland in 2010s.
4. The Pope and the paedophile scandals of the Catholic Church (BS, 2013, pp.102-118). These incidents have been intensively covered in international media in the 2000s.
5. The Utoya massacre in Norway in 2011, realised by a radical right-wing

terrorist called Anders Behring Breivik (BS, 2013, pp.104-105).

6. Several stories using Greece as an example of a crisis state. The topic of Greek economy was also heavily covered in European and Finnish press in 2010s.

We highlight the impacts of presentism through the detailed analysis of the story *Peace and Security!* The story discusses the role of religions in the creation of uncertainties in modern societies and uses an interesting combination of conservative economic logic and progressive cultural logic. The story is based on contextual arguments that have been popular in Finnish journals during the Eurozone crisis and fiscal austerity policies. The story links a present international case (the crisis of the Eurozone and the case of Greece), populist nationalist logic (the Finnish 2011 election) and contemporary atheist criticism as exemplified by Richard Dawkins. The story builds on this combination and parallels an orthodox religious culture and the capabilities of economic book-keeping:

> In the early 2000s Greece had still been in the vanguard of the most religious countries in Europe, with fully 97 percent of its population belonging to a church and over 80 percent acknowledging a belief in God. Critics had been arguing for years that there was a *correlation between religious belief and inability to manage an economy*, and Greece had been the textbook example for their theory. (BS, 2013, pp.111-112, emphasis added)

In its declaratory yet humoristic style, the story is an interesting case of bounded rationality. The atmosphere of the story reveals the grip of the present context; it conditions the perspective of the story and channels its approach for thinking on future events. The story is also demonstrative of the sort of 'rational-protestant-engineer' culture that has been on the rise in Finland for the last couple of years. The features of this culture highlight strict economic austerity (evident in the discussion on state debt and government spending) and the raising of financial issues and money as the core elements of human society. In the story, this thinking is evident in the prime narrative logic: the finances of the different churches should be returned to the state in order for the state to repair its fiscal deficits. The narration of the outcome is quite revealing:

> The centuries-old power of the Church quickly crumbled and national economies experienced a long-awaited revival. The governments of Protestant countries wrinkled their brows and, while their economies were on relatively firm ground, noticed their own churches were sitting on significant fortunes. Denmark and Norway were the first to join the consensus prevailing in the Catholic world and seized their churches' assets. […] Finnish citizens had signed countless petitions and staged anti-church protests, but the proposals to seize Finnish churches' assets only got wind in their sails when Sweden, Finland's neighbour to the west, went into action. People's faith in their government grew as the long-tumultuous economy was returned to an even keel. Suicide rates sank to their lowest levels in living memory, and citizens' hopes for the future were higher than ever before. (BS, 2013, p.113)

The above fragment is an interesting example of transposing the on-going economic crisis in Finland by juxtaposing atheism and theism. In a way, the fragment provides a creative solution for how to recover state finances, restore the faith in government and reach a new kind of hopeful future. The story demonstrates how the perspective of a very particular spatial setting, in this case, that of the specific context of a small Protestant Nordic state, can be extended – through the speculative liberty provided by the framework of science fiction – into a universal context for assessing the 'correct' and 'virtuous' forms of human behaviour.

Another related rhetorical strategy is to perceive the future as determined by the past. In this strategy, the future is seen to be 'haunted' by the past in the sense that some historical decision, or a practice, becomes a factor that directly conditions the future. In several stories, the haunting past was utilised as a lesson that rich Western states – including Finland – need for sticking with seemingly unsustainable governance practices. For example, the story *When Will the Lights Come Back On?* is based on the supposition that the energy infrastructure of the West, namely Europe, has collapsed while formerly developing nations, in this case, Congo and other parts of Africa, have become major solar energy superpowers. Thus, the global balance of power has drastically shifted. The following fragment from the story demonstrates the use of both temporal strategies – the present and the haunting past – in connecting the story to a recent political event (Jytky) and the historical trajectory of migration politics in Finland:

> 'Jytky' was the next word Nadifa Bushra uttered through her full, bright red lips. Pertti Katainen thought he had misheard the Finnish word popularly used to refer to the surprising electoral success of a populist, nationalist party. But no, Minister Bushra's staff had been busy digging up all sorts of things like that from the past, things Katainen would have preferred to forget. 'In 2011 a large number of your people voted for a party that thinks your welfare system is only for native-born Finns. Two years later, Somali refugees who had arrived in your country were returned to Somalia at the instigation of an MP from that party, despite the fact that the security situation here was very poor and our country was experiencing a terrible famine due to drought,' Nadifa Bushra recited, and Pertti Katainen understood the game was over. (BS, 2013, p.48)

In the story, the black swan of energy is used to illustrate a lesson – Western countries will reap what they sow – as the history of current economic inequality haunts the future.

The future as determined by technologies

The second rhetorical strategy was the most common strategy for identifying black swans (see also the PESTEV in Figure 1). This was to frame the black swan in a technological context. The stories roughly referred to the 1990s and the rise of Nokia and the Finnish telecommunications industry. Since that time, the development of technology has been perceived as an important building block in Finnish society. It is quite a widespread view among Finns that Finland can be seen as a pragmatic nation of engineers. This idea was strikingly visible in the stories.

In some stories, technology was utilised for opening radical techno-cultural black swans. An example is the story called *ID – Instantaneous Device* in which

a group of scientists in the 21st century invent a device that makes it possible to communicate instantly with societies thousands of light years away and even with the future (BS, 2013, p.195). Here, a technological gadget, based on quantum mechanics, was envisioned as a kind of universal time machine. Through different turns, the story leads to an intriguing idea of "an absolute future":

> The competence theory included a hypothesis of an absolute future, which represented the best possible future. According to the hypothesis, this absolute future took care of the notion that in the event of bad futures, past users would also receive information about what kind of development was desirable. (BS, 2013, p.204)

Thus, the technology would create a sort of utopian universal consciousness that would accelerate 'good futures' and hinder 'bad futures'. The device had an internal capacity to connect morality and future development, and to assess "progress contamination":

> In theory, then, the use of ID was linked to a certain problem of morality and purity. Sometimes the future was not desirable, and the device user had to try to identify the progress contaminant in the future and then influence the future in a way that produced the least progress contamination. (BS, 2013, p.206)

Another version of the disruptive technology future was presented in the story named *Greetings from the Hard Drive*. The story depicts a technology that enables one to make several copies of oneself in the virtual space, and thus form optimal working teams that, basically, contain multiple copies of one person. Hence, the copied minds of a talented researcher could act as an effective and mentally aligned research group:

> They seem to work well together and have a good work ethic, but the same is true of all of us, being as we are copies of one and the same person. That's probably the reason why conflicts are so rare in our association – conflicts only arise when we have been forced to interact with uploaded brains originating from other individuals. Certainly all emulations (as we call them and ourselves) are efficient and have a strong work ethic: the selection process is still strict because it is impossible to upload every single individual on the planet… (BS, 2013, p.257)

The story opens interesting perspectives on what life is and what it means to be human. The punchline of the story is the idea that the working copies are only able to live for the duration of a certain project period. The copies know that they are going to die exactly on the day when the project ends, which explains why they are hungry for experiences in their virtual cosmos. The story opens out toward utopian and dystopian perspectives. The utopian perspective is, obviously, the fact that the 'corporeal people' are freed from labour. The dystopian aspect is the inherent atomisation of the humans, because those who have the instruments to copy do not need anybody else.

In some of the stories, the technology was approached more as an acceleration of present development. There were, for example, depictions of 3D printing as a

future production revolution (BS, 2013, p.181) and the notion of "virtual persons" (who have passed the Turing test) and telepathy as the "next level of social media" (BS, 2013, p.215). A further example was technology called "functional magnetic resonance cinema" that would enable the visualisation, and even feeling, of memories (BS, 2013, p.248).

Surprising futures: the emergence of the unexpected

The third rhetorical strategy emphasised the element of surprise. In the stories, the most used strategy was the idea of a catastrophe. The source of disruption could come in the form of natural disaster or radically changing governance. In *The Angel of Death* society is run by criminal organisations. The source of disruption could also be viewing traditional practices, like agriculture, in a different context. For example, in the story called *Organic Bone Cuttings and Spleen Farms* human organs and bones are cultivated at organ farms for medical purposes. In *The Seed Is Taking Root!* a major disruption in society is caused by the acts of a single individual. The story describes a biological enthusiast, who has the idea of changing Finnish flora by secretly spreading the seeds of non-domestic plants. In the end, the practice results in major biological changes, which are speculated as being caused by a major systemic trend, like climate change (BS, 2013, p.161).

The majority of disruption elements in the stories were characterised in the context of a natural disaster. For example, the story *Rust Sky* depicts a volcanic eruption in the USA, causing a nuclear winter, resulting in massive migration waves. This then leads to negative consequences, like the collapse of societal infrastructure, economic insecurity and rioting. However, there were also stories in which the natural disaster resulted in positive effects, such as in the form of a return to sustainable low-tech cultures. For example, in the story *After the Disaster* a natural catastrophe, probably caused by a meteor collision, disrupts societal structures and, ultimately, leads to a more communal and sustainable way of living. A way to survive in these settings is to return to the traditions of agricultural societies and become competent in low-tech:

> Oh, you want to know how I've managed to survive here on my own for nearly four years? […] I've got that old wood-burning stove to heat my little cottage. I boiled water and cooked food on it. During the cold seasons I slept on a bunk in the kitchen, so I didn't freeze. There's a nice well in the garden where I've got water from most of my life. […] I'm also lucky it's got an old-fashioned hand pump so I could get the water up. (BS, 2013, p.279)

Linear futures: the amplification of a current trend

The fourth rhetorical strategy is called linear futures. The title emphasises an aspect of extending and stretching current trends and presenting some novel views that could be labelled black swans. An example of such a trend is the pervasiveness of neoliberal economic reasoning (see Ahlqvist and Rhisiart, 2015). Along with this reasoning, companies, as forms of organisation, are perceived as superior than other forms of organisation. On this basis, for example, the story *The Incorporation: the origins and consequences of the new geopolitics* depicts a change in

global geopolitics. The change is an outcome of a current trend, a form of extreme marketisation that leads companies and even the rich individuals, to sell and buy entire nation-states for profit and political veto rights. The society in the story is characterised by extreme unevenness in its distribution of resources and power.

Another example of trend amplification is the perception of Finland as "the most Chinese nation in Europe" in the *Chinatown of the Clay Fields*:

> Finland is rapidly becoming the most Chinese country in Europe. […] After the turn of the millennium came the fastest Europeanisation in history. […] Now, thirty years on, Finland is turning into a nation of Chinese immigrants. People drink green tea, while noodles have become more popular than potatoes. […] Several European companies have ended up with the same fate. The list of Chinese-owned brands is a long one: BMW, Harrods, Ikea, Philips and many more. (BS, 2013, pp.66–67)

Education, and resulting changes in working life, have also been much debated in Finland in the last few years and the debate was utilised in the story *Dragon in the Sea of Ash*, which depicts a woman called Kaisa having a hard time finding job – despite her B.A. degree – because she does not speak Chinese (BS, 2013, p.80). A further example of amplification deals with the question of synthetic additives in foodstuffs. The story *I Love You, Additive E1609* describes a synthetic meat product Granedo, containing a synthetic ingredient that drives people to addiction and egoism.

In our analysis, we also observed positions that could be called twists in current trends. One such twist was presented in the story *The Superconductor Age: an extract from the unabridged encyclopaedia*. The story describes the invention of a superconductor-based technology, leading to a new energy-abundant age. This position could be defined as a combination of technological utopianism and alternative energy futures:

> The energy crisis, which had lasted for centuries and worsened over time, was solved at once with the development of a superconductor that did not need to be supercooled to near absolute zero the way previous versions did. […] Thus, fossil fuels came to be replaced by renewable energy sources such as solar, wind, hydroelectric and geothermal energy. […] The mere fact that it was now possible to harness solar energy when previously only a fraction of its potential had been utilised meant that superconductors ensured a practically unlimited energy supply. (BS, 2013, pp.94–95)

Another example was related to healthcare and healthcare technologies. The reduction of the negative effects of aging has long been among the major target in health technologies, *ID – Instantaneous Device* depicts an extreme solution to aging: putting people's bodies, metabolism and cell chemistry in a dormant state by the use of polymer technology. In this state "people could live for millions of years without ageing biologically" (BS, 2013, p.200).

Closing the Cover: Imagining Black Swans

The analysed stories presented a variety of candidates for black swans. A member of the competition's official jury, an experienced critic of sci-fi and fantasy literature, stated that "the most common reason texts were ruled out was that many writers had failed to recognise the concept of the black swan" (Karppanen, 2013, p.309). He categorised the stories into following basic groups: pleas to decision-makers; "pre-digested and spoon-fed" prose (the text strongly emphasised some key idea in all its aspects); manifestos; strategies for the Finnish state; and disaster scenarios.

The members of the official jury also identified dimensions in the stories that seem to spring from the Finnish cultural setting. The first is that the stories were characterised by "negativity" when compared to "typical science fiction writing" (Karppanen, 2013, p.309). The art of negativity can be seen as a typical of Finnish wariness when approaching new issues: through understatement and a refusal to show enthusiasm. A second contextual observation is about the Finnish engineer-oriented culture that springs from the Protestant work ethic (Tiihonen, 2013, pp.300–301).

In our analysis, we did not focus primarily on the writing style or the atmosphere of the stories, but on the conditions for identifying and characterising black swans. When reading the stories, we asked the following question: What are the linkages between the particular black swan characterised in the story and the context of its creation? We used the notion of 'partial perspective' and deployed the classic theory of bounded rationality developed by Herbert Simon.

Indeed, some stories showed that issues at the time of writing had a significant impact in characterising the black swans. A typical example in the stories was the impact of the electoral success of the Finns Party in the 2011 parliamentary election in Finland. This was mostly utilised as a point for underlining ideas such as conservatism and nationalism. Another example was the financial crisis in Greece and speculation about the Greece's potential exit from the Eurozone. This was, perhaps surprisingly, used in several stories.

The analysis of the texts also highlighted absences, revealing bounded rationality. In particular, two absences are worth mentioning here. The first absence was identified by a member of the jury, Tiihonen, who argued that none of the texts pondered the end of jobs in the Westernised world. This is an apt observation because, in the last few years, talk about automatisation and robotisation has increased speculation about the future of work in Finland. The second absence is perhaps even more fundamental. The analysed texts revealed an inability to conceive of viable positive alternatives to the present capitalist economic order. This is evident in the catastrophe-prone atmosphere of many of the stories: alternatives were located only through utter chaos and the complete downfall of societies. Thus, it is perhaps not too extravagant to claim that the market economy and its biopolitical rule of conduct is perceived, in the limited confines of our empirical material, as a sort of natural state – as the normalised baseline of human societies.

Concluding Remarks

In the paper we have discussed the notion of black swans in the context of science fiction. We have put forward the argument that when imagining black swans through narratives, a person is always enmeshed in a web of partial perspectives and bounded rationality. We have demonstrated these points through a case study of the writing competition.

Our results show that certain common frames, like the inherent impact of local knowledge created in a certain spatio-temporal context and the impact of technologies, channel thinking when imagining black swans. Thus it is relevant to ask: Is it ontologically possible to identify black swans, or are they something else?

However, imagining black swans *ex ante* is not a futile effort. The effort is important especially from the strategic perspective due to the fact that contemplating surprising events will, in the end, widen the horizons of futures thinking and strengthen the realisation that the future always contains elements that cannot be linearly forecast from current events. This is why it is so critical for futures thinking to highlight alternative futures. Even though our thinking about black swans is always restricted by bounded rationality, this contemplation of possible alternatives keeps us aware of the fact that something will change radically in the future and tomorrow is never just a linear progression from today.

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Writing sci-fi and fantasy comes with the privilege of being only limited by your own imagination: the worlds, characters, and plots you can develop are endless. And while thatâ€™s exciting, it can also come with the challenge of too many options â€” with so many possible fantasy story ideas, how do you pick just one to focus on? Hopefully, browsing through the following fantasy writing prompts will give you that lightbulb moment and help you settle on that magic premise. Weâ€™re not just stopping at helping you find the right sci-fi or fantasy plot idea to write about.Â Check out How to Write a Short Story That Gets Published â€” a free, ten-day course by Laura Mae Isaacman, a full-time editor who runs a book editing company in Brooklyn. Stating personal comment of the writer to the story. LANGUAGE FUTURES Introducing personal participant; I, my group, etc Using chronological connection; then, first, etc Using linking verb; was, were, saw, heard, etc Using action verb; look, go, change, etc Using simple past tense. EXAMPLE. Mr. Richards family was on vacation.Â Chasing Black Swans Through Science Fiction - Surprising Future Events in the Stories of a Finnish Writing Competition. Uploaded by. Eduardo Spiller.